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

(11) Publication number: **0 416 641 A1**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **90117259.3**

(51) Int. Cl.5: **D05B 39/00**

(22) Date of filing: **07.09.90**

(30) Priority: **08.09.89 IL 91564**

(43) Date of publication of application:
13.03.91 Bulletin 91/11

(84) Designated Contracting States:
DE FR GB

(71) Applicant: **BETA ENGINEERING & DEVELOPMENT LIMITED**
P.O.Box 98 Hashalom Street Corner of Derech Hacharoshet
Beersheva(IL)

(72) Inventor: **Netzer, Yossef**
1, Aliza Tager Street
Ashkelon(IL)

(74) Representative: **Michelotti, Giuliano et al**
c/o SAIC BREVETTI S.r.l. Viale Bianca Maria 15
I-20122 Milano(IT)

(54) A workholder for necktie sewing and clamp therefor.

(57) A workholder for the combined tipping and assembly of the segments forming a necktie comprises a big tipping clamp, a small tipping clam, and two or more connection clamps. A tipping clamp useful in automated sewing machines is also described.

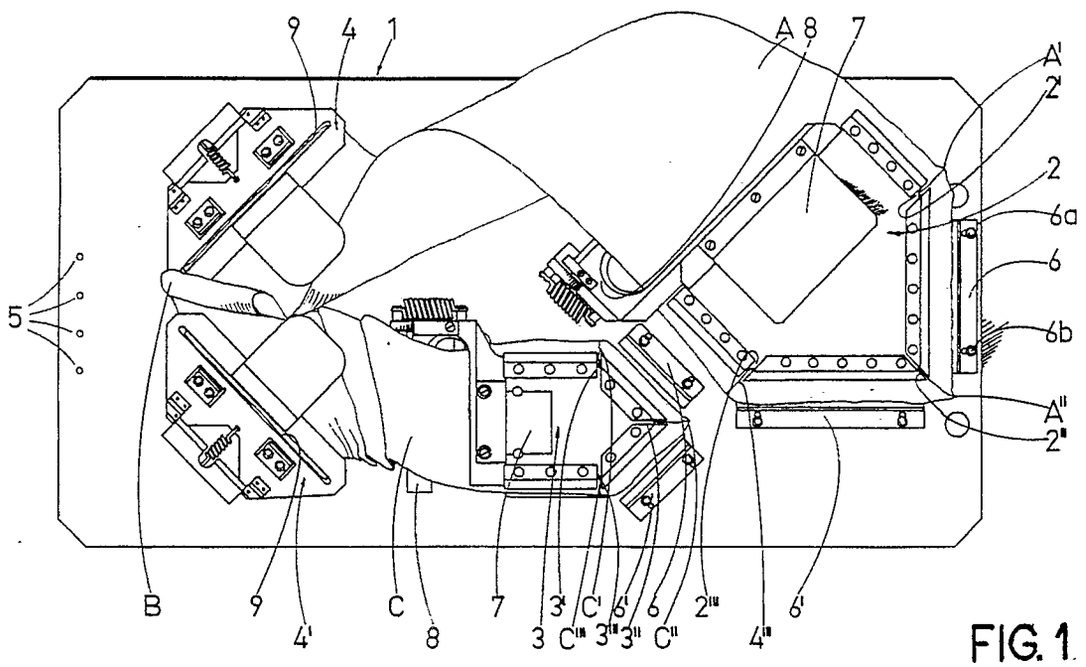

FIG. 1

EP 0 416 641 A1

A WORKHOLDER FOR THE COMBINED TIPPING AND ASSEMBLY OF THE SEGMENTS OF A NECKTIE AND TIPPING CLAMP THEREFOR

The present invention relates to a workholder which is adapted to be used with automated sewing machines, particularly for sewing together different segments that constitute a necktie, and simultaneously carrying out the tipping operation thereon.

Tipping clamps for sewing together the tip area of a tie with a lining are known in the art. Two such clamps are known, e.g., from U.S. Patent Nos. 4,574,717 and 4,644,885. The purpose of these clamps is to permit to effect the tipping of the tie, viz., the sewing together of the tip of the tie with a lining, with the desired shape. However, creating a tie requires not only to effect the tipping of the two ends of the tie, but also the assembly of three different segments of the tie: a big end-segment, small end-segment and an intermediate segment which connects them. This, according to the known art, is done by effecting the tipping of the large end-segment of the tie, the tipping of the small end-segment of the tie, and then the connection of the end-segments with an intermediate segment, by sewing them together. When working according to the known art, therefore, different workstations must effect the different stages of this necktie creation. This has severe drawbacks, the major of which is that time is wasted by the large number of separate operations made by a number of operators, at different workstations. Furthermore, known tipping clamps, which are used for effecting the tipping of the end-segments of the tie, are complicated and are not suitable for entirely automated operation.

