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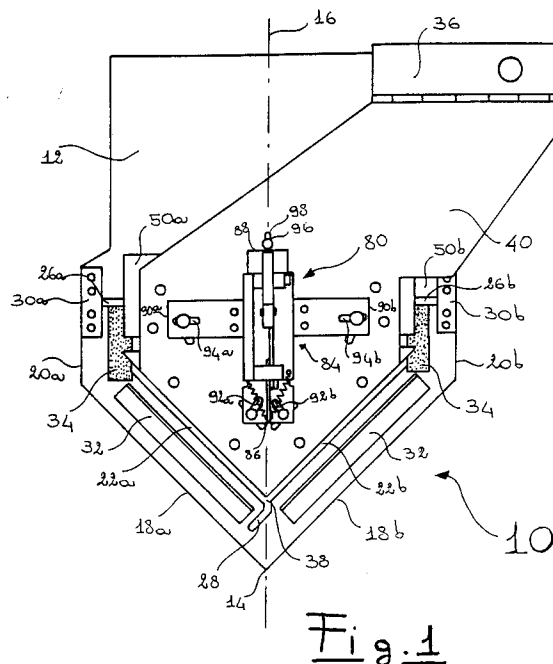
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**AT BE CH DE DK ES FR GB GR IE IT LI LU MC
NL PT SE**(71) Applicant: **FRIGERIO & CORAZZA S.n.c. DI
FRIGERIO GIORGIO & CORAZZA ANNA
MARIA
9, Via Fiume
I-22079 Villa Guardia, Como (IT)**(72) Inventor: **Frigerio, Giorgio
9, Via Fiume
I-22079 Villa Guardia, Como (IT)**(74) Representative: **Riccardi, Sergio
Riccardi & Co.
Via Macedonio Melloni, 32
I-20129 Milano (IT)**(54) **Tie-tipping apparatus and machine for its use.**

(57) Herein is described an apparatus (10) for the sewing and finishing of tie tips and the use of same through the use of properly modified and integrated sewing machines. The apparatus comprises a base (12) and a cover (40), each of similar form to the tie tip. The fabrics to be sewn are positioned between the base (12) and said cover (40) and, by means of a lever (80) system, instruments of friction (56, 58) are shifted, properly placed on the cover, which pull the upper fabric and take it to assume a configuration which allows for the sewing through an appropriate sewing slot. Said apparatus (10) permits an easier positioning of the fabrics, the possibility to regulate the sewing rim in a different way along the sides of the tip and along the flanks and the possibility of use in an automated work circuit.

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This invention concerns an apparatus for the sewing and finishing of tie tips and its use through the use of properly modified and integrated sewing machines.

As is known, the tie is produced using a strip of fabric with the ends cut in a tip shape: this is sewn to the lining and subsequently folded again in a proper way.

The sewing carried out with automatism presents particular problems regarding the quality of the results in comparison with the sewing with a traditional machine. These problems have been partially resolved with the tie tip finishing apparatus disclosed in United States Patent no. 4644885. In the aforementioned patent, a device for the sewing of tie ends is claimed, comprising a base on which is placed a first fabric on which, in turn, is placed a blade having upward protruding borders at one or more corners, thus, by superimposing on it another properly conformed fabric, by closing said fabrics and the blade between said base and a cover, and through said upward protruding borders, upward folds are formed on the upper fabric at the corners in such a way so as to allow the sewing of the two fabrics along the entire contour.

While this allows the sewing to the lining the entire external border of the fabric at the ends of the tie, said device presents several inconveniences. First, when it is necessary to position the borders of the fabric to be sewn in the device, one must be very careful that the upper fabric is further than the other because, otherwise, when the cover is closed, the lower fabric backs up with respect to the upper fabric, causing evident anti-aesthetic effects. This operation requires a certain care on the part of the operator with the possibility, however, of having poor results when this operation is done without care.

Another serious inconvenience of the prior art is the impossibility of being able to vary, with the same apparatus, the size of the rim. The possibility to be able to vary the size of the rim along the sides of the tip and flank in an independent manner is often important since it is often required by the stylists who wish to offer a high quality product with hand type finishing. Further, the saving of material attained by reducing the rim, though apparently little, can be important, taking into account the high cost of fabric used (very often silk).

Again, with the end of reducing the cost of production of ties, it would naturally be desirable to be able to realize equipment which permits the use of one or more of said apparatuses in a work circuit which allows for the sewing of tie ends in succession, one after the other, reducing as much as possible the amount of dead time. The prior art tie sewing device does not provide a completely automated work cycle (with the exception of the inevi-

table manual loading and unloading).

The object of the present invention is to improve upon the inconveniences of the prior art and, in particular, to realize a tie-tipping apparatus in which the fabrics to be sewn are placed in a perfectly superimposed manner, avoiding having to position one a little behind the other, and avoiding, thus, the possibility of their incorrect insertion, with the attainment, instead, of a perfect parallelism of the fabrics maintained also after the formation of the pinches at the corners.

A further object of the invention is to realize an apparatus which enables the user to vary the sizes of the rim on the flanks independently from the rim on the sides of the tip, for purely aesthetic purposes and to save material.

A still further object of the invention is to be able to use said apparatus in a work circuit which considerably reduces the time necessary to sew each tie, reducing as much as possible the dead time and the work of the operator.

The above-described problems are brilliantly resolved by a tie-tipping apparatus, having the features indicated in the characterizing part of claim 1, and by a machine for its use having the features indicated in the characterizing part of claim 6. Further advantageous characteristics of said apparatus and of said machine are set forth in the dependent claims.

The characteristics, the objects and the advantages of the invention will become more evident from the following description and from the accompanying drawings of an embodiment merely by way of non-limiting example in which the various drawings show:

- Fig. 1: view from above of entire device with the lever up;
- Fig. 2: view from above of tip area of the upper face of the base;
- Fig. 3: partial view from above of the cover without the lever mechanism;
- Fig. 4: view of lower face of the cover with the lever up;
- Fig. 5: partial view of lower face of the cover with the lever down;
- Fig. 6: side view of command lever device mounted on the cover;
- Fig. 7: view of lower and upper guide of the sewing needle;
- Fig. 8: partial view of the work circuit machine;
- Fig. 9: view of the pusher devices on the apparatus.

