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(54) Device for folding the edge of a shoe upper

(57) A device (1) for folding the edge of an upper stretched on a last (2) comprises a pair of plates (3, 4) which can be orientated angularly about a common centre of rotation (C), means (7) for supporting and guiding the plates (3, 4) and means (14) for setting the angular

orientation of the plates (3, 4) about the said common centre of rotation (C). Each plate (3, 4) comprises a front portion (3a, 4a) and a rear portion (3b, 4b) articulated on each other. The device (1) comprises driving means (16) for articulating each front portion (3a, 4a) with respect to each rear portion (3b, 4b).

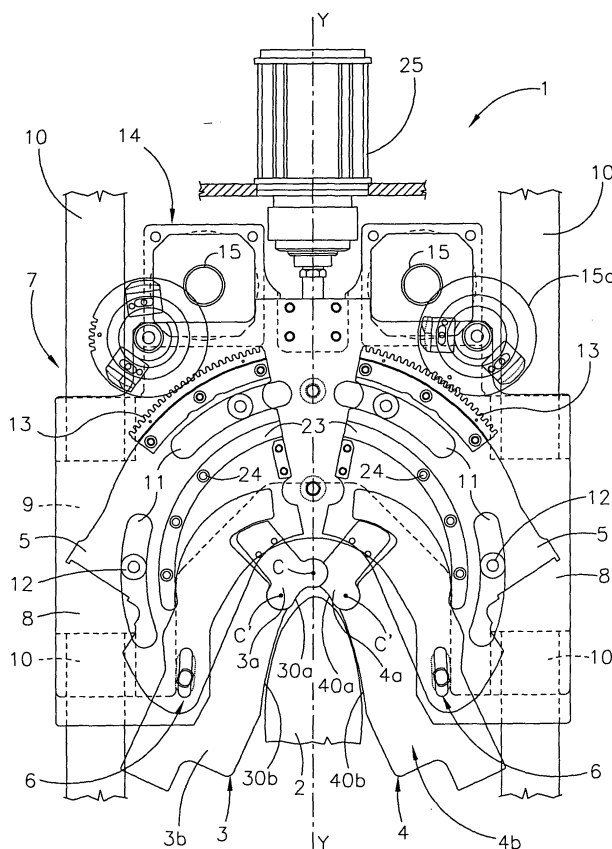


FIG. 1

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Description

[0001] The present invention relates to a device for folding the edge of an upper according to the precharacterizing clause of Claim 1.

[0002] As is known, in shoemaking the upper has to be glued to an insole. For this purpose, the upper is initially stretched on a shoemaker's last on the bottom of which an insole has previously been placed. Subsequently, after adhesive has been spread on the periphery of the insole, the edges of the upper are folded and pressed onto the insole.

[0003] In the known art, the operation of folding and pressing the upper onto the insole is carried out by means of a pair of movable assembly plates which can match the profile and the configuration of the bottom of the last.

[0004] An example of a device for carrying out the aforesaid operation is known from European Patent Application EP-A-585982. This device consists of two symmetrical half-plates which can be orientated angularly with respect to a common centre of rotation and two shaped sliding pieces fitted on the half-plates. During assembly, the two sliding pieces are made to adhere to the hollow area of the last.

[0005] The solution proposed in Patent Application EP-A-585982 has the advantage that a change can be made rapidly from the assembly of a shoe of a given type and size to that of a shoe of another size, or from the assembly of a right-hand shoe to that of a left-hand shoe and vice versa, solely by adjusting the positions of the shaped sliding pieces which adhere to the hollow area. However, this solution is not suitable for folding uppers on lasts which differ considerably from each other in their shape and/or dimensions, for example when the front part of the last has a profile which is more tapered, in other words more pointed, than the last on which the plates have been modelled. It must also be borne in mind that shoes of different shapes and fittings (narrow or wide, for example) may have to be made on lasts of the same size. In both cases considered above, it would be necessary to replace the plates with others having a more tapered configuration, by means of a rather laborious operation which would clearly have to be carried out with the machine stopped and therefore with negative effects on the output of the said machine.

[0006] Thus there is an acutely felt requirement for a device for folding the edge of an upper, which can be adapted to virtually all existing lasts, which differ from each other in their profiles, contours, size and configuration.

[0007] The technical problem underlying the present invention is that of providing a device for folding an upper on a last which has structural and functional characteristics such that it meets the aforesaid requirement while overcoming the drawbacks described with reference to the known art.

[0008] This problem is resolved with a device accord-

ing to Claim 1.

[0009] Further characteristics and the advantages of the device according to the present invention will be made clear by the following description of a preferred example of embodiment of the invention, provided for guidance and without restrictive intent, with reference to the attached figures, in which:

- Figures 1 and 3 show different simplified schematic views of a device for folding an upper on a last according to the present invention,
- Figure 2 shows a schematic view of the device of Figure 1 with some details omitted,
- Figure 4 shows a schematic view of a detail of the device of Figure 1 in a first configuration,
- Figure 5 shows a schematic view of a detail of the device of Figure 1 in a second configuration,
- Figure 6 shows a schematic view of a detail of the device of Figure 1 in two different operating configurations for a first last,
- Figure 7 shows a schematic view of a detail of the device of Figure 1 in an operating configuration for a second last, and
- Figure 8 shows a schematic view of a detail of the device of Figure 1 in two different operating configurations for the second last.

[0010] With reference to the aforesaid figures, the number 1 indicates the whole of a device for folding an upper on a last.

[0011] The last is shown schematically and partially in the figures and is indicated by 2, while the upper which is stretched on the last 2 is not shown in the figures.

[0012] In a wholly conventional way, the last 2 is positioned on a suitable support of the machine with which the device 1 according to the invention is associated. The last 2 is supported in such a way that it has the insole facing downwards.

[0013] The device 1 comprises a pair of plates, indicated jointly by 3 and 4 respectively, coupled together in such a way that they can be orientated angularly like jaws about a common centre of rotation C, and corresponding shaped sliding pieces (not shown in the figures).

[0014] Each plate 3, 4 has a support part or plate support 5 with which it is mechanically associated by coupling means 6.

[0015] Each plate support 5 has a rack 13, along a portion of its outer edge, extending along an arc of circumference having its centre in the common centre of rotation C.

[0016] The plates 3, 4 are mounted on supporting and guiding means, indicated as a whole by 7 (Fig. 1), which comprise a support 8 and a slider 9 which slides on two parallel guides 10.

[0017] Thus the plates 3, 4 and the corresponding plate supports 5 can slide along the parallel guides 10 in the direction indicated by the axis Y-Y in the figures,

so that the group consisting of the plates 4 and the plate supports 5 is brought from a position remote from the last 2 to an advanced position in which the said group is close to the last 2.

