



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
21.01.2015 Bulletin 2015/04

(51) Int Cl.:
D05B 11/00 (2006.01) D05B 39/00 (2006.01)

(21) Application number: **14170058.3**

(22) Date of filing: **27.05.2014**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
 Designated Extension States:
BA ME

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(30) Priority: **17.07.2013 IT BO20130374**

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(54) **Frame for sewing upper pillows on covering shells for mattresses**

(57) A frame (1) for sewing upper pillows on covering shells for mattresses, which comprises four perimetric walls (2). Each wall (2) is perpendicular to the two contiguous walls (2) and comprises at least one laminar portion (3) that constitutes a resting surface: the laminar portion (3) is co-planar with a lower edge of the wall (2); at least one of the walls (2) comprises at least one locking element (4) for at least one component, selected from between an upper pillow and a covering shell, arranged on a respective laminar portion (3); at least one of the

walls (2) comprises at least two bands (5, 6) and (7, 8) that are mutually aligned and can slide with respect to each other in order to vary the overall length of the wall (2); a linear actuator (9, 10) is interposed between the at least two bands (5, 6) and (7, 8) of the wall (2), for the controlled mutual sliding of the bands; the actuator (9, 10) being adapted to be controlled by a respective control and management unit of a sewing machine (100) that is functionally associatable with the frame (1).

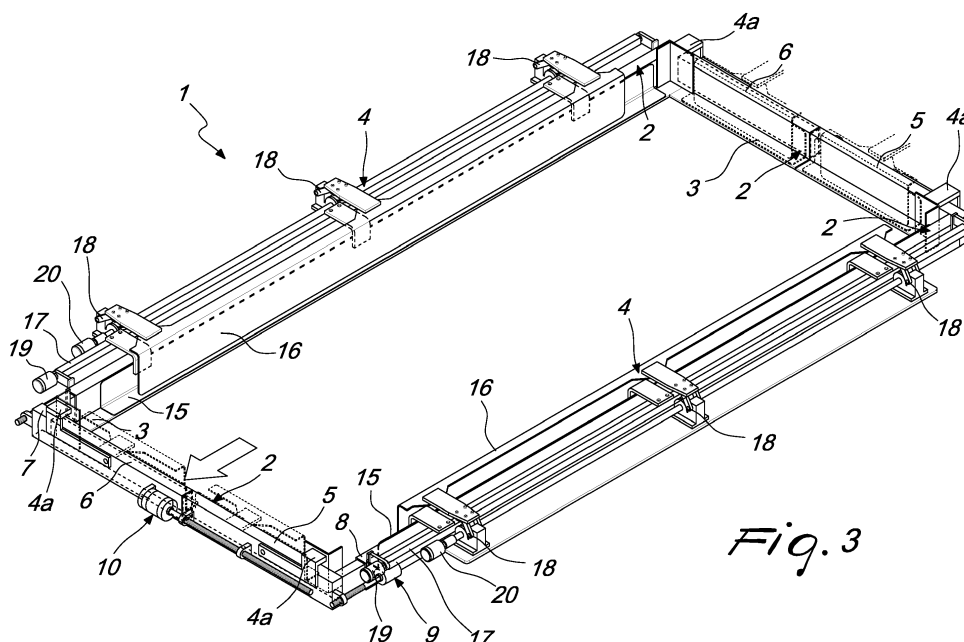


Fig. 3

Description

[0001] The present invention relates to a frame for sewing upper pillows on covering shells for mattresses.

[0002] Mattresses have undergone considerable advances in recent years: such advances have concerned the materials that constitute them, their structure and the presence/absence of specific components.

[0003] Recently the adoption is increasingly frequent of technical solutions that involve a true mattress, parallelepiped in shape, which is contained inside two substantially mirror-symmetrical shells, which are mutually interconnected along respective facing and proximate edges.

[0004] The coupling can be fixed (for example by way of stitch lines and/or edging) or detachable (for example using zip fasteners and/or strips of Velcro® and the like).

[0005] In this type of mattress, recently we have witnessed the spread (and to the great appreciation by customers) of mattresses that are provided with an accessory component called a "pillow top".

[0006] This embodiment involves the arrangement of a padded pillow of varying thickness on the top of the mattress, so as to define a soft layer at the surface upon which the users lie.

[0007] The thickness of this pillow is, generally, a few centimeters (starting from a minimum of approximately one centimeter up to 5 or more centimeters); despite the scant thickness, the interposition of this pillow between the mattress itself and the sheet offers the user a sensation of great comfort.

[0008] It is evident that this implementation solution requires an increase in the number of steps of working on the semi-finished product that will constitute the upper shell of the mattress.

[0009] In order to ensure a sufficient qualitative standard of the finished product, placing the pillow top on the respective shell and the corresponding mutual coupling are operations that are generally performed manually by specialist craftworkers.

[0010] This therefore determines a considerable increase in the costs of mattresses provided with these pillow tops, which relates to the cost of the labor necessary for their production.

[0011] Furthermore the production times are rather long, with consequent production limits that are linked to the need for manual intervention on each one of the mattresses: an increase in productivity is necessarily associated with the hiring of additional specialist craftworkers, who are able to carry out the necessary work.

[0012] The artisan nature of the work, furthermore, does not permit a standardization of the product within narrow margins, without providing for a high number of production discards.

[0013] This applicant has recently filed two patent applications that relate to technical solutions aimed at solving the problems cited above.

[0014] In particular, EPA 14157884.9 discloses and

claims a particular frame that enables an easy mutual positioning of the components on which it is necessary to execute the sewing operations (the shell and the upper pillow). The presence of such frame also makes it possible to identify a new type of optimized sewing machine that adopts it, and a new method of producing mattresses provided with "pillow tops".