Figure 1 illustrates the entire device seen from above. Obviously, the same characters in the various figures indicate the same or equivalent parts.

With reference to Figure 2, the form of the lower base 12 can be more clearly seen, similar to

that of the cover 40. It is irregular but shows, as seen from above, a tip 14 corresponding to the tie tip and an axis 16 coinciding with the tie axis itself.

Looking, thus, at Figure 2, with the base of the apparatus placed with the tip 14 downward, a symmetrical shape is seen with respect to said axis 16, with two tip sides 18a, 18b convergent in said base tip 14 and two base flanks 20a, 20b parallel to said base axis 16. Also in reference to Figure 2, a sewing slot, defined by the tip slot sides 22a, 22b is visible, and by the slot flanks 24a, 24b, parallel to said base tip sides 18a, 18b and to said base flanks 20a, 20b, respectively.

Said sewing slot is connected to the external base contour 12, by two further slot parts 26a, 26b, essentially perpendicular to said two slot flanks 24a, 24b.

The tip slot side 22b extends further toward the tip side 18a, through a slot extension 28, essentially in a direction parallel to said tip side 28b of the slot and toward the tip side 18a.

The two parts of the base 12, divided by the sewing slot, are connected by small plates 30a, 30b, connected near the base flanks 20a, 20b. In the strips between the base sides 18a, 18b and said tip slot sides 22a, 22b, wall means 32a, 32b are provided essentially parallel to said tip sides as to define an exact placement position of the fabrics (not shown) to be sewn together.

Along the entire sewing slot (or part of it), there are provided friction means 34 to avoid the slipping of the fabric from the placement position. In the present embodiment, said friction means 34 consisting of strips of sand paper.

Said base 12 is hinged along its side, preferably the one opposite said tip 14, to the cover 40 by a hinge 36.

The cover 40 (see Figures 1, 3, and 5) is also of irregular form but is shaped in such a way that, superimposing it on said base 12, the two tip sides 44a, 44b and the two flanks 46a, 46b follow the internal contours of the sewing slot on the base along the slot tip sides 22a, 22b and slot flanks 24a, 24b, respectively.

On the external face of said cover 40, along its axis of symmetry, a lever mechanism 80 is connected (see Figure 1, 6).

Said lever mechanism 80 acts on surface tip parts 48a, 48b and on surface flank parts 50a, 50b, adapted to graze the lower face of said cover 40, making them shift in the predetermined directions.

Said surface parts 48a, 48b, 50a, 50b show their respective external sides 52a, 52b, 54a, 54b parallel to said tip sides 44a, 44b and to said flanks 46a, 46b of the cover, respectively.

Along the external sides 52a, 52b, 54a, 54b of the respective surface parts 48a, 48b, 50a, 50b are connected the friction means 56a, 56b, 58a, 58b,

such as rubbery surfaces.

The external sides 52a, 52b of the respective surface tip parts 48a, 48b are essentially superimposed on the respective cover sides 44a, 44b but slightly behind the tip 42 with the lever in a lever-raised position while they coincide perfectly with these when in a lever-lowered position.

Similarly, the external sides 54a, 54b of the respective flank surface parts 50a, 50b are parallel but slightly more outward with respect to the respective cover flanks 46a, 46b, with the lever in a lever-raised position, while they essentially coincide when in a lever-lowered position.

On each of the said surface tip parts 48a, 48b, first guide grooves 60a, 60a', 60b, 60b' are provided, parallel to the respective external sides 52a, 52b, within which first screws 62a, 62a' and 62b, 62', connected on the cover, glide.

On the contrary, at each of said surface tip parts 48a, 48b are connected second screws 64a, 64b, directly connected to the lever mechanism 80, which glide within second guide grooves 66a, 66b, milled on the cover parallel to said tip sides 44a, 44b of said cover 40.

In the same way, on each of the said flank surface parts 50a, 50b, are provided third guide grooves 68a, 68a', and 68b, 68b', respectively, with axis inclined at a certain angle with respect to the cover axis, in which glide third screws 70a, 70a' and 70b, 70b', respectively, connected to the cover 40; in addition to each of said flank surface parts 46a, 46b are connected fourth screws 72a, 72b, directly connected to the lever mechanism 80, which glide within fourth guide grooves 74a, 74b, provided on the cover and parallel to said third grooves 68.

The lever mechanism 80 is connected to the upper cover face and permits, by lowering the lever 82, the shifting of a cross surface 84 toward the tip 42 along the cover axis (see Figure 1). Said cross surface 84 has a first end 86 adjacent to the tip 42, a second end 88, opposite the prior one, and a third and fourth end 90a, 90b on axis perpendicular to the cover axis and placed on the cover flanks 46a and 46b themselves.

At said first end 86 are provided a first and a second gliding groove 92a, 92b, perpendicular to said second guide grooves 66a, 66b, respectively, provided on the cover 40 and within which first and the second gliding grooves said second screws 64a, 64b glide.

Said second end 88 is placed against a stud 96 which can be shifted along the axis, being able to glide in a stud groove 98 and be subsequently fixed in the desired position.

At said third and fourth end 90a, 90b are respectively provided third and fourth gliding grooves 94a, 94b, in which said fourth screws 72a, 72b can

glide.

Said lever 82 is shaped in such a way that, to act on it, it is necessary to press downward so that the cover presses against the base. To increase said force, return springs 100 have been added which, in addition, return the lever 82 to the raised position, using a light force on the free end of said lever 82.

The operation of the tie-tipping apparatus, according to the present invention, is the following.

First, the cover 40 is raised and the two fabrics to be sewn are positioned together along the borders, with said borders placed against said wall means 32a, 32b.

In this connection, it is useful to specify that it is necessary to position the two fabrics on top of each other with the tip sides mating and not, as in the prior art, placing one ahead of the other, thereby avoiding possible mistakes and useless waste of time.

After closing the cover 40, one acts on the lever 82, pressing its free end downward. In this way, said friction means 56a, 56b, 58a, 58b are shifted to make them coincide with the respective tip sides 44a, 44b and flank sides 46a, 46b of the cover 40.