[0018] The support 8 has four slots 11, in which two pairs of guide pins 12 are inserted, each pair of pins being integral with a corresponding plate support 5.

[0019] In a preferred embodiment, the slots 11 have a curvilinear shape, corresponding to a portion of semi-circumference having its centre in the common centre of rotation C.

[0020] The plates 3, 4 are movable and can be orientated angularly between a rest position and a working position. In the rest position, the plates 3, 4 are remote from the last 2 and do not engage with the upper. Conversely, in the working position (Fig. 1, Figs. 6 - 8), the plates 3, 4 are located next to the last 2 in such a way that they can engage with at least one peripheral portion of the upper. The plates 3, 4 are designed to fold the edge of the upper onto an insole, not shown in the figures, which is associated with the underside of the last 2.

[0021] For this purpose, the plates 3 and 4 have edges 30 and 40 shaped to follow the profile of the last and to engage with the upper.

[0022] For the angular orientation of the plates 3, 4 between the rest position and the working position, the device 1 comprises means for setting the angular orientation. In a preferred embodiment, the means for setting the angular orientation comprise two electric motors 14, one for each plate, mounted on the slider 9. A pinion 15 is keyed on each shaft of the motors 14 and these pinions are connected mechanically by means of intermediate gears 15a to the toothed sectors 13 to drive them.

[0023] Essentially, the electric motors 14 transmit an angular rotary movement about the common centre of rotation C, by means of the pinions 15, the intermediate gears 15a and the toothed sectors 13, to the plate support 5 and consequently, because of the coupling means 6, to the plates 3, 4.

[0024] The rotary movement of each plate support 5 about the common centre of rotation C is facilitated by the presence of the guide pins 12 inserted in the corresponding slots 11 which, as stated, extend through an arc of circumference having its centre in the common centre of rotation C.

[0025] Advantageously, each plate 3 and 4 comprises at least two portions 3a, 4a and 3b, 4b articulated on each other. In a preferred embodiment, the portions 3a, 4a form corresponding front portions of the plates 3, 4, while the portions 3b, 4b form corresponding rear portions of the plates 3, 4.

[0026] In order to meet specific requirements, each plate can comprise a greater number of portions.

[0027] The front portions 3a, 4a and the rear portions 3b, 4b of each plate 3, 4 are articulated on each other and can be orientated angularly with respect to each other about a corresponding second common centre of rotation C' which is separate from the common centre

of rotation C.

[0028] In other words, the common centre of rotation C' about which the front portion 3a and the rear portion 3b are articulated is separate from the common centre of rotation C' about which the front portion 4a and the rear portion 4b are articulated.

[0029] The rear portions 3b, 4b have edges 30b, 40b which are tapered towards the last 2 and are shaped in the form of curved lines to follow the profiles of the sides of a last.

[0030] In a preferred embodiment, the articulating between the front portions 3a, 4a and the corresponding rear portions 3b, 4b is performed by means of an interlocking connection between complementary profiles, of the male and female type for example. This type of coupling makes it possible to provide an articulation without rotation pins in the centres of rotation C and C'. Advantageously, this permits the use of very thin plates, since the absence of hinge pins makes it unnecessary to provide a partial overlap of the portions 3a, 4a, 3b, 4b at the positions of the articulations centred on C and C'.

[0031] The absence of hinge pins also makes it possible to shape the edges 30b, 40b of the rear portions 3b, 4b and the edges 30a, 40a of the front portions 3a, 4a at the positions of the hinge points. The shaping can be carried out, for example, by milling or equivalent machining operations. It should be noted that such shaping would be impeded by the presence of pins because of the discontinuity of the profiles of the front portions 3a, 4a at the positions of the said pins.

[0032] Advantageously, therefore, the front portions 3a, 4a have edges 30a, 40a which are tapered towards the last 2 and shaped in the form of a curved line to follow the profile of the toe of a last.

[0033] Because of the articulating in the form of an interlocking connection with no pins, the rear portions 3b, 4b can be replaced easily and rapidly, for example in the case of lasts having sides which differ significantly from each other.

[0034] The front portions 3a, 4a can also be replaced in order to meet specific requirements. This may be necessary when lasts having toes shaped in very different ways are to be mounted. With reference to the above description, the advantage of using front portions 3a, 4a which can be orientated and which have shaped edges should therefore be noted.

[0035] In a preferred embodiment, the device 1 according to the present invention is symmetrical about the axis Y-Y on which the common centre of rotation C of the plates 3, 4 lies. Consequently, in order to simplify the description, the device 1 will hereafter be described with reference to the plate 4 only, the description relating to the plate 3 being equivalent.

[0036] Clearly, it is possible, as an alternative to the above, for the device 1 not to be symmetrical about the axis Y-Y and for it to have a pair of plates 3 and 4 whose common centre of rotation C does not lie on the axis Y-Y.

[0037] The articulating of the front portion 4a with re-

spect to the corresponding rear portion 4b is achieved by using separate driving means 16 (Fig. 3) for each plate 3, 4. The driving means 16 act on one of the two portions 4a, 4b, which in the example in Figure 3 is the front portion 4a, in such a way as to orientate one portion angularly with respect to the other about the second common centre of rotation C'.

[0038] Since the two portions of plate 4a and 4b are coupled at the point C', in such a way as to be articulated with respect to each other, and the rear portion 4b is connected to the plate support 5 by the coupling means 6, it is evident that a movement of the front portion 4a of the plate 4 is solely responsible for determining the movement of the rear portion 4b of the plate 4 and its final positioning.

[0039] Essentially, the positioning of the rear portion 4b is solely determined by the positioning of the corresponding front portion 4a.

[0040] Alternatively, in order to meet different requirements, the driving means 16 can act on both plates 4a, 4b simultaneously or sequentially.

[0041] In order to enable the device 1 to operate correctly, the driving means 16 are mounted on the plate support 5 which, as stated previously, is coupled to the plate 4 by coupling means 6.

[0042] Advantageously, the coupling means 6 consist of a link mechanism which connects the plate support 5 to the rear plate 4b.

[0043] In a preferred embodiment, the driving means 16 comprise a pair of motor means, each acting on the respective front plate 4a of the corresponding plate 4.

[0044] Advantageously, the driving means 16 comprise an electric motor 17 (Fig. 3), a bevel gear pair transmission 18, and a worm screw 19.

[0045] In a preferred embodiment, the front portion 4a is connected to a support 20 (Figs. 4, 5) on which a toothed element 21 is mounted.