[0015] In order to increase the automation and reduce the intervention of operators to the minimum, the Italian patent application no. BO2013A000211 relates to an improved machine that is adapted to sew the upper pillow to a respective shell and which requires only a minimal intervention by operators.

[0016] In reality the intervention of the operators, even in the technical solutions disclosed in the two patent applications cited above, in any case constitutes an important portion of the unit cost of the end product that is produced (the semi-finished product constituted by the shell with the upper pillow sewn on top).

[0017] In some cases, the influence of labor on the cost of the product can be such as to render the technical solutions disclosed in the two patent applications cited above insufficient to achieve an objective of economy of optimal execution, which is required by the makers of mattresses.

[0018] The aim of the present invention is to solve the above mentioned drawbacks, by providing a frame for sewing upper pillows on covering shells for mattresses which is suitable for automating the operations to juxtapose the upper pillow with the respective shell.

[0019] Within this aim, an object of the invention is to provide a frame for sewing upper pillows on covering shells for mattresses which does not require intervention by operators for the change of format operations.

[0020] Another object of the invention is to provide a frame for sewing upper pillows on covering shells for mattresses which makes it possible to increase the productivity of the machine and/or plant in which it is installed.

[0021] Another object of the invention is to provide a frame for sewing upper pillows on covering shells for mattresses which makes it possible to obtain a juxtaposition with optimal alignment of the upper pillow with the respective shell in order to achieve a constant and high qualitative standard of the semi-finished products that it produces.

[0022] Another object of the present invention is to provide a frame for sewing upper pillows on covering shells for mattresses which is low cost, easily and practically implemented and safe in use.

[0023] This aim and these objects are achieved by a frame for sewing upper pillows on covering shells for mattresses, which comprises four perimetric walls, each wall being perpendicular to the two contiguous walls and comprising at least one laminar portion that constitutes a resting surface, said laminar portion being co-planar with a lower edge of said wall, at least one of said walls comprising at least one locking element for at least one component, selected from between an upper pillow and a

covering shell, arranged on a respective laminar portion, characterized in that at least one of said walls comprises at least two bands that are mutually aligned and can slide with respect to each other in order to vary the overall length of the wall, between said at least two bands of said wall there being interposed a linear actuator for the controlled mutual sliding thereof, said actuator being adapted to be controlled by a respective control and management unit of a sewing machine that is functionally associatable with said frame.

[0024] Further characteristics and advantages of the invention will become better apparent from the detailed description that follows of a preferred, but not exclusive, embodiment of the frame for sewing upper pillows on covering shells for mattresses, according to the invention, which is illustrated by way of non-limiting example in the accompanying drawings in which:

Figure 1 is a schematic axonometric view of a frame for sewing upper pillows on covering shells for mattresses according to the invention;

Figure 2 is an enlarged view of a first detail of the frame in Figure 1;

Figure 3 is a schematic axonometric view of the frame in Figure 1 in a first step of adjusting dimensions;

Figure 4 is a schematic axonometric view of the frame in Figure 1 in a second step of adjusting dimensions;

Figure 5 is an enlarged view of a second detail of the frame in Figure 1, in the configuration of locking the pillow on the shell;

Figure 6 is an enlarged view of a third detail of the frame in Figure 1, in the open configuration;

Figure 7 is a front elevation view of a machine for sewing upper pillows on covering shells for mattresses;

Figure 8 is a schematic side view of a first step of operation of the frame according to the invention;

Figure 9 is a schematic side view of a second step of operation of the frame according to the invention;

Figure 10 is a schematic side view of a third step of operation of the frame according to the invention;

Figure 11 is a schematic side view of a fourth step of operation of the frame according to the invention.

[0025] With reference to the figures, the reference numeral 1 generally designates a frame for sewing upper pillows on covering shells for mattresses.

[0026] The frame 1 according to the invention, in an embodiment thereof that is particularly simple and functional, comprises four perimeter walls 2.

[0027] Each wall 2 is perpendicular to the two walls 2 that are contiguous thereto and comprises at least one laminar portion 3 that constitutes a resting surface: the shell that is intended to line one half of the mattress will be laid on such surface, and the pillow top will subsequently be fixed on such shell.

[0028] The laminar portion 3, in order to obtain a structure that is functional and with contained encumbrances, will preferably be co-planar with a lower edge of the wall 2: in essence the laminar portion 3 will constitute a lower frame of the walls 2 that is designed to define a resting base for the shell.

[0029] At least one of the above mentioned walls 2 will comprise at least one locking element 4 for at least one component, selected from between an upper pillow and a covering shell, which is arranged in turn on a respective laminar portion.

[0030] According to the invention, at least one of the walls 2 comprises at least two bands, respectively 5 and 6 (on the short walls 2, with particular reference to the accompanying figures) and 7 and 8 (on the long walls 2, with particular reference to the accompanying figures) which are mutually aligned and can slide with respect to each other in order to vary the overall length of the wall 2 that they define.

[0031] It should be noted that between the at least two bands 5 and 6 (and also between the at least two bands 7 and 8) of the wall 2, a linear actuator 9 (or 10 on the wall 2 of greater length) will be interposed for the controlled mutual sliding of those bands.

[0032] The actuator 9 and/or 10 will in turn be controlled by a respective control and management unit of the sewing machine that is functionally associated with the frame 1.

[0033] This will make the system that is constituted by the frame 1 and by the machine 100 a single plant in which the frame 1 is run integrally with the machine 100.

[0034] In essence the adjustment of the dimensions of the frame 1 will be set by the control and management unit of the sewing machine.

[0035] The advantage of this solution is the complete automation of operations.

[0036] In fact, the operator will only have to select the program corresponding to the sewing process to be executed (which will comprise the dimensions of the mattress that it is intended to produce, the stitch types, their geometry and the affixing of any accessory labels): the control and management unit will send specific signals to the linear actuators 9 and 10 in order to adjust the dimensions of the frame 1 so that it will be able to correctly accommodate the respective shell and, obviously, also the corresponding pillow (as specified below).