It is an object of the invention to provide a workholder which overcomes the aforesaid disadvantages, and which permits to effect the combined tipping and assembly of the segments forming a necktie by means of an automated sewing machine, in one workstation. Alternatively, the same workholder may be used in more than one workstation to assemble the necktie in more than one step.

It is another object of the invention to provide a tipping clamp which can be used in automated operation, and which is simple in construction and in operation.

The workholder for the combined tipping and assembly of the segments of a necktie according to the invention comprises together on a workholder base a big tipping clamp, a small tipping clamp and at least two connection clamps. The big tipping clamp is adapted to effect the tipping of the big end-segment of the tie, the small tipping clamp is adapted to effect the tipping of the small end-segment of the tie, and the two connection clamps are adapted to connect the intermediate segment of the tie to the small end-segment on one side and the big end-segment on the other side. While any convenient tipping clamp can be used according to the invention, such as those described in the aforesaid U.S. patents, the clamp according to the invention, which will be described below, is preferred. The reason is that the clamp of the invention, or a comparable one, affords means for the automated opening of the clamps, which will be described hereinafter, and which, it will be understood, is a convenient feature of the invention.

As will be appreciated by a person skilled in the art, some important advantages of the invention can be retained also if not all sewing operations are carried out on a single workholder. Thus, for instance, it is possible to provide one workholder on which the two tipping clamps are provided, and another workholder on which the two intermediate clamps are provided. Thus, in this situation, one operator would feed the material needed for the tipping to the tipping clamps, and then a second operator would take the already-tipped ends of the tie and the intermediate portion of the tie, and position them in the intermediate clamps, so as to complete the sewing of the necktie. Alternatively, two separate workholders can be provided, each of which contains a tipping clamp and an intermediate clamp. When first tipping and connection of one end of the intermediate segment is effected, the material can be transferred to the second workholder in which connection of the intermediate section is completed, and tipping of the second end is effected.

Furthermore, in different necktie productions, it may be possible to use different segments. Thus, if more than one intermediate segment is provided, one or more additional intermediate clamps must be provided. These variations, however, are within the scope of the skilled engineer, and therefore throughout the following description reference will be made to workholders which are designed for the sewing of neckties having only one intermediate segment, and it is understood that any variations or deviations from this type of operation are within the skill of the routineer.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The invention will be now described in detail through preferred embodiments, which are intend-

ed to be illustrative and not limitative, with reference to the appended drawings wherein:

- Fig. 1 shows a workholder in the working position, the tie segments being mounted thereon;
- Fig. 2 shows the workholder of Fig. 1 in the closed position, the segments of the necktie having been removed;
- Fig. 3 shows the clamps of the workholder of Figs. 1 and 2 in the open or released position, the tie having been removed;
- Fig. 4 shows the intermediate plate of a clamp according to one embodiment of the invention;
- Fig. 5 shows the intermediate plate of a clamp according to another embodiment of the invention; and
- Fig. 6 is a detail of Fig. 5.

With reference now to Fig. 1, the workholder base plane is generally indicated by 1, and bears a big tipping clamp 2 and a small tipping clamp 3. The two connection clamps are indicated by 4 and 4′.

The workholder may have different parts, holes, and the like, which may be used for its displacement on the working plane of the sewing machine. For instance, it will have a number of holes 5, which are used to connect the workholder to the x-y apparatus which moves it relative to the sewing needle, during sewing operation. The area of the tip of each of the end-segments of the tie is delimited on the workholder by ribs 6 and 6′, which will be used by the operator to position both the lining and the end-segment of the tie, before sewing. An advantage of the invention is that the ribs 6 and 6′, which delimit the area in which the lining and necktie material to be sewn are positioned by the operator, can be moved, e.g., by providing fastening means such as bolts 6a and 6b, shown in Fig. 1. Thus, the actual area in which the material to be sewn must be placed can be delimited easily and changed at will, and the operator will only have to make sure that the material placed in the tipping clamp is found between these delimiting ribs. This, of course, will avoid many mistakes and mispositioning on the part of the operator. Handle-like means 7 can conveniently be provided on each of the upper covers of the clamps, to assist the operator in rotating and locking it. As can be seen in Fig. 1, the first, big end-segment of the tie, A, is fastened in the clamp between the intermediate plate and the upper cover. The lining, not seen in the figure, is likewise located between the lower plate and the intermediate plate. The lower plate, conveniently, will be an area of the workholder, but an additional plate can be added, which can be fastened onto the workholder plane. The end-segment A will then be fastened at its second end in the connecting clamp 4. It should be noted that the tipping clamp should be shaped in a way that the end-segment can conveniently be extended out of the clamp. For this purpose, in the embodiment of Fig. 1 the lower portion of the upper cover of the tipping clamps 2 and 3, indicated by 8, has a shape of a **U**, one of the sides of which is hinged on the workholder. So, the large end-segment A and the small end-segment C can extend outside the clamp through the middle of this **U**. The middle segment B of the tie is also held in the connection clamp 4 on one side, and in the connection clamp 4′ on the other side. It should be noted that sewing in these clamps is done through a slot 9. The small end-segment C of the tie is, in turn, positioned so that the end to be tipped is located in the tipping clamp 3, and the other end, together with the second end of the middle portion B, is found in connection clamp 4′.