Said movement generates, at the tip 42 and at the other two corners of the cover 40, pinches 110, 112a, 112b, rising upward from the upper fabric which is tightened between the adjacent ends of said friction means 56, 58.

The shifting of said friction means 56, 58, rigidly connected to the respective surface parts 48, 50, is due to the shifting of said second and fourth screws 64a, 64b and 72a, 72b, guided by the lever mechanism into the respective grooves.

The presence of said friction means 34 on the base 12 causes that the lower fabric does not move during the generation of the pinches. At this point, it is possible to carry out the sewing following the sewing slot with the needle.

For said object, a system commonly used on automatism for form sewing with the lower needle guide 120 (see Figure 7), which is inserted in the sewing slot to define perfectly the sewing itself, has been used.

The upper needle guide 122 comprises a circular rim which is able to lean on the upper cover face 40 next to the tip sides and the flanks. The greatest problems of sewing arise next to the sewing tip slot due to the presence of the tip pinch 100.

The needle at said tip pinch 100 cannot sew but must, when it is immediately adjacent, be raised up and, afterward, continue along the adjacent sewing side.

The problem has been resolved, providing that the lower needle guide 120, when at the tip sewing

slot, be guided to move within said slot extension 28 while said upper guide 122 is raised so as not to come in contact with the tip pinch 100. Subsequently, the lower guide 120 is guided to return back into said slot extension 28 and, at the same time, the upper needle guide is lowered so that the circular rim 124 is on the upper cover face, following the contour and continuing, thus, the sewing process.

As it can be clearly understood, the sewing operation can be done using a manually run sewing machine in the needle-raising, needle-lowering and apparatus moving phases, as was the case in the prior art embodiments or, on the contrary, these phases can be done by computer. This computer controlled type of operation is not, on the contrary, possible in the prior art embodiments in which it is necessary to rotate the apparatus with respect to the needle when the needle arrives next to the tip.

It is possible, thus, to use a plurality of said tie-tipping apparatuses inserted in a circuit 130 (partially seen in Figure 8), which causes said apparatuses to move toward the sewing machine 132 for sewing, and away from said sewing machine after the sewing has been completed.

The needle and its respective upper and lower guides 122, 120 remain fixed but, next to the sewing machine, the apparatus is shifted by a properly programed pantograph 134 in the direction perpendicular to the machine direction and it is engaged with proper small wheels 76 connected to the base next to the hinge 30.

The fact that the movement along this direction is sufficient to move the apparatus and, thus, carry out the entire sewing process results from the fact that a piston is provided which acts on a pusher device 136 (essentially an arm which pushes the apparatus in the machine direction) whose action is controlled electronically. Two pusher devices 136 are provided to accommodate the different sizes of the apparatuses for the two ends of the tie.

In addition, means are provided to allow that the movement of the apparatus occur with an increasing velocity from the lower needle dead tip to the upper needle dead tip. In this way, there is a minor curling of the fabric and greater work speeds can be maintained.

Further, the sewing stitch is maintained at a constant length also along the tip sides through the variation of the speed of the carriage through a sensor system which acts on a speed reducer. The sewing machine motor is also able to command directly the advancement of the pantograph through a system of belts and pulleys (not shown) in phase with the sewing machine.

Reverting to the apparatus 10, it is necessary to specify that it is possible to vary the size of the

sewing rim on the tip sides by simply acting on the stud 88 and connecting it in a position more or less advanced with respect to the tip 42.

In addition, it is possible to regulate the rim sizes on the flanks by varying the inclination of the corner: a value of alpha of 0 will reduce the rim size to zero while for greater alpha values, the same rim size will increase as a result.

In conclusion, the present invention fulfills the proposed objects and, in particular, permits the attainment of a tie tip sewing process being able to determine the rim sizes along all the sides of the sewing line itself, and it is not necessary to be particularly attentive in the positioning of the fabric and, moreover, it makes possible its use in a continuous work circuit.

It is evident that, to this embodiment described merely by way of non-limiting example, numerous modifications, adaptations, supplements, variants and substitutions of elements with others functionally equivalent can be made without going beyond the scope of the following claims.

Claims

1. Tie-tipping apparatus comprising a base (12) with a form, in one of its portions, similar to the tie tip; a cover (40), hinged at the base (12) with a zone of a form similar to the tie tip but with smaller dimensions with respect to the base tip, a sewing slot of fundamentally the same size as the above-mentioned cover (40) zone, characterized in that on said base (12), on the contour of the sewing slot, friction means (34), integral with said base (12), are provided; on said cover (40), a lever system (80) is provided which acts to move friction means which place the upper fabric to be sewn to the lower fabric in a proper way for the sewing operation; it is possible to vary the sewing rim of the tip sides by shifting the lever device (80) along the cover axis; the two fabrics to be sewn together are to be positioned on top of each other in such a way that their tip sides coincide and lay against the wall means (32a, 32b), which are able to determine the exact position.

2. Apparatus as in claim 1, characterized in that the shifting of said friction means (56, 58) on the cover is attained by the lever system (80), causing first, second, third and fourth screws (62, 64, 70 and 72) to move into respective grooves (60, 66, 68, and 74).

3. Apparatus as in claim 2, characterized in that the friction means (56a, 56b) at the tip sides (44a, 44b) of the cover (40) shift in a direction

parallel to said tip sides (44a, 44b) while the friction means next to the flanks (46a, 46b) of the cover (40) shift, guided within the grooves (68, 74) on an angle with respect to the cover axis, said angle (alpha) being such that with the increase in its value, the rim size on the flank increases.

4. Apparatus as in claim 3, characterized in that the base sewing slot is representable by a polygonal broken line having slot tip sides (22a, 22b), slot flanks (24a, 24b), and slot parts (26a, 26b) essentially perpendicular to said flanks (24a, 24b) and directed toward the contours of the base (12), and a slot extension (28) which extends from the sewing slot tip essentially extending one of said tip sides (22a or 22b) toward the opposite base side (18a or 18b), said slot parts (26a, 26b) permitting the entrance and exit of said lower guide (120) from said sewing slot during the use of the apparatus (10) in a work circuit (130).