[0037] At this point the control and management unit will command the locking means 4 to lock the shell on the laminar portions 3.

[0038] The arrangement of the pillow on top of the shell that was previously coupled to the frame 1 can be done manually by an operator and/or be completely automated, comprising respective apparatuses for depositing the pillow on the frame 1, for example of the type disclosed in Italian patent application no. BO2013A000211.

[0039] It should be noted that, according to a particular embodiment of undoubted practical and applicative interest, the at least two bands 5 and 6 (and/or 7 and 8)

are coaxial, one at least partially inside the other.

[0040] In this embodiment the bands 5, 6 and/or 7, 8 are able to slide telescopically, one inside the other, by way of the action of the respective linear actuator 9 and 10 (respectively) in order to vary the overall length of the respective wall 2.

[0041] It should be noted that, with particular reference to an embodiment of undoubted efficiency, all four of the walls 2 are constituted by at least two bands 5, 6 and 7, 8.

[0042] In this particular case, at least two contiguous walls 2 will comprise a respective actuator 9 and/or 10 for varying the length and the width of the frame 1.

[0043] In order to ensure that the size variations of the frame 1 are fluid and that no jamming will occur owing to interference and/or friction, it should be noted that each wall 2 will comprise a respective actuator 9 and/or 10 for varying the length and the width of the frame 1.

[0044] The actuator 9 and 10 is of the type selected preferably from among a hydraulic cylinder, a pneumatic cylinder, a motor assembly 11, 12 and an endless screw 13, 14, a linear induction motor, an oscillating slot link, an apparatus provided with a rack and pinion, and the like.

[0045] The embodiment shown in the accompanying figures for the purposes of non-limiting explanation is a frame provided with actuators 9 and 10 that are constituted by respective motor assemblies 11, 12 and endless screws 13, 14.

[0046] On the work surface of the invention described, it should be noted that the locking element 4 can conveniently comprise at least one angular abutment 4a that can move from a first configuration, for the insertion of the shell in the frame 1, in which it is arranged substantially outside the walls 2, to a second configuration, for locking the corners of the shell, juxtaposed with the laminar resting portion 3 for the shell at the corners of the shell. In such second configuration the corners of the shell will be aligned and accommodated in the corners of the frame 1, and locked there by the respective angular abutments 4a.

[0047] The presence of four angular abutments 4a (one at each corner of the frame 1), which are capable of moving and adapting to the variations in dimensions of the frame 1, enable an effective locking of the shell, ensuring that it is completely spread out on the frame and that there are no overlaps, wrinkles or arrangements that are not compliant with the requirements of the subsequent sewing.

[0048] The embodiment of greatest interest in terms of practical implementation involves a locking element 4 that comprises a bracket 15 that can move from a first configuration (substantially open), for the insertion of the shell in the frame 1 (resting on the laminar portions 3), in which it is arranged substantially outside the walls 2, to a second configuration, for locking the shell, in which such bracket 15 is juxtaposed with the laminar portion 3 and thus is resting on the shell.

[0049] When the bracket 15 is in the second configu-

ration, the shell is thus clamped between the laminar portions 3 and the bracket 15, and is thus rigidly locked on the frame 1: different types of embodiment are possible, including the solution of undoubted practical interest in which the shell is held on the laminar portions 3 on the four sides of the frame 1. Embodiments are not ruled out in which the shell is locked on the laminar portions 3 only on two mutually opposite sides of the frame 1.

[0050] It should further be noted that the locking element 4 further comprises a retention tab 16 that can move from a first configuration, for the insertion of the pillow in the frame 1 on top of the shell (which was previously locked on the frame 1 by way of the bracket 15), in which it is arranged substantially outside the walls 2, to a second configuration, for locking the pillow on the shell, in which such retention tab 16 is juxtaposed with the laminar portion 3, with the interposition of the shell, of the bracket 15, and of the pillow.

[0051] The at least one laminar portion 3 constitutes a resting surface that is extended along the entire length of the respective wall 2, thus accommodating the shell and the pillow and supporting the perimeter thereof.

[0052] The laminar portions 3 of the walls 2 thus define a lower resting border that lies on the plane that contains the lower edge of the walls 2.

[0053] It should be noted that the angular abutment 4a, the resting bracket 15 and the retention tab 16 are associated with the frame 1 with respective articulation elements 17, 18 that are controlled by specific actuation means 19 and 20 (in the accompanying figures the articulation elements and the actuation means for the movement of the angular abutment 4a are not specifically shown since they are apparatuses of the conventional type, which may be substituted with others that have the same functional characteristics and are based on different principles).

[0054] The actuation means 19 and 20, which are generally constituted by controlled electric motors (however, the possibility is not ruled out in which they are operated manually), can also be controlled by the control and management unit for the automation of the movements of the bracket 15 and of the tab 16.

[0055] The possibility is not ruled out however of adopting actuation means 19, 20 that are manually controlled, i.e. handled by the operator who operates the frame 1.

[0056] The sequence for locking the shell and pillow on the frame thus involves the positioning of the shell on the frame 1, the locking of the respective corners with the angular abutments 4a, the arrangement of the supporting brackets 15 along the sides of the shell, the juxtaposition of the pillow on the shell in the frame, and the corresponding locking with the retention tab 16.

[0057] This sequence ensures an optimal arrangement of shell and pillow in order to be able to subject them to the subsequent sewing.

[0058] A specific high-efficiency and optimally-productive application of the present invention is the implementation of a machine 100 for sewing upper pillows on cov-

ering shells for mattresses, which comprises a supporting structure 101 for at least one retention frame 1 for upper pillows and covering shells for mattresses.