[0046] The toothed element 21 has, along its outer edge part, a toothed sector 22 extending along an arc of circumference having its centre at the point C, the toothing of this sector engaging with the worm screw 19 (Fig. 3).

[0047] Thus the electric motor 17, acting through the bevel gear pair transmission 18, the worm screw 19 and the toothed sector 22, can impart a rotary movement about the common centre of rotation C to the front portion 4a of the plate 4.

[0048] Since the driving means 16 are mounted on the plate support 5, the rotary movement of the front portion 4a of the plate 4 about the centre of rotation C causes a change in the angular orientation of the said front plate 4a with respect to the rear portion 4b about the common centre of rotation C'.

[0049] Figures 4 and 5 show the plates 3, 4 in two different configurations. In particular, in the movement from the configuration of Figure 4 to that of Figure 5, the front portions 3a, 4a are rotated about the common centre of rotation C in such a way as to change the angular

orientation of the said front portions 3a, 4a with respect to the corresponding rear portions 3b, 4b about the corresponding centres of rotation C'.

[0050] The driving means 16 therefore make it possible to modify the profile of the front part of the pair of plates 3, 4 by acting on the corresponding portions 3a, 4a, thus adapting the device 1 to lasts whose toes differ significantly from each other (Figs. 4 and 5 and Figs. 6-8).

[0051] To enable the plates 3 and 4 to be adapted to lasts having front profiles which differ significantly from each other, as in the case of square-toed or extremely pointed profiles, in a particular advantageous embodiment the extension of the edge 30a, 40a of the front portions 3a, 4a is smaller than the extension of the edge 30b, 40b of the rear portions 3b, 4b.

[0052] Thus the profile of the front part of the pair of plates 3, 4 can be finely adjusted to adapt it to the profile of the toe of the last to be mounted.

[0053] Advantageously, each plate support 5 has a slot 23 (Figs. 6-8) into which is inserted a male guide sector (not shown in the figures) fixed to the support 20 with fixing screws 24. The male guide sector is therefore integral with the front portion 4a.

[0054] Thus the rotation of the front portion 4a about the common rotation point C is guided by means of the male guide sector slidable in the slot 23 with respect to the corresponding plate support 5.

[0055] Advantageously, the slots 23 have a curved shape corresponding to a portion of semi-circumference having its centre in the common centre of rotation C.

[0056] In order to move the plates 4 from the rest position to the working position, an electric motor 25 (Figs. 1-3) coupled to the slider 9 by a recirculating balls screw and nut screw system, is fixed to the frame of the machine, which is shown only partially in the figures.

[0057] Since the guides 10 are also fixed to the frame, by means which are not shown, the operation of the motor 25 causes the whole assembly consisting of the plates 3, 4 and the plate support 5 to move on the guides 10, in such a way as to bring the plates 3, 4 from the rest position to the working position next to the last 2 (Fig. 1, Figs. 6-8).

[0058] In a particularly preferred embodiment, the electric motor 25, the electric motors 14 and the driving motors 16 are made subordinate, by suitable connecting and control means, to a control unit, for example a programmable electronic unit, in such a way that they can be operated by this unit independently of each other according to a predetermined operating program.

[0059] The angular orientation of the pair of plates 3, 4 about the common centre of rotation C is advantageously carried out during the advance of the assembly consisting of the plates 3, 4 and the plate support 5 along the guides 10 towards the last 2 from the rest position to the working position.

[0060] Alternatively, the angular orientation of the pair of plates 3, 4 is carried out before the commencement

of the advance of the assembly consisting of the plates 3, 4 and the plate support 5 along the guides 10.

[0061] The articulating of the front portion 4a with respect to the rear portion 4b, in other words the angular orientation of the portions 4a, 4b about the common centre of rotation C', is carried out advantageously, for the plate 4, before the advance of the assembly consisting of the plates 3, 4 and the plate support 5 along the guides 10 towards the last 2.

[0062] The front portion 3a is articulated in a similar way with respect to the rear portion 3b for the plate 3.

[0063] However, it is also possible to make further adjustments to the angular orientation of the portions 4a, 4b of the plate 4 and the portions 3a, 3b of the plate 3 about the centre of rotation C' even when the plates 3, 4 are in the working position.

[0064] For example, a micro-adjustment can be made when there is a change in the shoe size, while the macro-adjustment is made before the advance of the plate support assembly.

[0065] In particular, the machine operator can store in the control unit a set of last profiles by acting on the driving means 16 in such a way as to change the angular orientation of the portions 4a, 4b and of the portions 3a, 3b about the corresponding centre of rotation C'.

[0066] These data will then be used whenever a predetermined model of last needs to be mounted.

[0067] Advantageously, different last profiles can be set for the plate 3 and for the plate 4. The device 1 according to the present invention is therefore particularly suitable for mounting asymmetrical lasts, since it is possible to set different profiles for plates 3 and 4 by acting in different ways on the corresponding portions 3a, 3b and 4a, 4b. The device 1 according to the present invention is easily adapted to working with a right or left last.

[0068] In the operation of the folding device 1 according to the present invention, the operator positions, on the support of the machine to which the device 1 is fitted, a last 2 on which an upper is stretched, and under which is placed an insole to which an adhesive has been applied in advance.

[0069] The operator then selects from the set of last profiles stored in the control unit the profile suitable for the last to be mounted. Following this selection, the driving means 16 are operated to change the angular orientation of the front portions 3a, 4a with respect to the rear portions 3b, 4b about the common centre of rotation C'. Thus the pair of plates 3, 4 is in what is known as an "encircling" position; in other words the plates are positioned to engage the edges of the upper.

[0070] Alternatively, the driving means can sequentially drive first the front portion 3a and then the front portion 4a, or vice versa.

[0071] It is also possible to drive only one of the two front portions 3a, 4a.

[0072] In both cases, the electric motor 25 and the means for setting the angular orientation 14 of the plates

3, 4 about the common centre of rotation C are operated simultaneously to bring the plates 3, 4 from the rest position in which the plates 3, 4 are remote from the last 2 to the working position in which the plates 3, 4 engage a portion of the upper to fold the edge of the upper onto the insole.

[0073] Clearly, the means for setting the angular orientation 14 act on the pair of plates 3, 4 in such a way as to change the angular orientation of the said plates 3, 4 about the common centre of rotation C without changing the relative angular orientation of the corresponding front portions 3a, 4a and rear portions 3b, 4b about the common centre of rotation C'.

[0074] When the plates 3, 4 are in the working position in which they encircle the upper, the means for setting the angular orientation 14 of the plates 3, 4 are operated to close the plates 3, 4 like jaws, in such a way as to bring them to the "end of closing" position.