5. Apparatus as in claim 4, characterized in that it is possible to use one or more of said apparatuses in a work circuit (130) which moves said apparatuses, manually loaded beforehand with the fabric, next to the sewing machine (132) which performs the sewing line without needing any further action by the operator, with the exception of the unloading of the sewn fabric.

6. Machine for use of one or more apparatuses (10), according to one or more of the preceding claims, comprising a transport apparatus(es) (130), a sewing machine (132) whose sewing needle is fixed with respect to the machine, and characterized in that the entire movement of the apparatus(es) (10) is controlled electronically, in that there are provided sensors to determine the exact position of the apparatus (10) with respect to the circuit (130) and in that said apparatus(es), next to the sewing machine, move(s) in a direction perpendicular to the machine direction through a pantograph (134).

7. Machine as in claim 6, characterized in that a lower guide (120) of the needle is provided, said needle engaging the interior of the sewing slot; in that an upper needle guide (122) is provided, comprising a rim (124) which runs along the contour of the apparatus (10) to the upper cover face (40); in that, further, when the needle is next to the sewing slot tip (38), said lower guide (120) continues along said slot extension (28) while said upper guide (122) is

raised to avoid sewing of the tip of the fabric, after which said lower guide (120) returns in the slot tip (38) traveling in the opposite direction into the slot extension (28), the upper needle guide (122) goes down and rests again at the beginning of the adjacent tip side (22a) to continue the sewing. 5

8. Machine as in claim 7, characterized in that one or more electronically controlled pusher devices (136) are provided which make possible the continuing the performance of the sewing once the needle and its guides (120, 122) are arrived at next to the sewing slot tip (38), pushing the apparatus in the machine direction. 10 15

9. Machine as in claim 8, characterized in that the pantograph is controlled directly by the motor of the sewing machine through a system of belts and pulleys and engages the apparatus through little wheels (76) connected to the lower face of the apparatus itself. 20

10. Machine as in claim 9, characterized in that the advancement of the apparatus occurs with increasing velocity from the lower dead point to the upper dead point of the needle and in that the sewing stitch is maintained at constant length through the variation of the advancement velocity of the carriage and made in phase with the sewing machine. 25 30

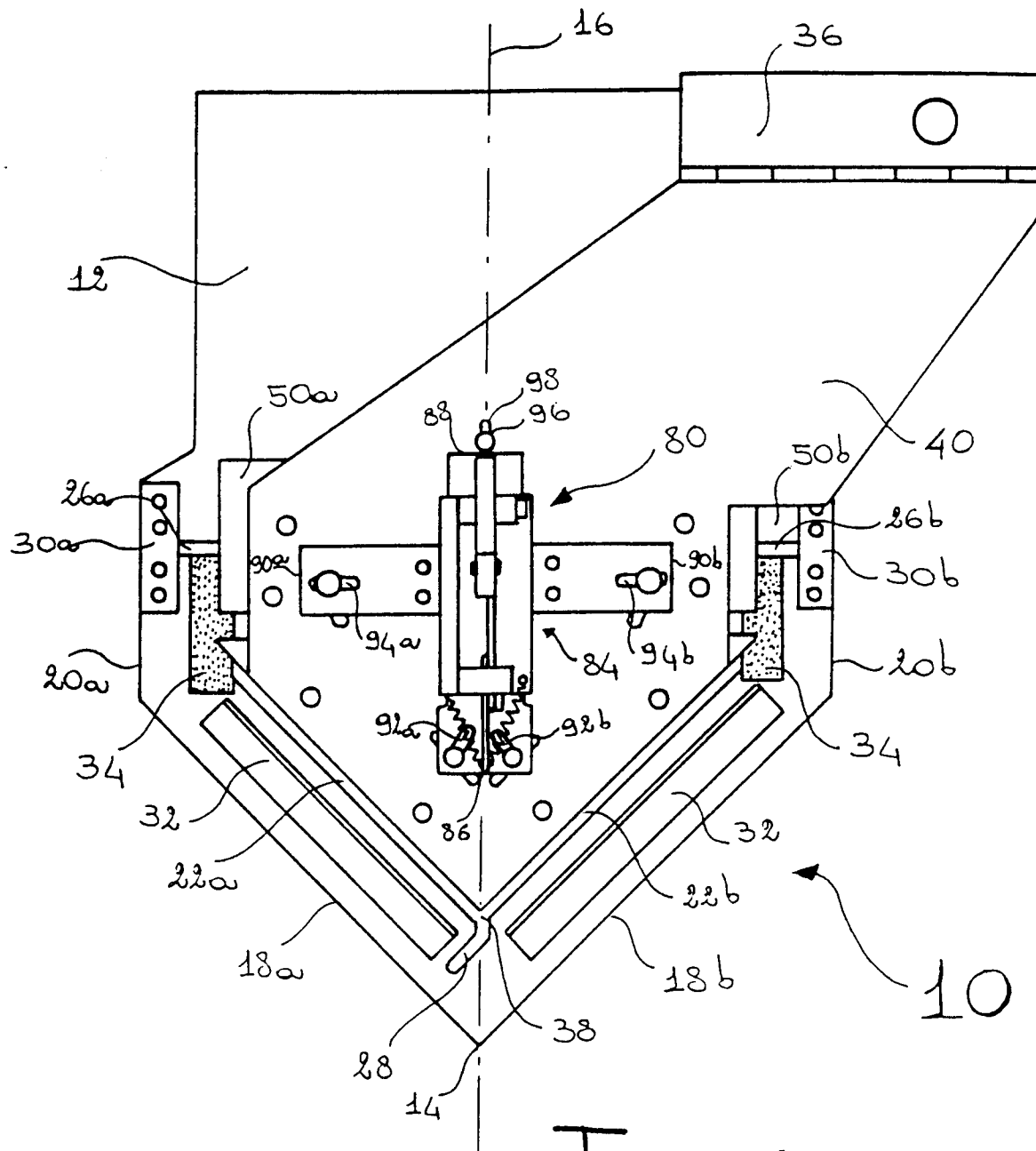
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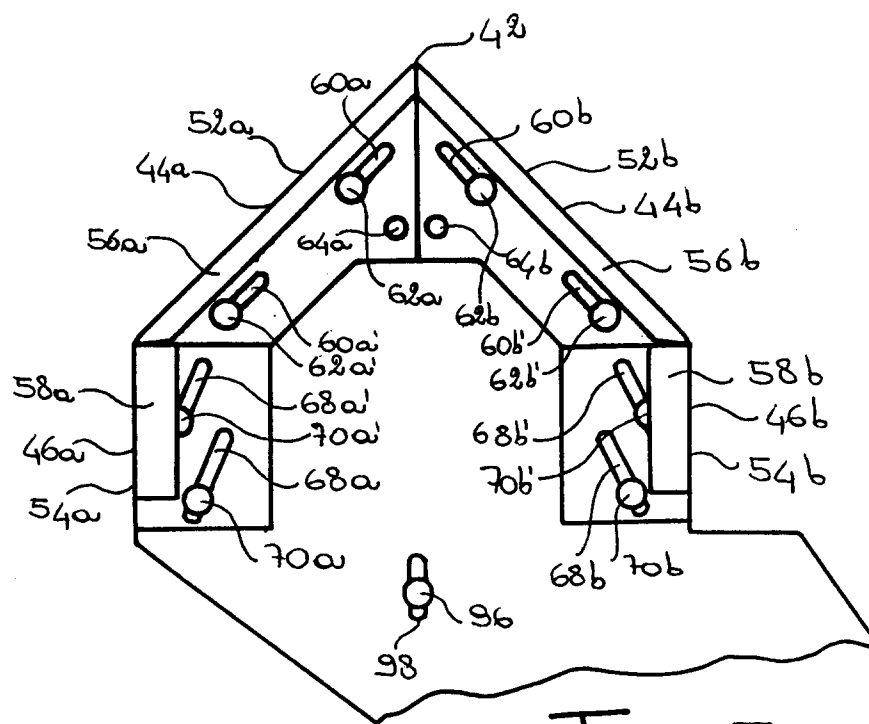