[0059] The frame 1, once arranged on the machine 100, will be associated with respective movement elements that are arranged on the structure 101.

[0060] The machine 100 will further comprise a guiding track 102 for at least one sewing head 103.

[0061] The sewing head 103 will in turn be able to perform a translational movement along the track 102 in a direction that is perpendicular to the movement direction of the frame 1 on the structure 101.

[0062] According to the invention, the machine 100 comprises a control and management unit 104 that is provided with at least one memory stage for storing data strings.

[0063] The stored data strings will relate to a plurality of predefined measurements of upper pillows and covering shells for mattresses and to parameters for sewing each single pillow on the shell.

[0064] It should be noted that the control and management unit 104 will further comprise a user interface, which in particular comprises a display screen 105 and a keypad 106, for entering and selecting the data strings.

[0065] The possibility is not excluded of connecting the unit 104 to a computer network and/or directly to a computer, using the keyboard and screen of a personal computer for entering and/or modifying data.

[0066] It should further be noted that specific elements for moving the frame 1 on the structure 101 and for moving a slider, which can move along the guiding track 102 and is integral with the sewing head 103, are controlled by the control and management unit 104.

[0067] It should conveniently be pointed out that the structure 101 will comprise positively a recess at the sewing head 103: such recess must allow the needle of the sewing head 103 to move to a level lower than that of the structure 101 itself (thus passing through the shell and the pillow that are placed on the frame 1 that is arranged on the structure 101) in order to complete each stitch via a respective abutment.

[0068] According to a particular embodiment of undoubted practical and applicative interest, the guiding track 102 can be arranged substantially at the centerline of the machine 100, and in such case the structure 101 will be constituted by a sliding surface of size adapted to the accommodation and movement of at least one frame 1: the elements for the movement of the frame 1 on the structure 101 will be of the type selected from among belts, preferably of the toothed type, gearwheels and racks and chains.

[0069] This construction choice is dictated by the necessity to precisely define the instantaneous position of the frame 1 at every moment: the presence of teeth (toothed belts, and gearwheels) or links (chains) enables a very precise movement of the frame 1 on the structure 101.

[0070] The movement elements will in turn be coupled

to at least one respective actuation motor that is controlled, as explained previously, by the control and management unit 104. The coordinated movement of the frame 1 on the structure 101 and of the sewing head 103 along the track 102 makes it possible to provide lines and portions of stitching of any length, direction, and shape, optionally even with superimpositions thereof, which enable the creation di embroidery, patterns and the like.

[0071] Finally, it should be noted that the sewing head 103 will be functionally associated with a respective abutment that is controlled by it: such abutment will be adapted to the completion of the sewing operations (comprising thus the elements necessary for the formation of the single stitch, such as the crochet hook and the corresponding spool of thread).

[0072] With regard to the production of shells coupled to respective upper pillows with which to provide the upper covering of a mattress, it should be noted that the sewing operations will consist of a series of consecutive steps, which are listed briefly below.

[0073] Firstly it is necessary to arrange a covering shell for mattresses on the retention frame 1, the dimensions of which have previously been adjusted by way of the actuators 9 and 10 which are controlled by the control and management unit 104.

[0074] The shell must be locked with the bracket 15.

[0075] Subsequently a respective upper pillow will need to be juxtaposed with the covering shell that is accommodated in the frame 1, and will be retained in such position by way of the tab 16.

[0076] Such juxtaposition will be facilitated by the presence of the walls 2 of the frame 1 which will guide the insertion of the pillow, imposing the correct centering thereof with respect to the frame 1.

[0077] The frame 1 can thus be aligned with the sewing head 103 which will perform the coupling, by way of stitch lines, of the upper pillow and of the covering shell.

[0078] Advantageously the present invention solves the above mentioned problems, by providing a frame 1 for sewing upper pillows on covering shells for mattresses which is adapted to the automation of the operations for mutual juxtaposition of the two components that it is designed to contain.

[0079] Positively the frame 1 does not require intervention by operators for the change of format operations.

[0080] Conveniently the frame 1 makes it possible to increase the productivity of the machine 100 and/or plant in which it is installed.

[0081] Profitably the frame 1 makes it possible to obtain a juxtaposition with optimal alignment of the upper pillow with the respective shell in order to achieve a constant and high qualitative standard of the semi-finished products that it produces.

[0082] The invention, thus conceived, is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims. Moreover, all the details may be substituted by other, technically equivalent elements.

[0083] In the embodiments illustrated, individual characteristics shown in relation to specific examples may in reality be interchanged with other, different characteristics, existing in other embodiments.

[0084] In practice, the materials employed, as well as the dimensions, may be any according to requirements and to the state of the art.

[0085] The disclosures in Italian Patent Application No. BO2013A000374 from which this application claims priority are incorporated herein by reference.