[0075] At the same time, the tensioning pincers are released so that the upper can be folded on the last 2 and pressed firmly against the insole in such a way that it adheres to the latter, owing to the adhesive previously applied.

[0076] Figures 6 and 8 show, on the left-hand side, the plate 3 in the "encircling" position and, on the right-hand side, the plate 4 in the subsequent "end of closing" position.

[0077] Figures 1 and 7, on the other hand, show the plates 3, 4 in the "encircling" position for two lasts 2 with different toe shapes.

[0078] It should be noted that the angle set between the portions 3a, 3b and 4a, 4b can be different in the "encircling" position to approximate the profile of the last 2 and in the "end of closing" position to adhere in the best possible way to the bottom of the last 2, in other words to the insole.

[0079] As the above description makes clear, the device according to the present invention makes it possible to meet the requirements and overcome the problems mentioned above in the introduction to the present description with reference to the known art.

[0080] The advantages obtained from the use of the folding device according to the present invention lie principally in the fact that it is unnecessary to replace the plates when there is a change in the configuration of the front part of the last to be mounted, even in the case of lasts having extremely pointed or square toes, and in the fact that asymmetrical lasts can be encircled by forming different profiles for the right- and left-hand plates.

[0081] The device according to the present invention is also particularly suitable for mounting asymmetrical lasts.

Claims

1. Device (1) for folding the edge of an upper stretched

on a last (2), the said device (1) comprising:

- a pair of plates (3, 4) which can be orientated angularly about a common centre of rotation (C) like jaws, the said plates (3, 4) being capable of being moved and angularly orientated between a rest position in which the plates (3, 4) are remote from the last (2) and a working position in which the plates (3, 4) engage with at least a portion of the upper,
- means (7) for supporting and guiding the plates (3, 4),
- means (14) for setting the angular orientation of the plates (3, 4), capable of angularly orientating the said pair of plates (3, 4) about the said common centre of rotation (C),

characterized in that

each plate (3, 4) comprises at least two portions (3a, 3b, 4a, 4b) articulated on each other, and **in that** the said device (1) comprises driving means (16) for articulating one portion with respect to the other.

2. Device (1) according to Claim 1, in which the said at least two portions (3a, 3b, 4a, 4b) form a front portion (3a, 4a) and a rear portion (3b, 4b) articulated and capable of being orientated angularly with respect to each other about a second common centre of rotation (C').
3. Device (1) according to Claim 2, in which the articulation between the said front portion (3a, 4a) and the said rear portion (3b, 4b) is performed in the form of an interlocking connection without pins.
4. Device (1) according to Claim 2 or 3, in which the said front portion (3a, 4a) and said rear portion (3b, 4b) have corresponding edges (30a, 40a) and (30b, 40b) shaped to follow the profiles of the toe and the sides of the last respectively.
5. Device (1) according to Claim 4, in which the extension of the edge (30a, 40a) of the front portion (3a, 4a) is smaller than the extension of the edge (30b, 40b) of the rear portion (3b, 4b).
6. Device (1) according to any one of Claims 2 to 5, in which the front portion (3a, 4a) can engage with the toe of the last (2).
7. Device (1) according to any one of Claims 2 to 6, in which the said driving means (16) for articulating act on each front portion (3a, 4a) to enable it to rotate about the said common centre of rotation (C) in such a way as to change the angular orientation of the front portion (3a, 4a) with respect to the corresponding rear portion (3b, 4b) about the said common centre of rotation (C').
8. Device (1) according to any one of Claims 1 to 7, in which the said driving means (16) are motor means.
9. Device (1) according to Claim 8, in which the said driving means (16) comprise an electric motor (17), a bevel gear pair transmission (18) and a worm screw (19).