Fig. 5

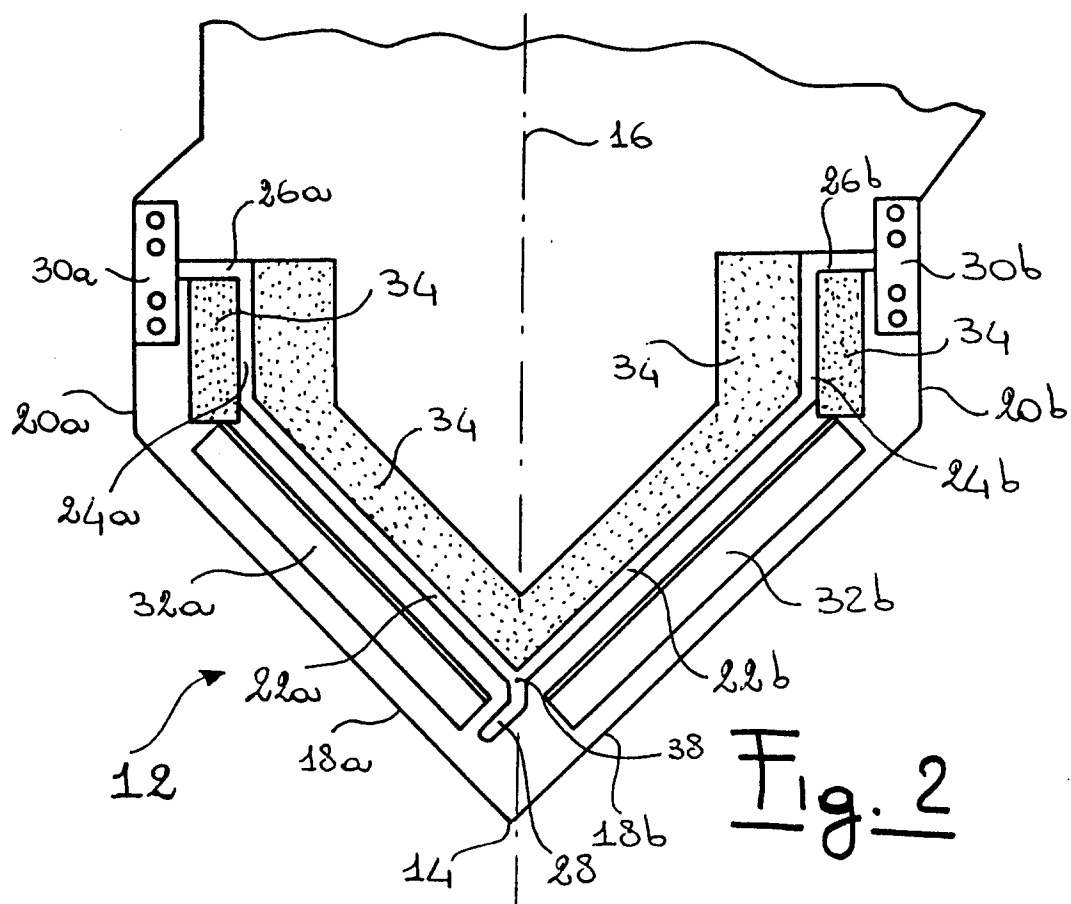


Fig. 2

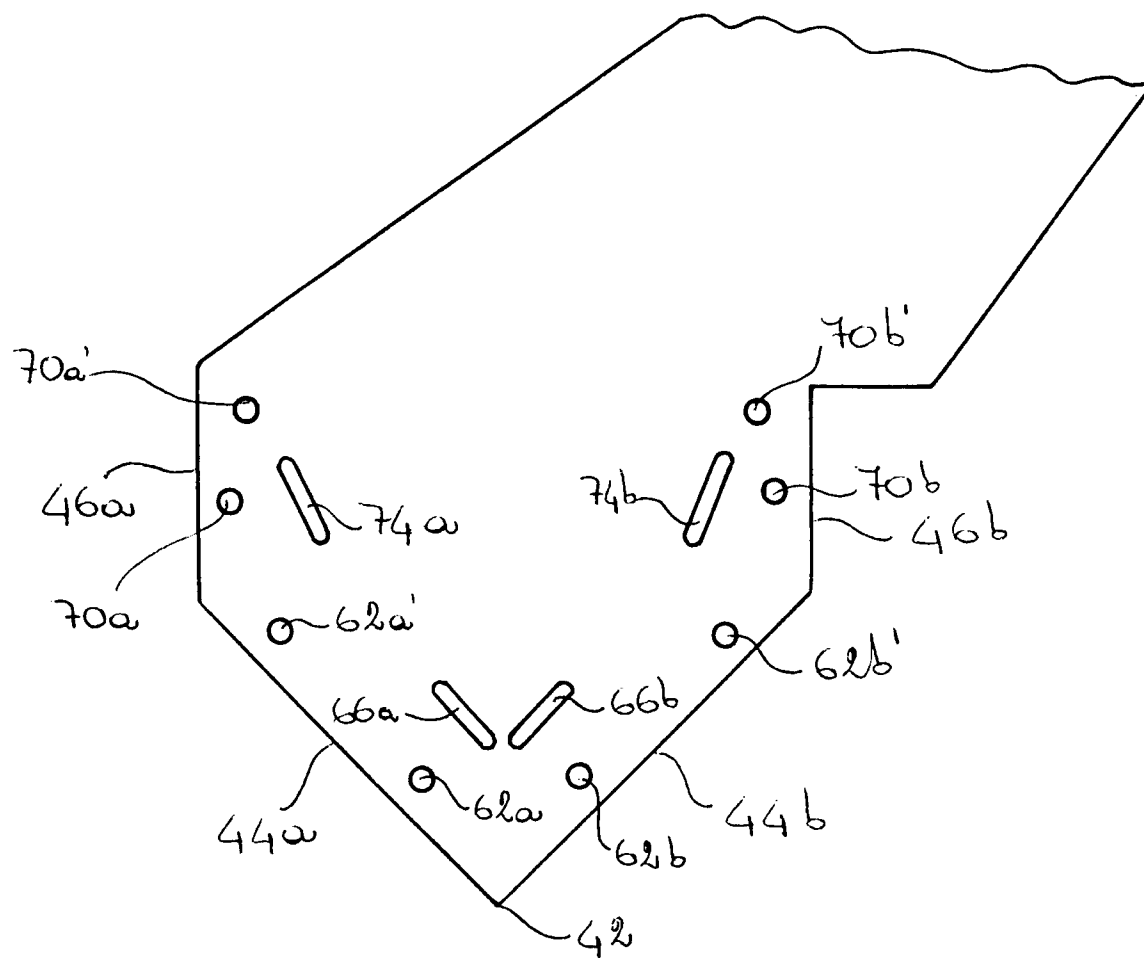