[0086] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A frame for sewing upper pillows on covering shells for mattresses, which comprises four perimetric walls (2), each wall (2) being perpendicular to the two contiguous walls (2) and comprising at least one laminar portion (3) that constitutes a resting surface, said laminar portion (3) being co-planar with a lower edge of said wall (2), at least one of said walls (2) comprising at least one locking element (4) for at least one component, selected from between an upper pillow and a covering shell, arranged on a respective laminar portion (3), **characterized in that** at least one of said walls (2) comprises at least two bands (5, 6) and (7, 8) that are mutually aligned and can slide with respect to each other in order to vary the overall length of the wall (2), between said at least two bands (5, 6) and (7, 8) of said wall (2) there being interposed a linear actuator (9, 10) for the controlled mutual sliding thereof, said actuator (9, 10) being adapted to be controlled by a respective control and management unit of a sewing machine (100) that is functionally associatable with said frame (1).
2. The frame according to claim 1, **characterized in that** said at least two bands (5, 6) and (7, 8) are coaxial, one at least partially inside the other, and are able to slide telescopically under the action of said actuator (9, 10) in order to vary the overall length of the respective wall (2).
3. The frame according to claim 1, **characterized in that** said walls (2) constituted by at least two bands (5, 6) and (7, 8) are four in number, at least two contiguous walls (2) comprising a respective actuator (9, 10) in order to vary the length and width of said frame (1).
4. The frame according to claim 3, **characterized in that** each wall (2) comprises a respective actuator (9, 10) in order to vary the length and width of said frame (1).
5. The frame according to claim 1, **characterized in that** said actuator (9, 10) is of the type selected from among a hydraulic cylinder, a pneumatic cylinder, a motor assembly (11, 13) and an endless screw (12, 14), a linear induction motor, an oscillating slot link, an apparatus provided with a rack and pinion, and the like.
6. The frame according to claim 1, **characterized in that** said locking element (4) comprises at least one angular abutment (4a) that can move from a first configuration, for the insertion of said shell in said frame (1), in which it is arranged substantially outside said walls (2), to a second configuration, for locking the corners of said shell, juxtaposed with the laminar resting portion (3) for said shell at the corners of said shell, the corners of the shell being aligned and accommodated in the corners of said frame (1).
7. The frame according to claim 1, **characterized in that** said locking element (4) comprises a bracket (15) that can move from a first configuration, for the insertion of said shell in said frame (1), in which it is arranged substantially outside said walls (2), to a second configuration, for locking said shell, juxtaposed with the laminar resting portion (3) for said shell.
8. The frame according to claim 1, **characterized in that** said locking element (4) comprises a retention tab (16) that can move from a first configuration, for the insertion of said pillow in said frame (1) above said shell, in which it is arranged substantially outside said walls (2), to a second configuration, for locking said pillow on said shell, juxtaposed with the laminar resting portion (3), said at least one laminar portion (3) constituting a resting surface that lies along the entire length of the respective wall (2), said laminar portions (3) of said walls (2) defining a lower resting border, which lies on the plane that contains the lower edge of said walls (2).
9. The frame according to one or more of the preceding claims, **characterized in that** said angular abutment (4a), said resting bracket (15) and said retention tab (16) are associated with said frame (1) by way of respective articulation elements (17, 18) which are controlled by specific actuation means (19, 20).
10. A machine for sewing upper pillows on covering shells for mattresses of the type comprising a supporting structure (101) for at least one retention frame (1) for upper pillows and covering shells for mattresses, which is associated with respective

movement elements that are arranged on said structure (101), and a guiding track (102) for at least one sewing head (103), said sewing head (103) being able to perform a translational movement along said track (102) in a direction that is perpendicular to the movement direction of said frame (1) on said structure (101), **characterized in that** it comprises a control and management unit (104) provided with at least one memory stage for storing data strings relating to a plurality of predefined measurements of upper pillows and covering shells for mattresses and to parameters for sewing the pillow on the shell, which is associated with a user interface (105, 106) for entering and selecting said data strings, at least one wall (2) of said frame (1) comprising at least two bands (5, 6) and (7, 8) that are mutually aligned and can slide with respect to each other in order to vary the overall length of the wall (2), between said at least two bands (5, 6) and (7, 8) of said wall (2) there being interposed a linear actuator (9, 10) for mutual sliding, which is actuated by them and is controlled by said control and management unit (104).

- 11. The machine according to claim 10, **characterized in that** said movement elements and a slider, which can move along said guiding track (102) and is integral with said sewing head (103), are controlled by said control and management unit (104).

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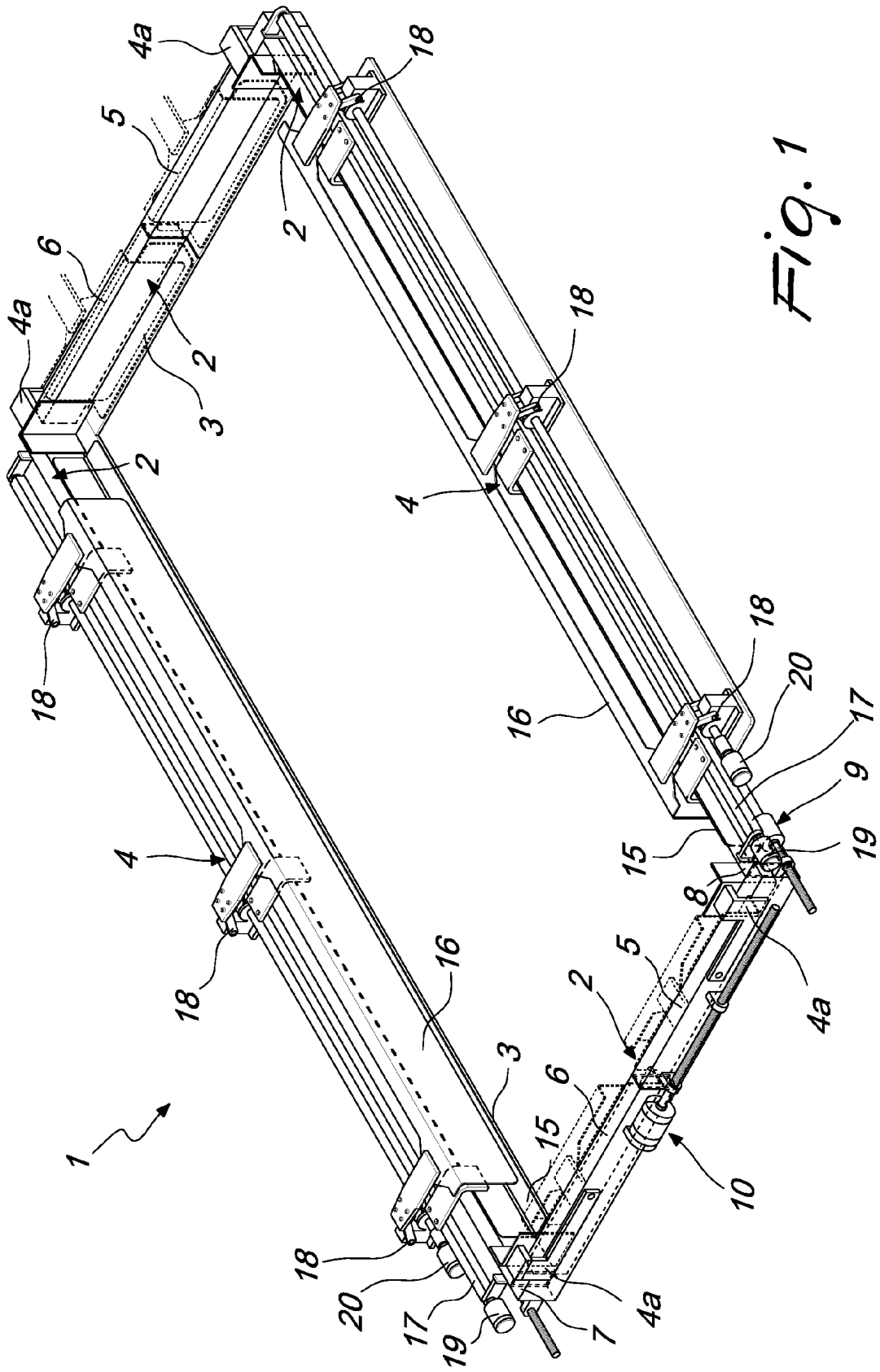