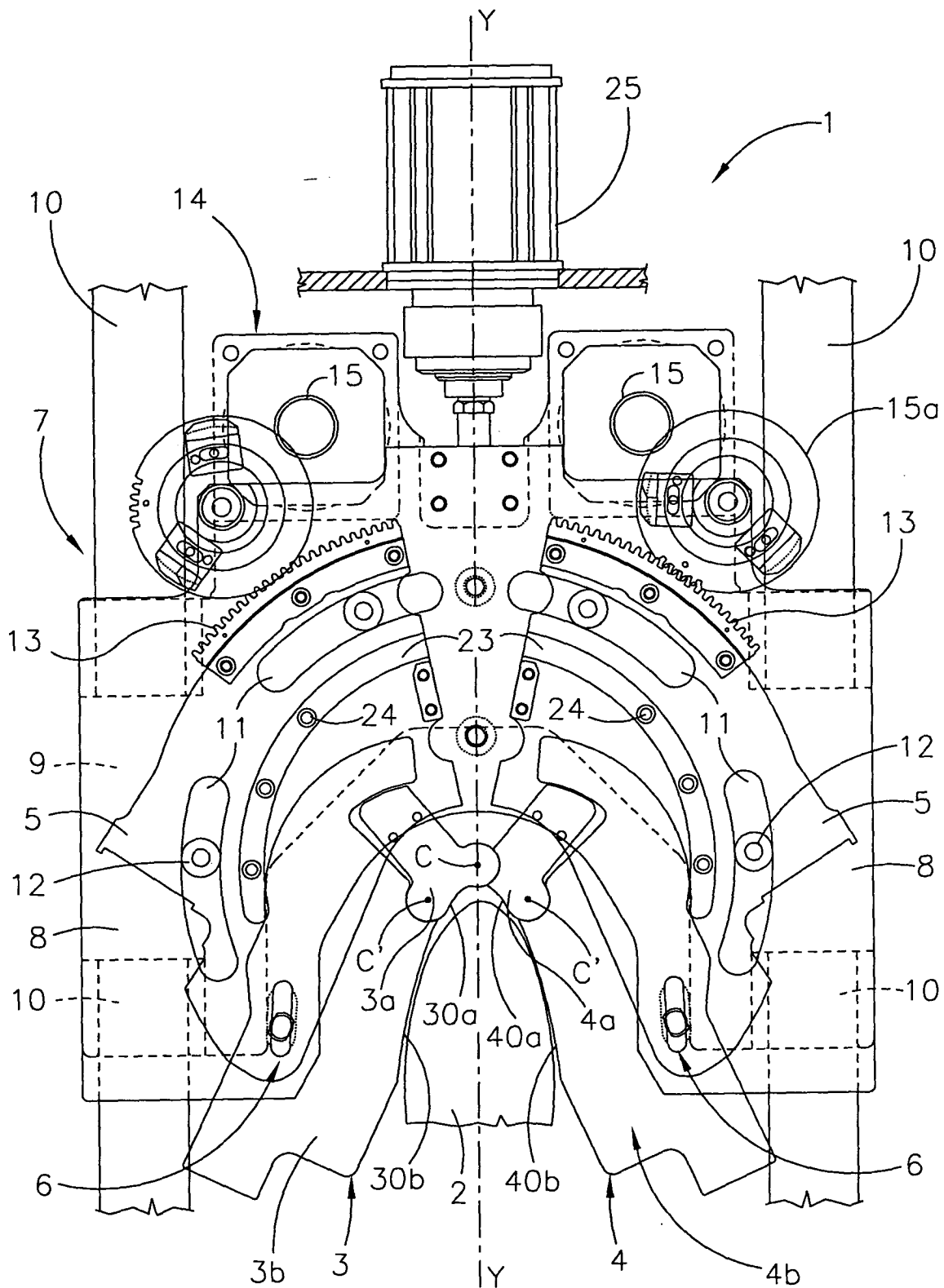
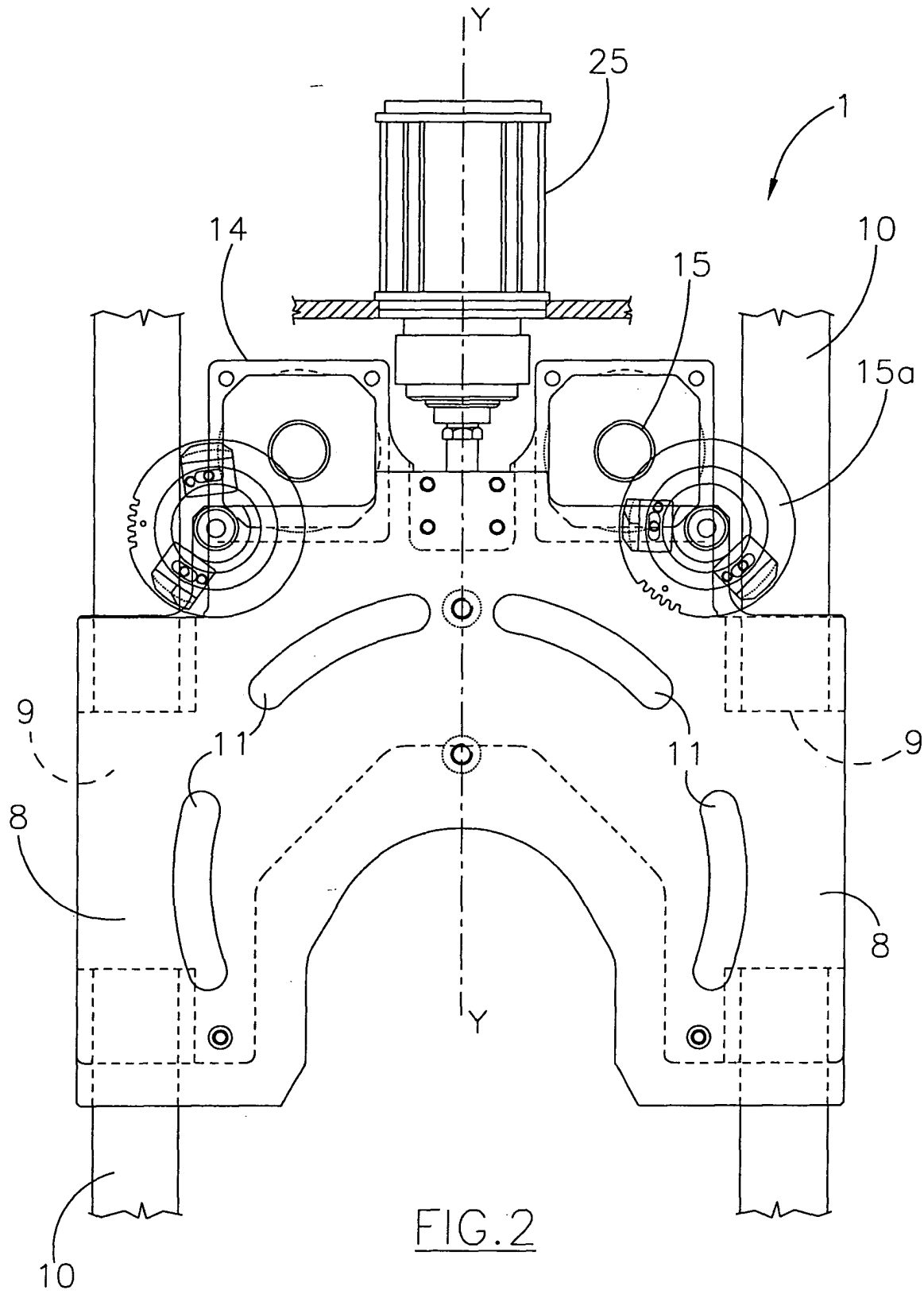
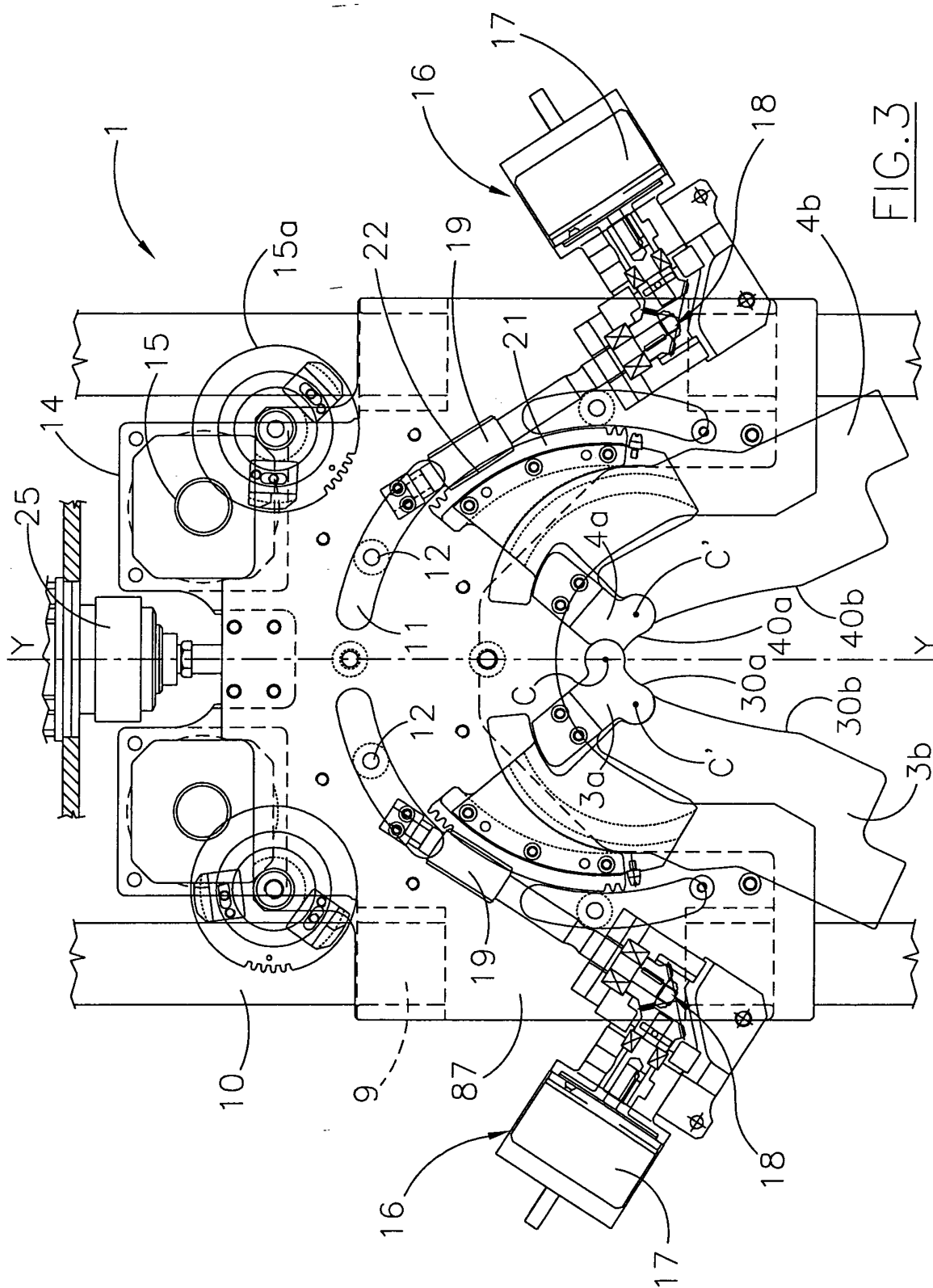