The upper cover of the tipping clamp 2 has three slot-like openings 2′, 2″ and 2‴, in which, as will be explained hereafter, the fabric of the end tip A is folded, and folds A′, A″ and A‴ are formed. These folds are necessary to provide the appropriate shape of the sewn tip. The same is found in tipping. clamp 3, in which the openings are marked 3′-3‴, and the folds C′-C‴.

Fig. 2 is provided to show the workholder of Fig. 1, the segments of the necktie having been removed. In this figure it is possible to see a number of other details, which are covered by the fabric in Fig. 1. Turning first to the **U**-shaped portion 8 of the upper covers, in each of them there can be seen a spring 23 which is responsible for the maintaining of the upper cover in the open position. The upper cover rotates around, the hinge 24 to which the spring 23 is attached. An additional hinge 25 is, seen, which belongs to the intermediate plate (not seen in the figure). The intermediate plate rotates around this hinge, the other part of which, 25′, is fastened to the plane of the workholder.

Similarly, the connecting clamps 4 and 4′ are provided with springs 26, which apply force thereon, and which tend to keep the clamp in a closed position.

A slot 27 is provided along the sewing lines of the tip of the tie, surrounding the large tipping clamp 2. In this slot 27 the sewing needle will move when sewing together the fabric of the necktie and the lining.

Similarly, a slot 28 is provided surrounding the parameter of the small tipping clamp 3.

The workholder of Figs. 1 and 2 is shown in Fig. 3 in its open position. The lower plates 10 and 10′, and the intermediate plates 11 and 11′, are clearly seen in this figure. The figure also shows four holes 12-12‴, positioned near each of the clamps. These holes are provided so as to permit a

piston or the like device to apply a force or a blow on the clamp, and to cause it to open and to release the material it holds. In this way, when the operator receives the workholder, either he opens the clamps manually, or the separation is automatically effected when the workholder reaches a predetermined position. At this stage, the operator removes the tie, the pieces of which have been sewn together, from the workholder. The workholder is now ready for charging operations.

When charging the workholder, the operator will place the appropriate pieces of lining on the lower plates 10 and 10′, so as to fit the ribs 6 and 6′. Then, he will apply a pressure on the intermediate plates 11 and 11′, and cause them to be fastened on the plane of the workholder. He will then position the end-segments of the tie in the tipping clamps on the intermediate plates 11 and 11′, again taking care to bring them in a position in which the ribs 6 and 6′ delimit the perimeter of the segment. The upper covers 13 and 13′ will then be pushed down and closed, and the other non-terminal end of each of the two end-segments will be brought to the connection clamps 4 and 4′. The end of these end-segments will then be placed on a working base 14, which may be common to the two connection clamps - or each connection clamp may have one of its own - which is similar to the lower plate 10 of the tipping clamp. These lower plates may be partially covered with fabric, to facilitate the positioning of the end segments thereon. The middle segment B of the necktie (see Fig. 1) will then also be positioned between the two connection clamps 4 and 4′, so that its ends match each one end of the end-segments A and C (of Fig. 1). The clamps 4 and 4′ will then be closed. Now, the workholder is ready for operation, it is taken to the sewing machine, the x-y system moves the workholder, and the sewing operations are effected, according to the predetermined program even to the sewing machine, and in the order given. In practice, the sewing that will have to be effected will include the contouring of the tips of the necktie, viz., sewing along the perimeter of the tie which protrudes outside the tipping clamps (slots 27 and 28), and connection of the various segments of the tie, by sewing along the slots 9 of connection clamps 4 and 4′.

Figs. 4 and 5 illustrate tipping clamps according to two embodiments of the invention. In Fig. 4, the intermediate plate 11 is shown. This intermediate plate comprises a hinge 25, around which the plate rotates from a closed position, which is superimposed on the lower plate 10, to an open position, at an angle with the workholder. This intermediate plate has two ribs 16 and 16′, along the perimeter of its tip. These two ribs define two sides of a triangle. This triangle is of importance in obtaining the correct shape of the tie, as is well known to persons skilled in the art. In order that an appropriate shape be obtained, it is necessary to provide the small folding at the apexes of the triangle defined by ribs 16 and 16′, as explained before with reference to Fig. 1. This is done, according to this embodiment of the invention, by providing retractable tips 17 and 17′, and central tip 15. The tip 15, according to this embodiment of the invention, is not retractable, but it can be moved outwards and inwards by adjusting screws 15′. The retractable tips 17 and 17′, on the other hand, are pushed outwards by the action of displacing means 18 which, when the intermediate plate 11 is brought into contact with the lower plate 10, move outwards, e.g., because of their conical cross-section, as explained hereinbelow with reference to Fig. 6, or in any other way known to the skilled person. The action of the springs 19, on the other hand, is such that, when the intermediate plate 11 rotates upwards away from the lower plate 10, they tend to retract the tips 17 and 17′ inwards. If, e.g., the displacement means 18 have a frustoconical shape, when this plate is released the pressure of the spring 19 will tend to push the displacement means 18 downwards, and thus the body of the tip 17 will be free to move inwards.