Fig. 1

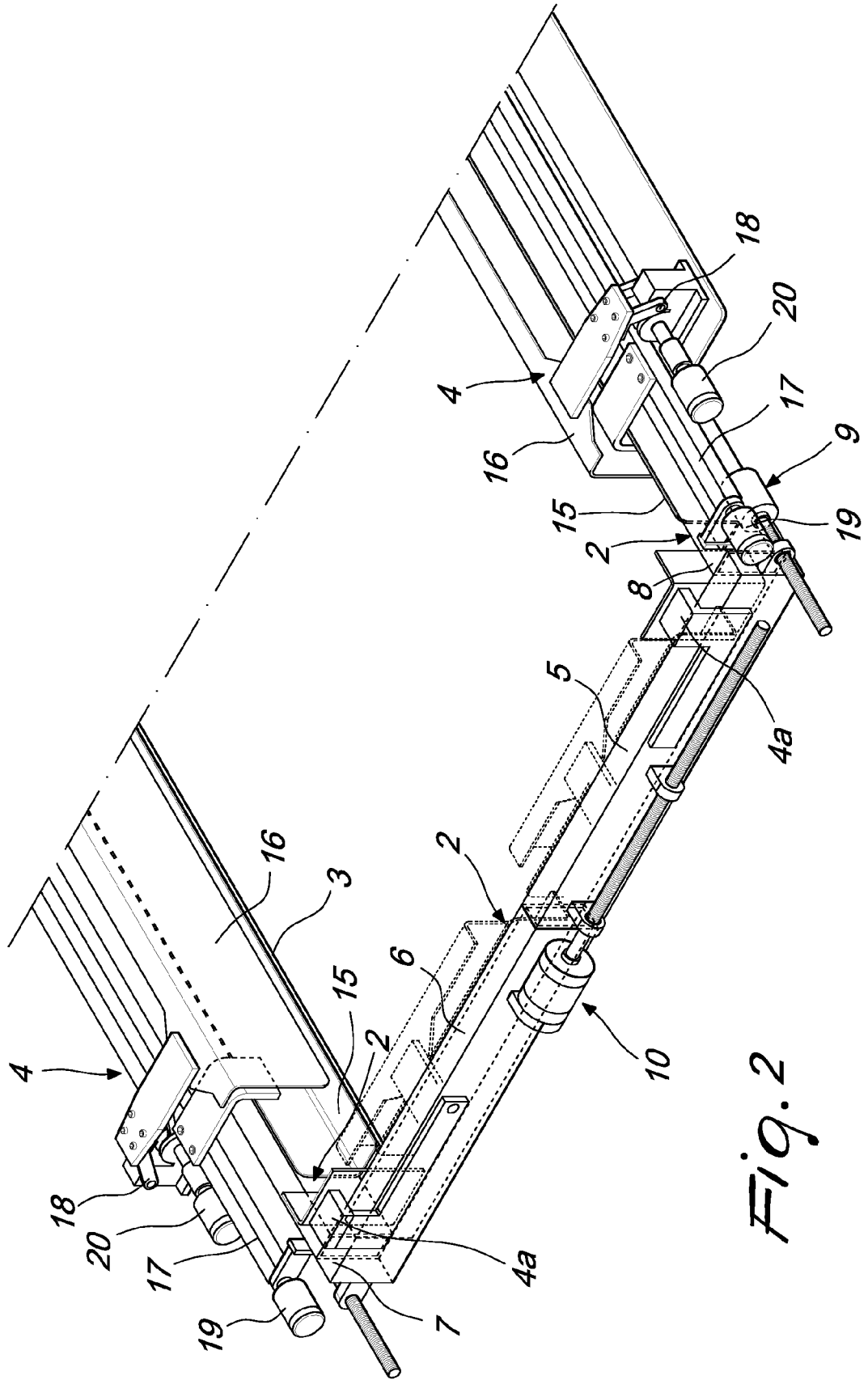


Fig. 2