Fig. 3

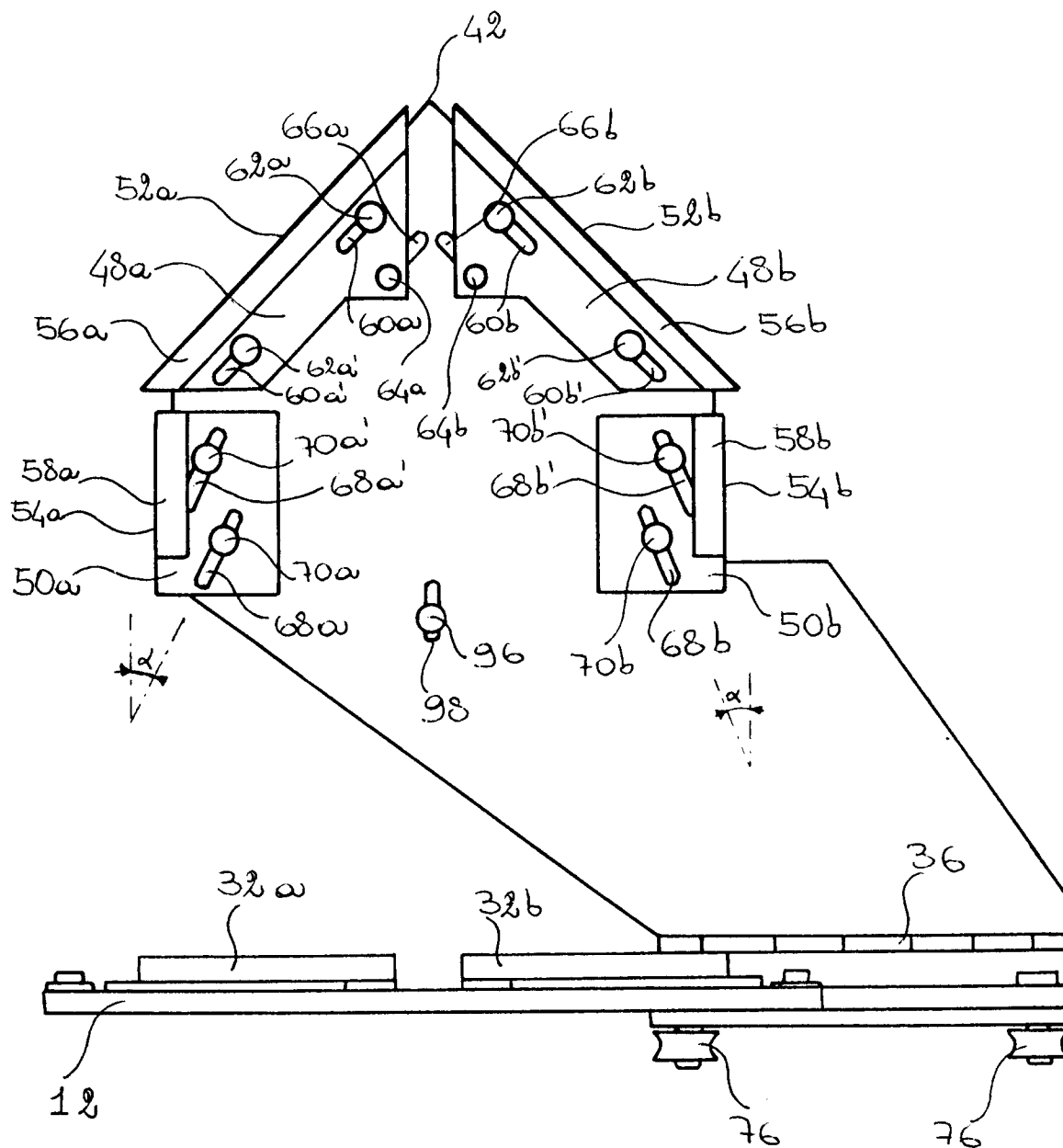
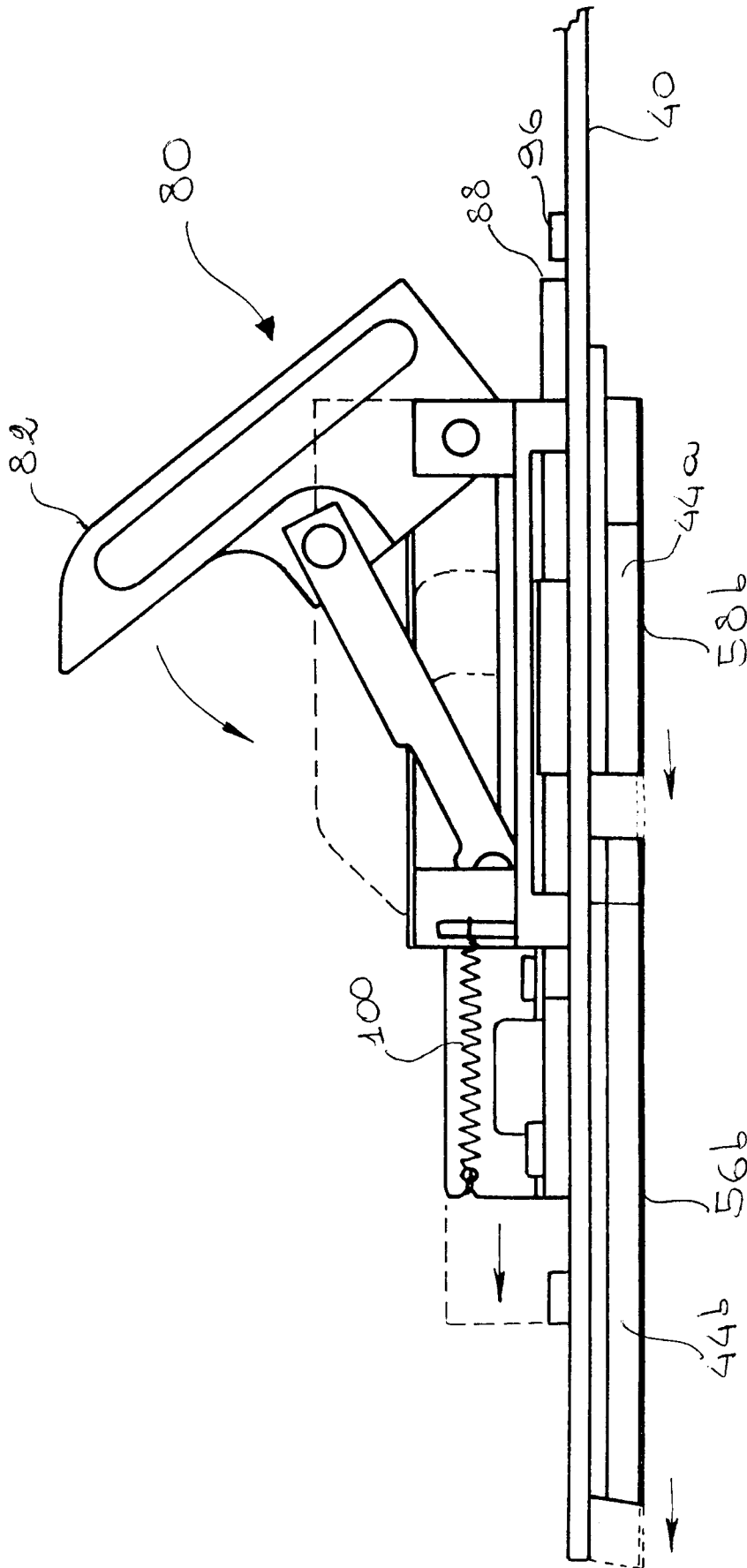