When these tips are extended as in Fig. 4, the fabric is slightly raised and sewing occurs around these tips. As said, extension and retraction of these tips is effected, according to the invention, by providing appropriate displacing means which actuate them, so that when the intermediate plate is pushed down and fastened on the workholder above the lower plate, the tips 17 and 17′ are displaced outwardly and extend as explained. As will be easily apparent to a person skilled in the art, in this way not only the desired effect on the fabric is obtained during sewing, but the created tipped end of the tie is very easily removed from the intermediate plate, after sewing is completed.

A similar arrangement is shown in the tipping clamp of Fig. 5. This clamp is more suitable for use with the small end of the necktie, because of its easily reducible size. In this arrangement, only one displacement means 18 is used, and only one spring 19. As will be appreciated, this difference is only a result of convenience, and is not essential to different parts of the invention. In Fig. 6, the displacement means 18 is schematically shown, having an upper portion 18′ and a lower portion 18″. It can be seen that the middle body of this displacement means is frustoconical, so that its upper portion has a diameter which is much smaller than its lower portion. When a pressure is applied in the direction of the arrow indicated by P, this displacement means is pushed up and applies a force against the body of the retractable tips 17 and 17′,

which counterbalances the force applied by the spring 19. In this way, the tips are pushed out, since the end 18′ lies on the lower plate 10′. When the intermediate plate is released, the force applied by the spring on the frustoconical body of the displacement means 18 causes it to move downwards, and to permit the retraction of the tips 17 and 17′ inwardly.

It should further be noted that ribs 16 and 16′ are shown in Figs. 4 and 5 being of equal length. Sometimes it may be convenient to provide clamps which have such ribs having different lengths, and which are in fact asymmetrical. This may be needed for producing neckties in which the final sewing requires such asymmetrical tipping, but is not specifically illustrated herein for the sake of simplicity, and because it is understood that providing asymmetrical ribs of this type is within the scope of the skilled technician.

Returning now to Fig. 3, an upper plate 13 according to one embodiment of the invention is shown. This upper plate comprises a base member 8, shaped as a **U**, one side of the base member being hinged to the workholder by hinge 24. The base member 8 is also the portion of the clamp which receives the pressure or blow applied by the release piston or the like which penetrates through opening 12. The perimeter of the upper plate is discontinuous, and three openings 2′-2‴ can be seen. These openings are positioned so as to correspond to the retractable tips 17 and 17′, and to tip 15. So, when the tips 17 and 17′ extend outwardly, they extend through the openings 2′ and 2‴, and tip 15 through opening 2″, and sewing of this part of the fabric is done at the perimeter of the upper cover 13 of the clamp, around these tips. The perimeter of the upper cover (generally indicated at 20) is conveniently made of rubber, to more easily fasten the fabric and avoid its movement, to provide uniform pressure on the material sewn, and to reduce noise. The inner part 21 of the upper cover is made in a cup-like form, and is not a plate, because it must house the displacement means 18, the ribs and tips of the intermediate plate, and permit their movement as needed.

According to a preferred embodiment of the invention, the clamp is held in the closed position partly by magnetic forces. For this purpose, magnets 22 are provided in the bottom portion of the intermediate plate 11, to engage corresponding metal areas 29 in the lower plate. Thus, the magnetic force holds the intermediate plate in a substantially superimposed position with respect to the lower plate, and in turn the upper cover is kept in the closed position by a spring or the like means. When the upper cover is violently opened by a blow received from a piston through opening 12, its opening causes also the intermediate plate to rotate around its hinge, and to reach the open position. Springs may be provided, as appropriate, to facilitate the opening of the clamps, and to maintain the upper cover and the intermediate plate in a desired specified open position. It is clear, however, that magnetic closure is not the only means of holding the intermediate plate in the closed position, and to cause the intermediate plate to open when the upper cover opens. This can be effected in many other ways which will be apparent to a person skilled in the art, and therefore it is clear that the invention is not limited to any specific closure means. The magnetic closure is mainly provided for temporarily keeping the linen in place, until the fabric is positioned and the upper cover is closed. Then, the spring of the upper cover will suffice to keep the material firmly in place.