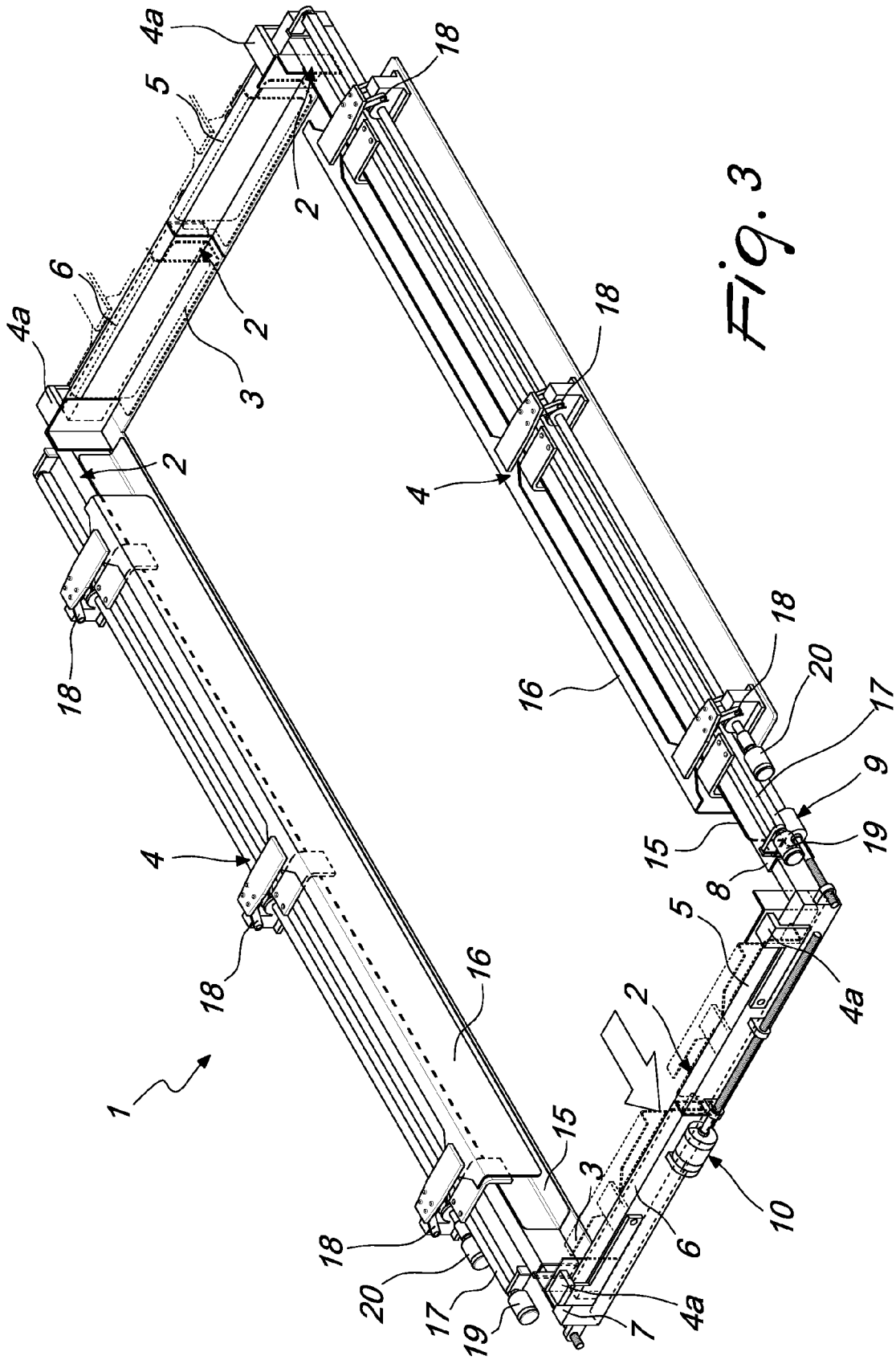


Fig. 3

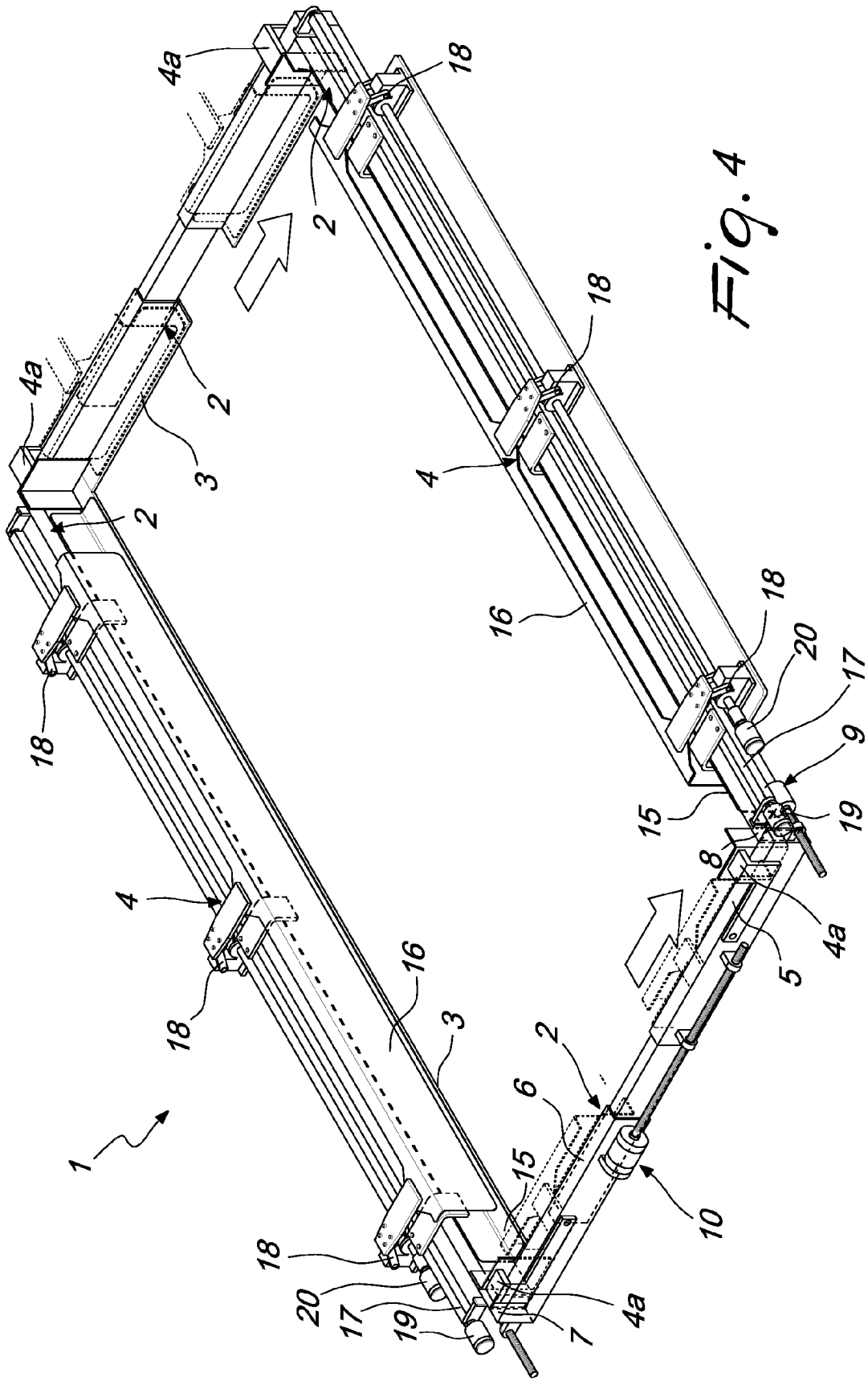