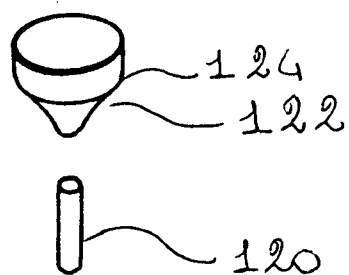
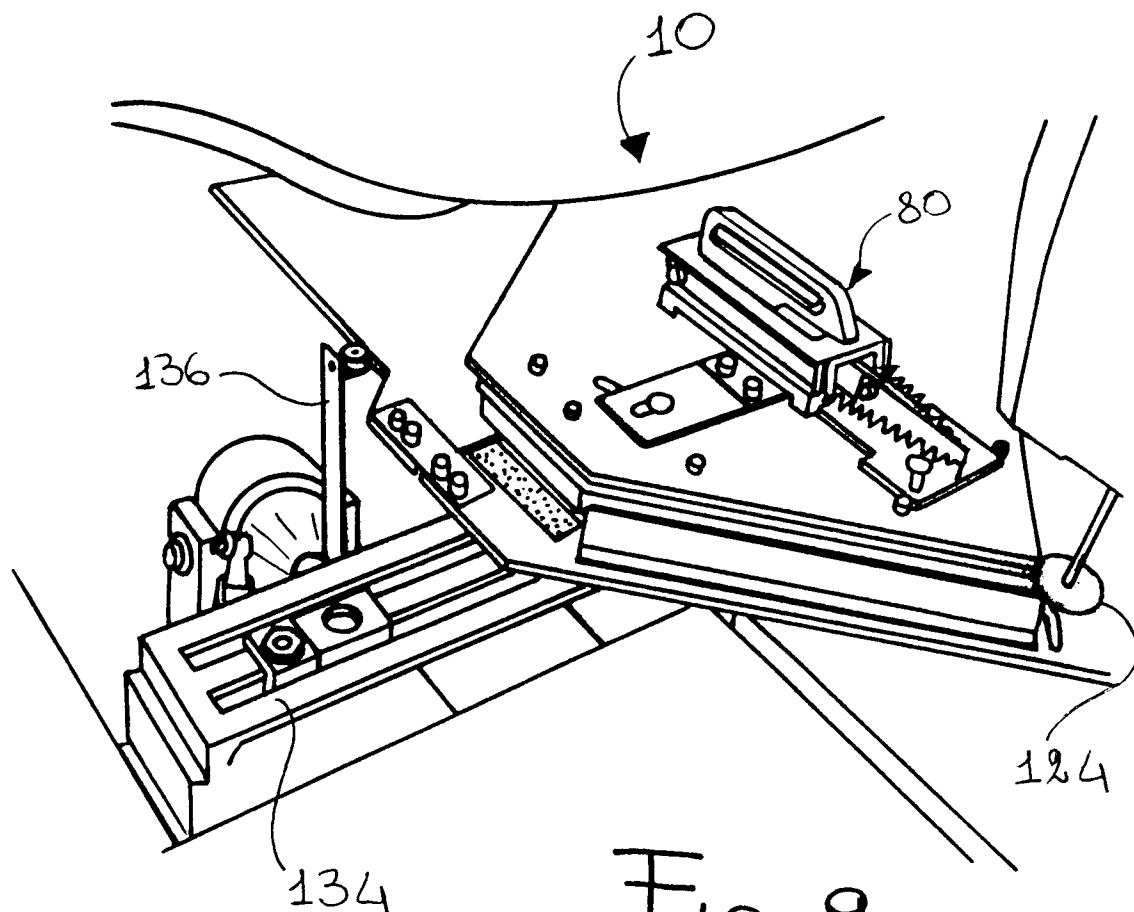