As will be apparent to a person skilled in the art, the invention also provides a method for the tipping and assembly of a necktie, which comprises the use of a workholder according to the invention for simultaneously tipping and connecting the segments of a necktie. Further embraced by the present invention is a workstation comprising automated sewing apparatus, such as a computerized sewing machine, and a workholder according to the present invention. Of course, more than one workstation can be involved in the sewing of the tie, the pieces of which have been assembled on a workholder according to the invention. For instance, one automated sewing apparatus may be employed for tipping, while another may be employed for connection. Such variations are of course within the scope of the invention.

The above description has been given for the purpose of illustration, and is not intended to be limitative. Many variations can be effected in the various parts, relationships between them, their positioning on the workholder, and so on, without exceeding the scope of the invention.

Claims

1. A workholder for the combined tipping and assembly of the segments forming a necktie, comprising a big tipping clamp, a small tipping clamp and at least two connection clamps.

2. A tipping clamp for automated sewing machines, comprising a lower plate, an intermediate plate and an upper cover, the said intermediate plate being hinged to the plane on which the said lower plate lies and being free to rotate from a position substantially superimposed with respect to the lower plate, to form an angle with the said lower plate, and the said upper cover also being hinged to the plane on which the lower plate lies and being free to rotate from a position in which the lower plate,

the intermediate plate and the upper cover are superimposed, to form an angle with the said lower plate; means being provided for maintaining the said lower and intermediate plates and upper cover superimposed when in working position.

3. A clamp, according to claim 2, wherein the intermediate plate is provided with two ribs positioned along its perimeter, so that the common origin of the two ribs is located on the most extreme end or tip of the plate and constitutes the apex of a triangle of which the two ribs are two sides.

4. A clamp according to claim 3, wherein at least two retractable tips are provided at two of the apexes of the triangle defined by the two ribs, the said retractable tips being in the retracted position when the clamp is open and in the extended position when the clamp is closed in its working position.

5. A method for the combined tipping and assembly of the segments forming a necktie comprising providing a workholder having a big tipping clamp, a small tipping clamp and at least two connecting clamps, positioning the lining of the tips within the tipping clamps, positioning the segments of the necktie to be sewn within the tipping and the connection clamps, and feeding the workholder to an automated sewing apparatus.

6. Automated sewing apparatus comprising an automated sewing machine and a workholder according to claim 1.

7. A workholder for the combined tipping and assembly of segments forming a necktie comprising at least two clamps selected from a group consisting of a big tipping clamp, a small tipping clamp and a connection clamp.