FIG. 1



FIG. 3

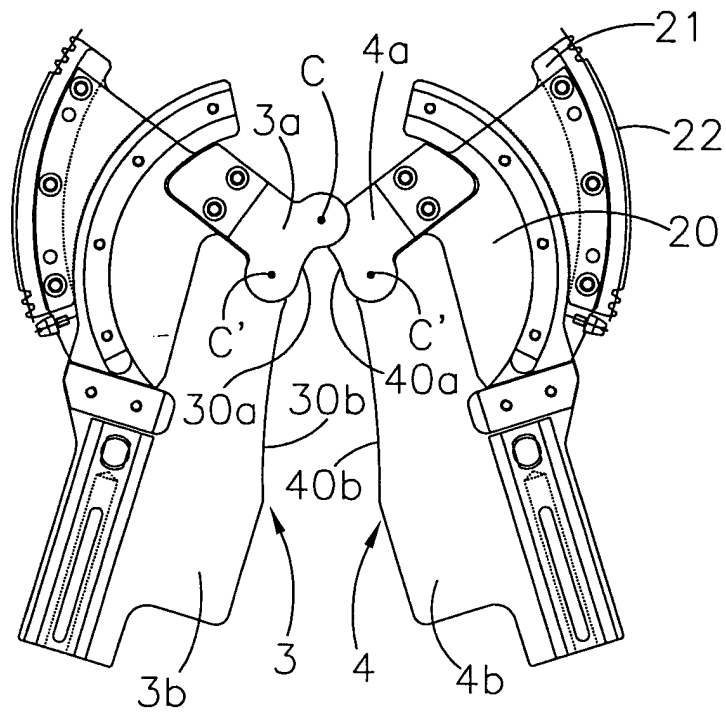


FIG. 4

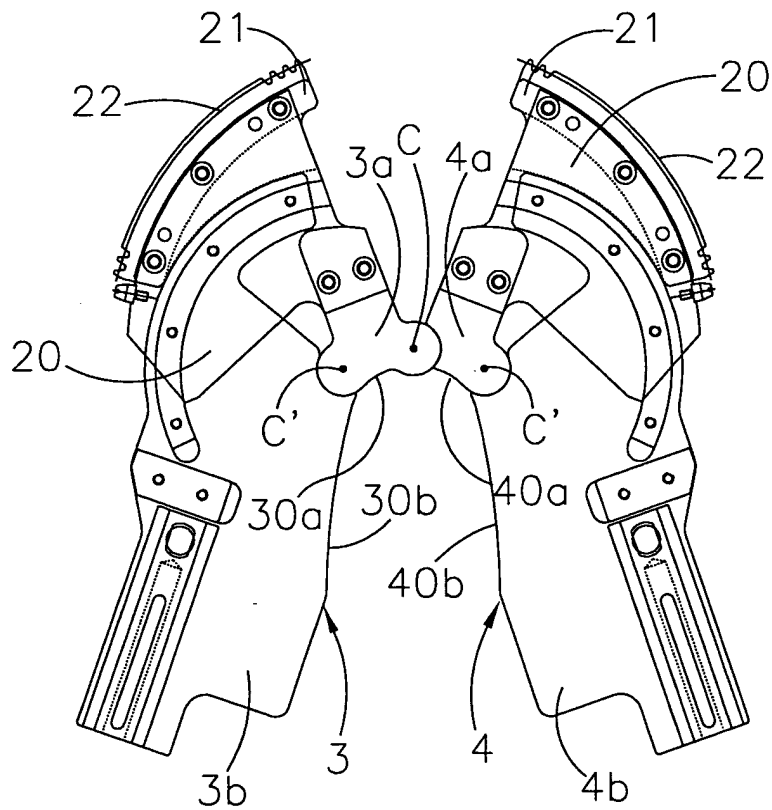


FIG. 5