Fig. 4





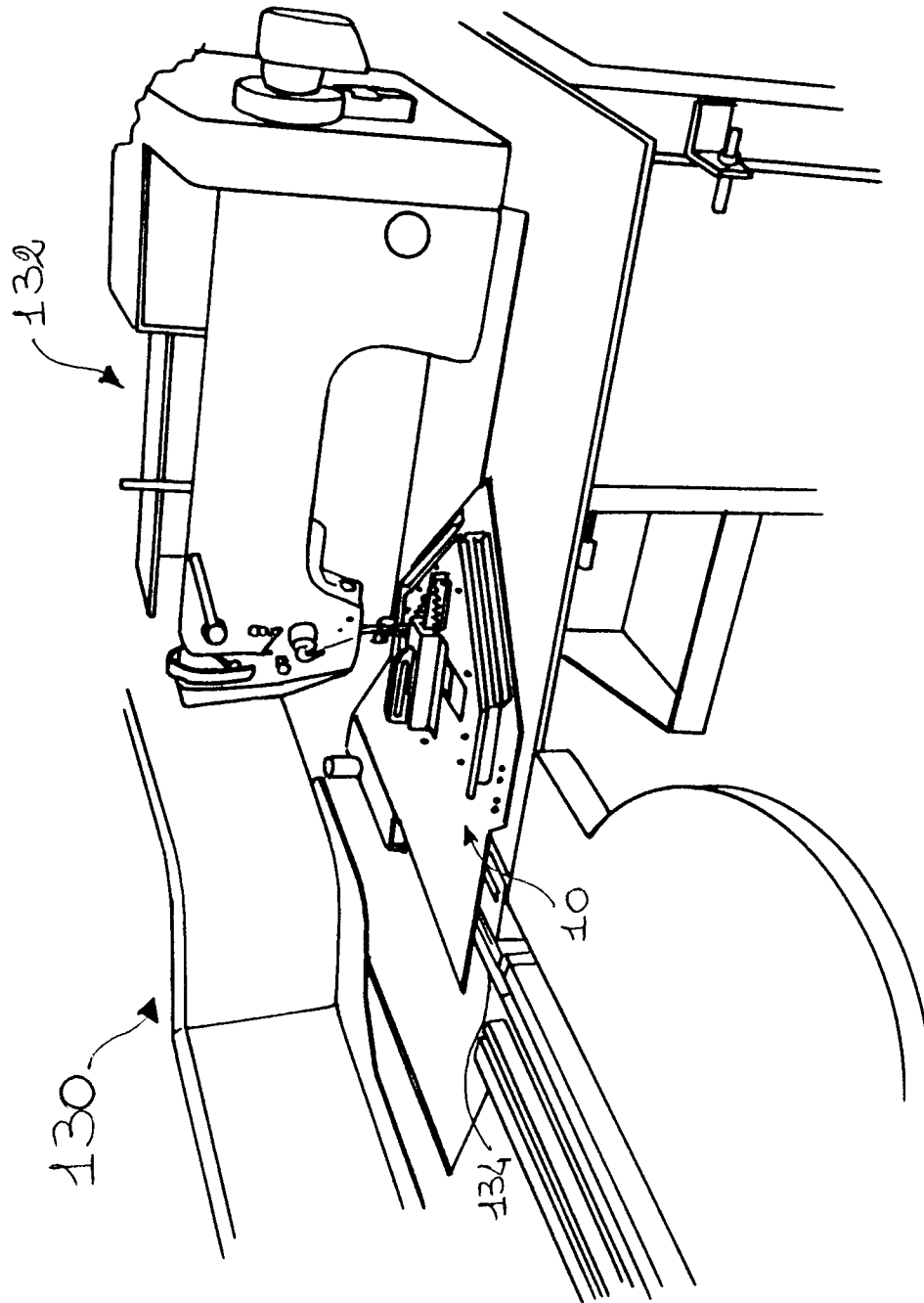


Fig. 8



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EUROPEAN SEARCH REPORT

Application Number
EP 94 20 1245

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)
A	GB-A-2 173 520 (KOCHS ADLER AG) * page 4, line 28 - line 87 * * page 5, line 12 - line 62; claim 1 * ---	1	D05B39/00
A	DE-A-34 05 721 (KOCHS ADLER AG) * page 9, line 21 - page 10, line 10 * * page 12, line 28 - page 13, line 2 * ---	1,5	
A	DE-A-40 31 749 (W. KAWASHIMA) * column 4, line 31 - line 46 * ---	5	
D,A	US-A-4 644 885 (M.N. BENNISON) ---		
A	US-A-3 172 379 (B. LIGHT) -----		
			TECHNICAL FIELDS SEARCHED (Int.Cl.5)
			D05B A41D
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12 September 1994	Examiner D Hulster, E
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