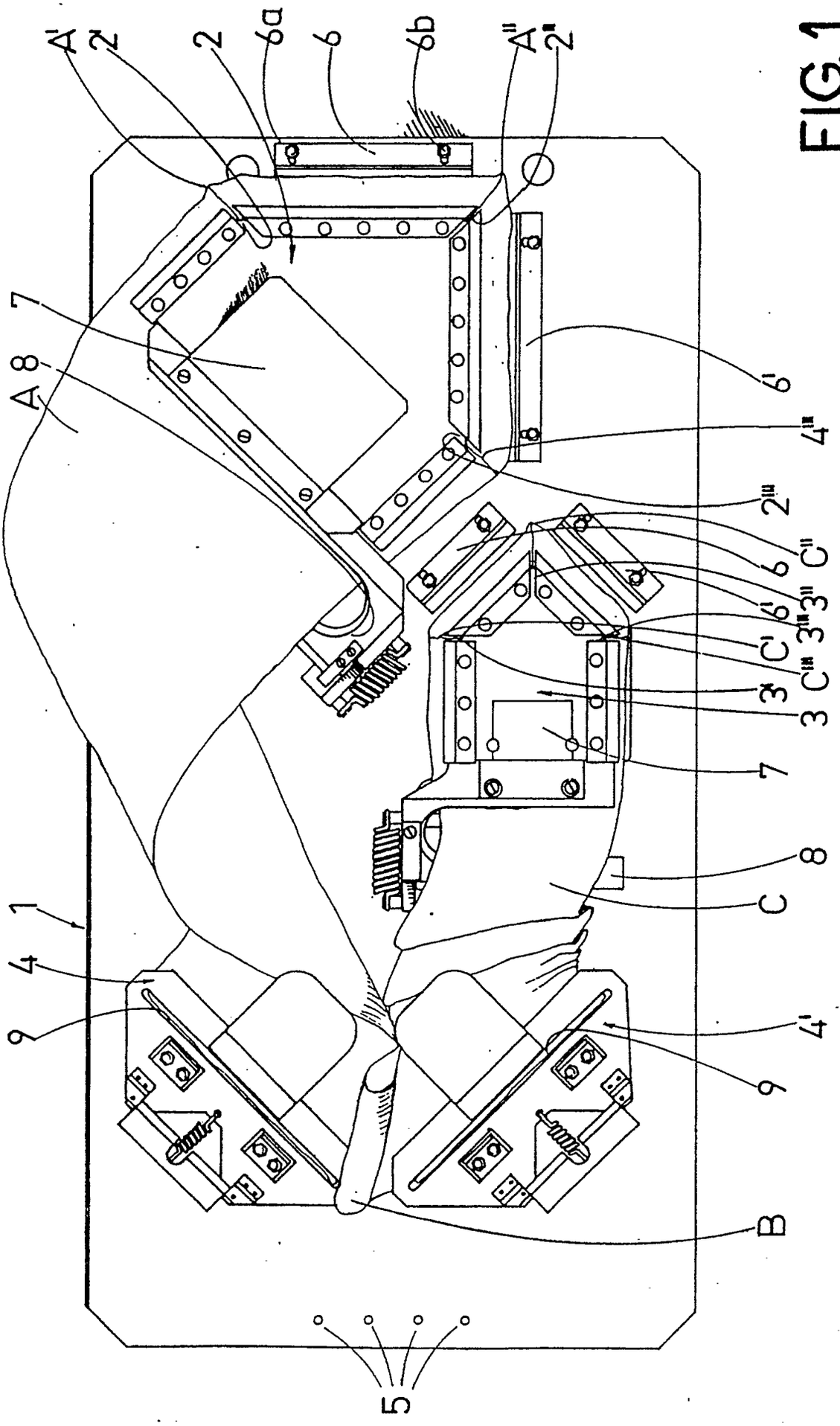

FIG. 1

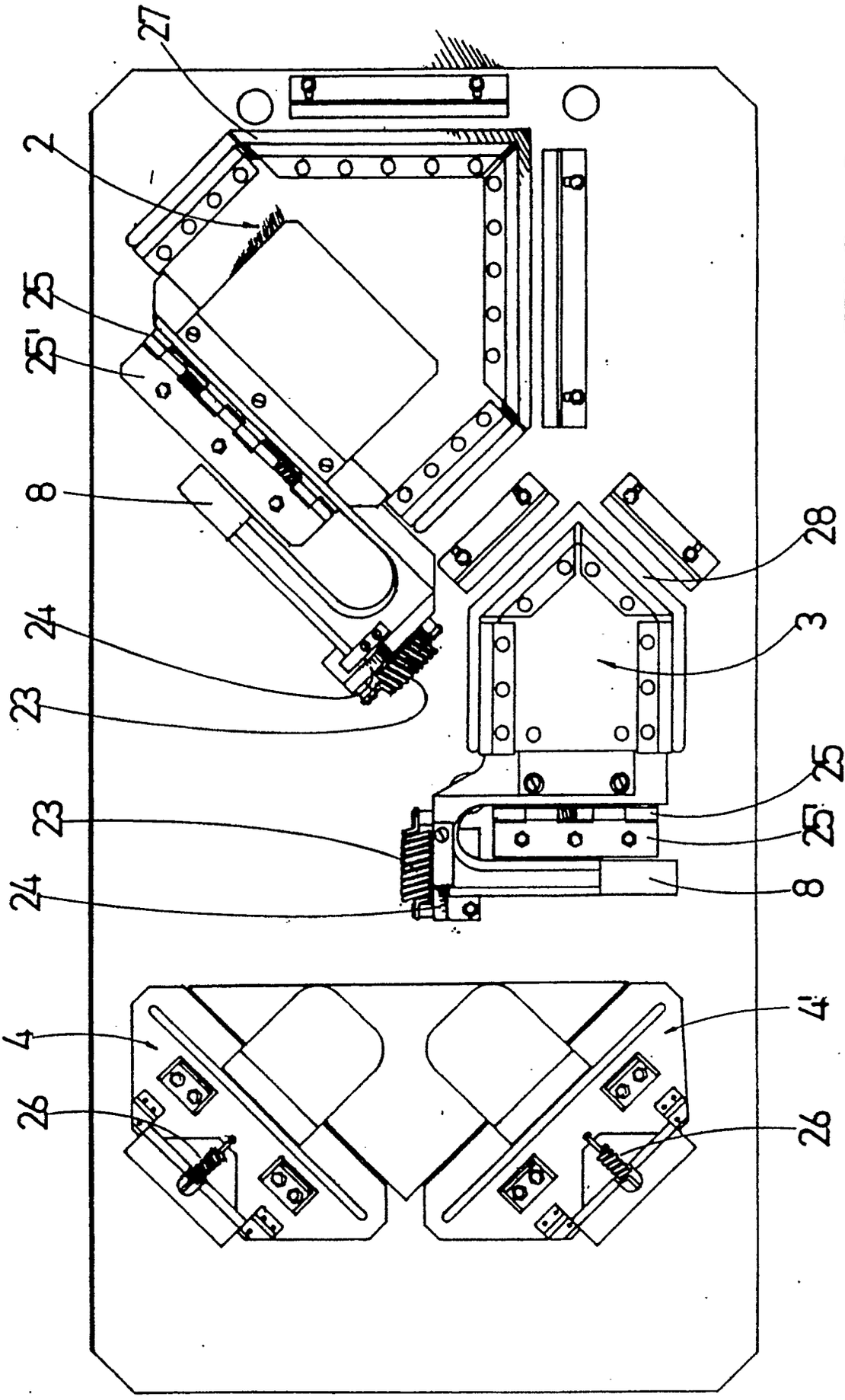

FIG. 2

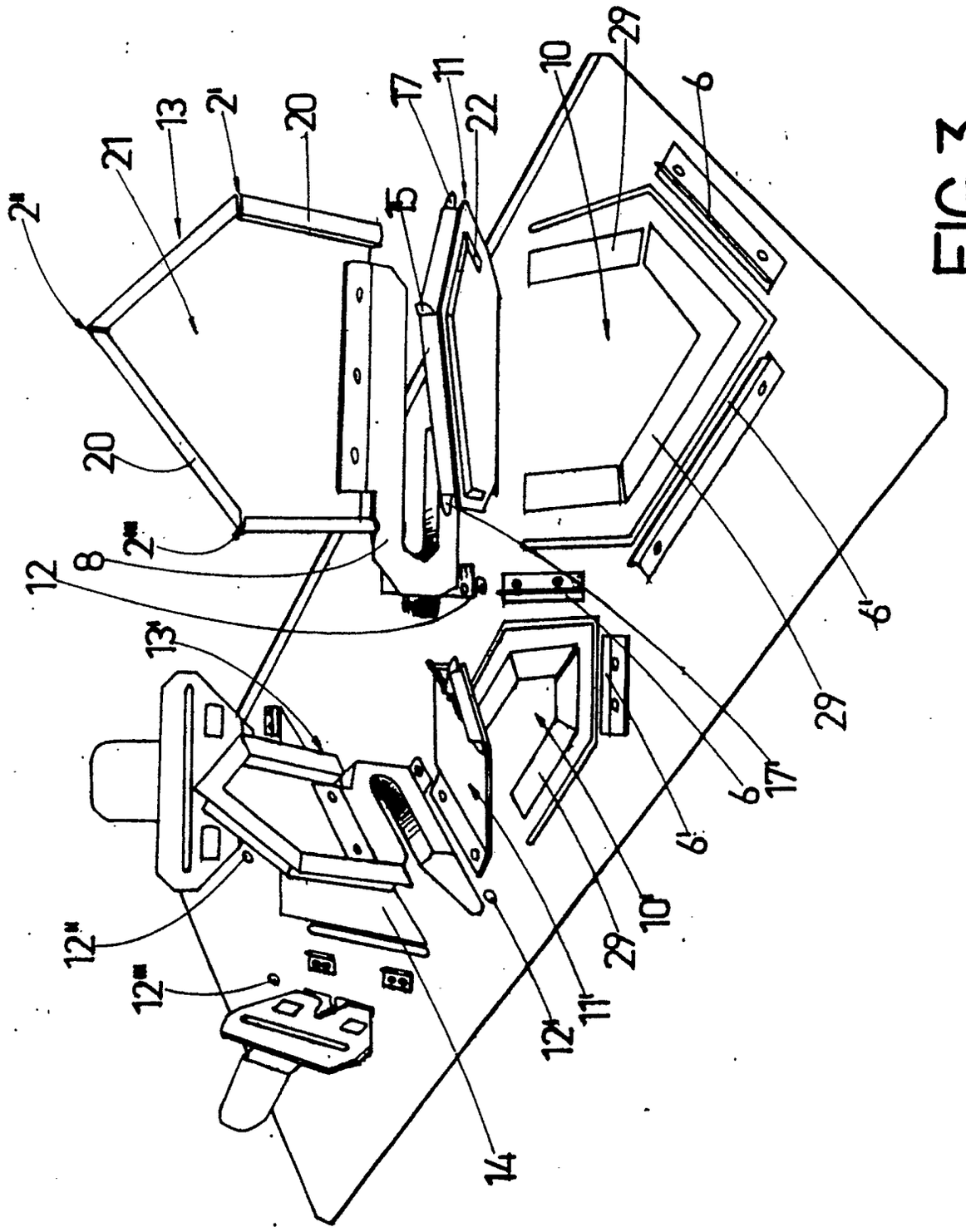

FIG.3

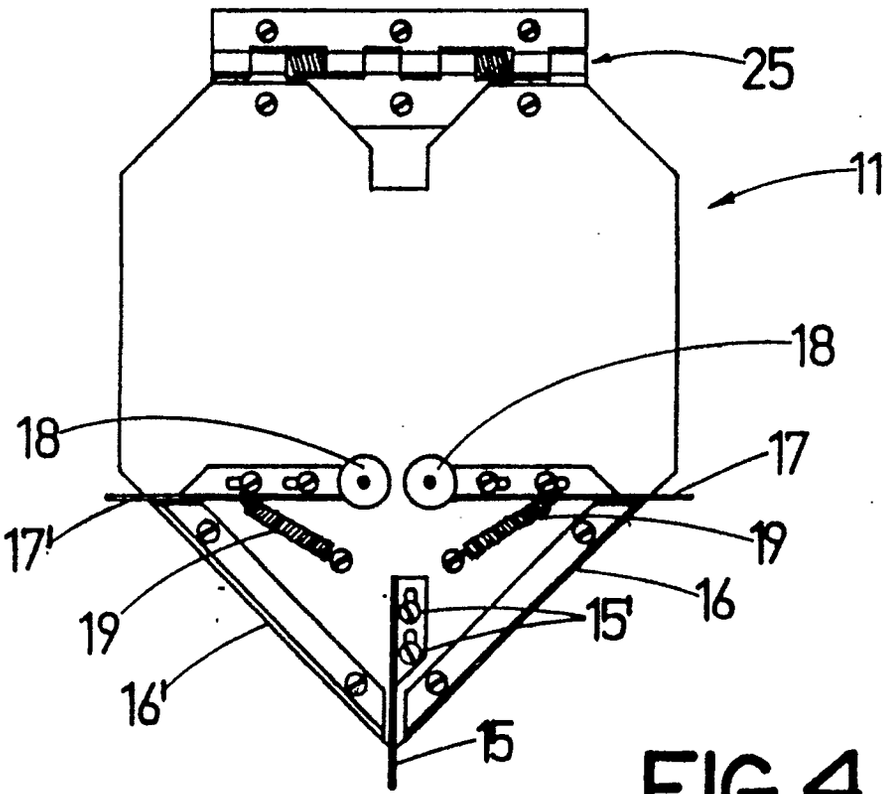

FIG. 4

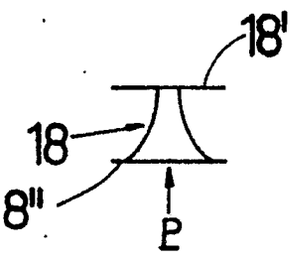

FIG. 6

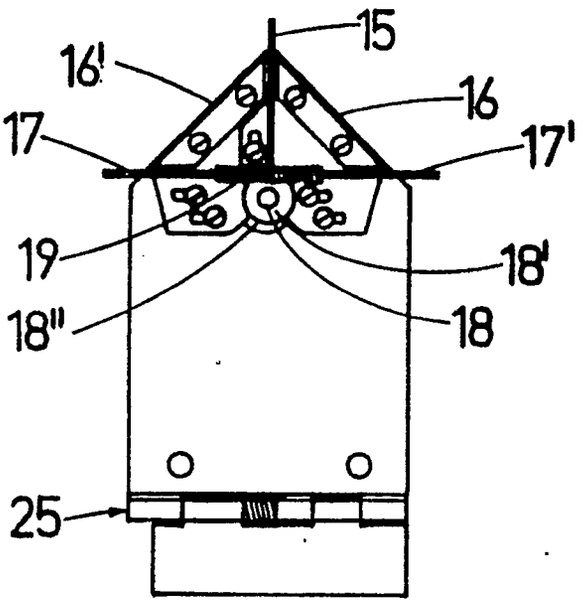

FIG. 5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number

EP 90 11 7259

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.5)
X	EP-A-0 106 083 (S. WAXELBAUM) * page 4, line 32 - page 5, line 23 * * page 6, lines 17 - 34 *	1,5-7	D 05 B 39/00
D,X	US-A-4 574 717 (H. JÜNEMANN; S. RÖMICH) * the whole document *	2	
X	GB-A-2 173 520 (KOCHS ADLER AG) * the whole document *	2	
A	US-A-3 174 447 (L. BONO) * column 2, line 24 - column 3, line 33 *	1	
A	US-A-4 503 789 (H. SCHOLL) * figure 5 *	1	
A	US-A-3 405 670 (H. SCHOLL; H. JÜNEMANN)		
A	US-A-4 467 735 (Y. SADEH)		
D,A	US-A-4 644 885 (M.N. BENNISON)		
A	GB-A-2 139 257 (AMF INCORPORATED)		

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

D 05 B
A 41 D

The present search report has been drawn up for all claims

Place of search	Date of completion of search	Examiner
The Hague	20 December 90	D HULSTER E.W.F.

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
Y: particularly relevant if combined with another document of the same catagory
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