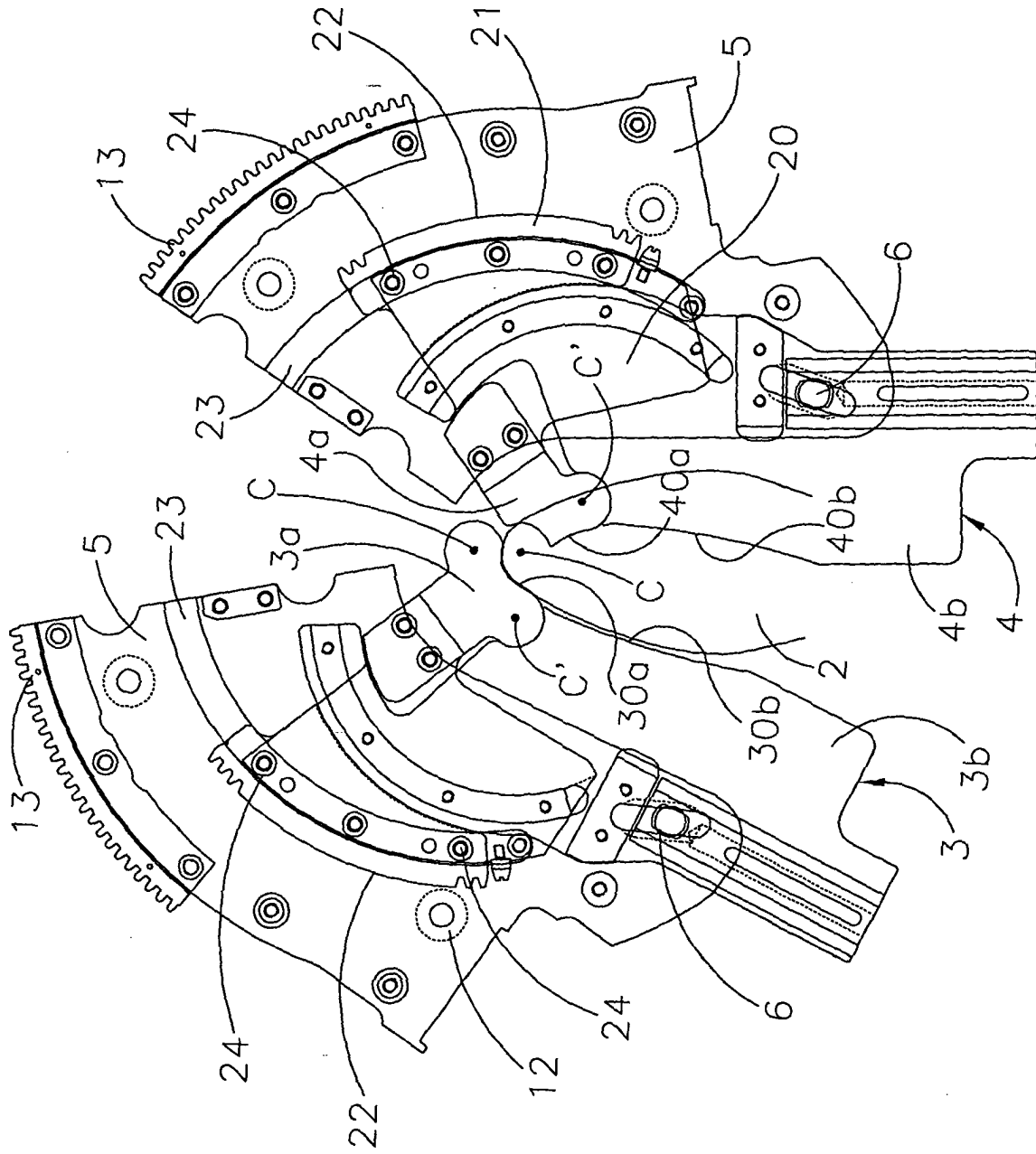
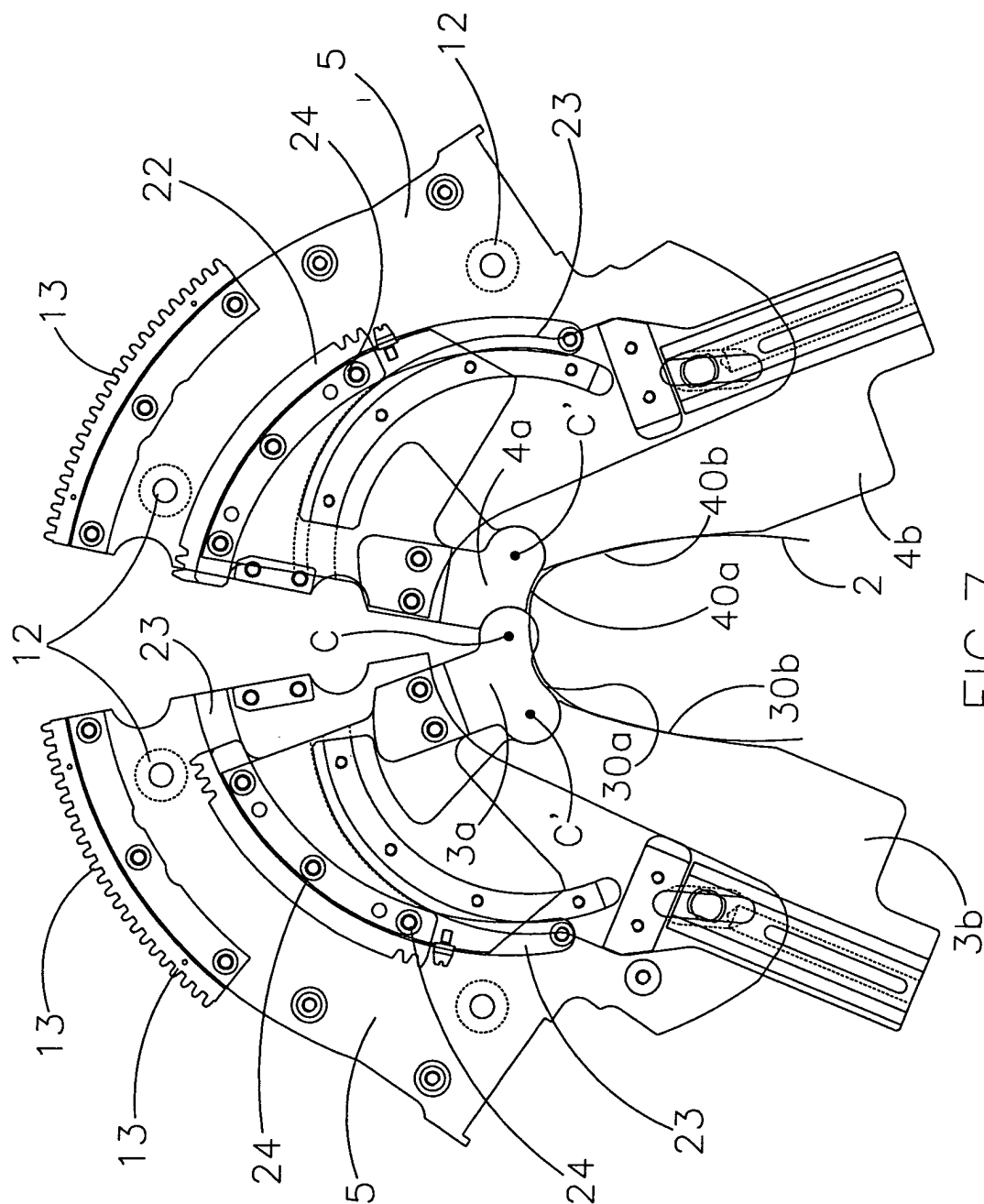
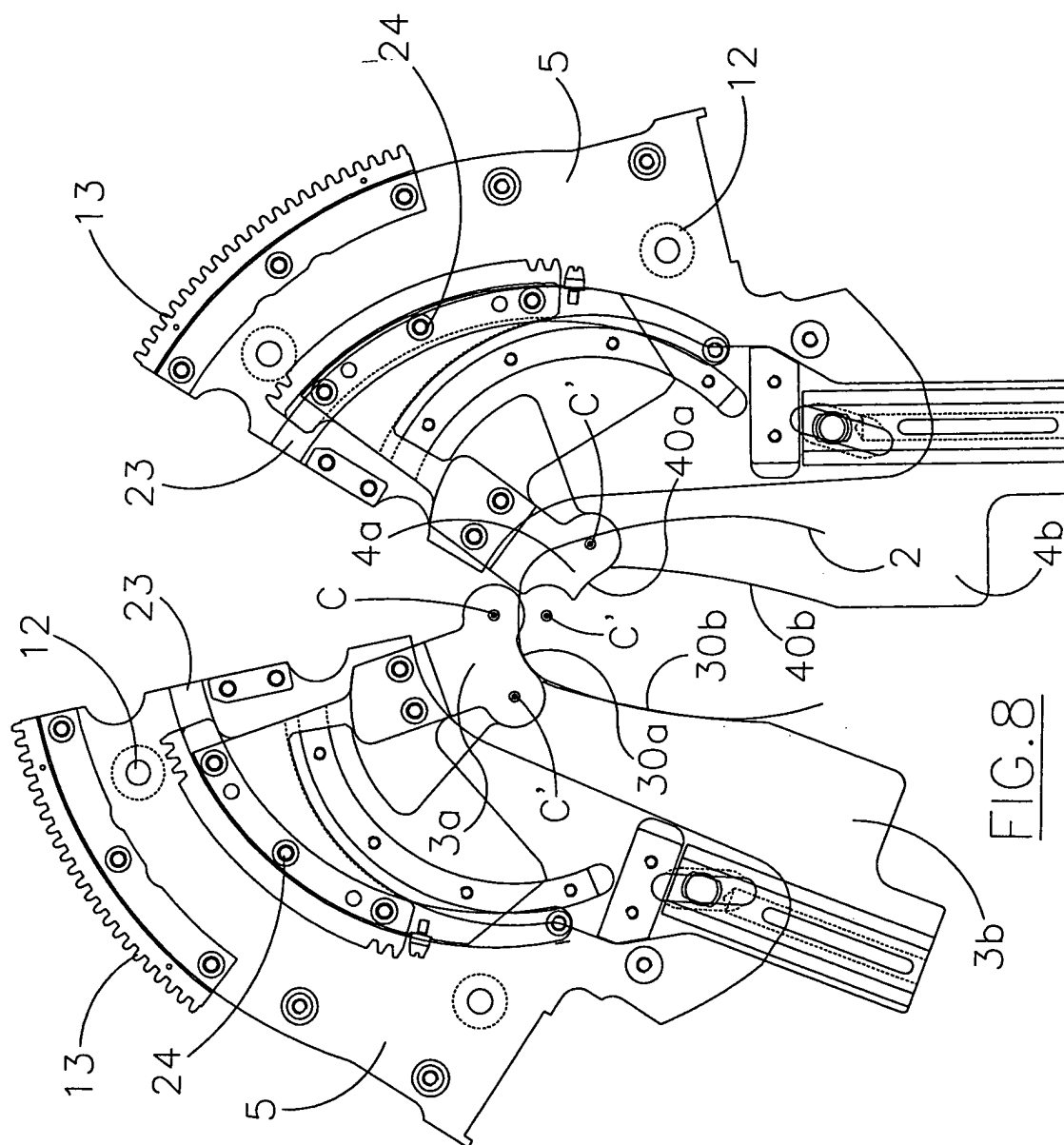


FIG. 6







European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 03 42 5410

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.7)
X	EP 0 338 722 A (DVSG PATENTVERWALTUNGS GMBH ;VER SCHUHMASCH GMBH (DE); BRITISH UNI) 25 October 1989 (1989-10-25) * column 7, line 20 - column 13, line 19; claims; figures 2,3 *	1-9	A43D23/02
X	US 3 434 169 A (TEERLING MARTINUS ET AL) 25 March 1969 (1969-03-25) * column 3, line 71 - column 6, line 66; claims; figures 1,2 *	1,2,4-7	
X	GB 2 105 572 A (MOENUS TURNER MASCHF) 30 March 1983 (1983-03-30) * page 2; claims; figures *	1,2,4-6	
X	US 5 722 103 A (WALEGA WILLIAM) 3 March 1998 (1998-03-03) * figures 7,9,10,24-33 *	1,2,7	
D,A	EP 0 585 982 A (MOLINA & BIANCHI SPA) 9 March 1994 (1994-03-09) * the whole document *	1-9	TECHNICAL FIELDS SEARCHED (Int.Cl.7) A43D
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 21 November 2003	Examiner Herry, M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 42 5410

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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21-11-2003

Patent document cited in search report		Publication date		Patent family member(s)	Publication date
EP 0338722	A	25-10-1989	DE	68923644 D1	07-09-1995
			DE	68923644 T2	11-01-1996
			EP	0338722 A2	25-10-1989
			KR	9702514 B1	05-03-1997
			US	5025521 A	25-06-1991

US 3434169	A	25-03-1969	DE	1685440 A1	13-05-1971
			FR	1513783 A	16-02-1968
			GB	1171949 A	26-11-1969

GB 2105572	A	30-03-1983	DE	3131696 A1	03-03-1983
			BR	8204700 A	02-08-1983
			FR	2511230 A1	18-02-1983
			IT	1155746 B	28-01-1987

US 5722103	A	03-03-1998	NONE		

EP 0585982	A	09-03-1994	IT	1256128 B	29-11-1995
			BR	9301885 A	22-03-1994
			EP	0585982 A1	09-03-1994

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82