Fig. 4

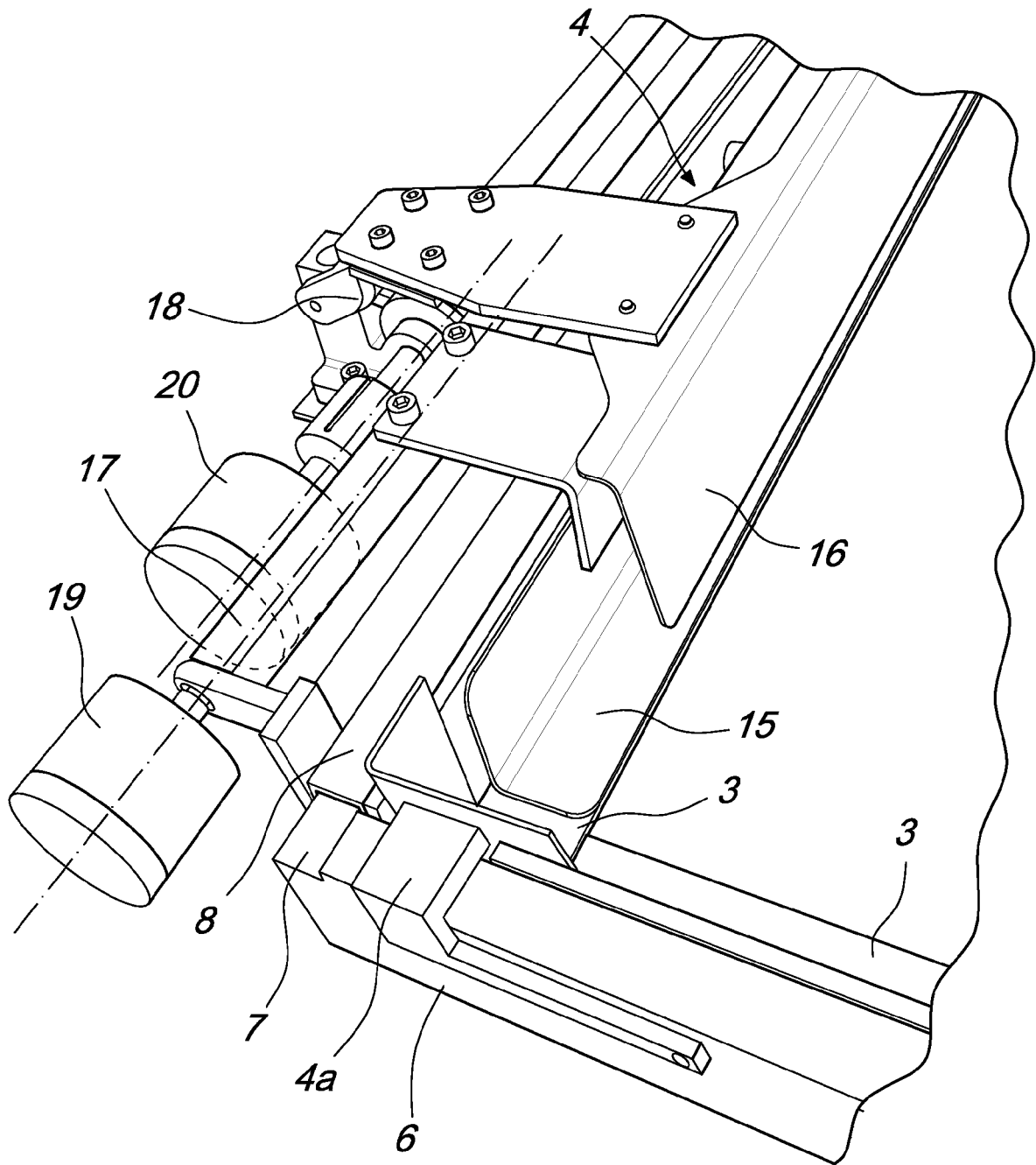


Fig. 5

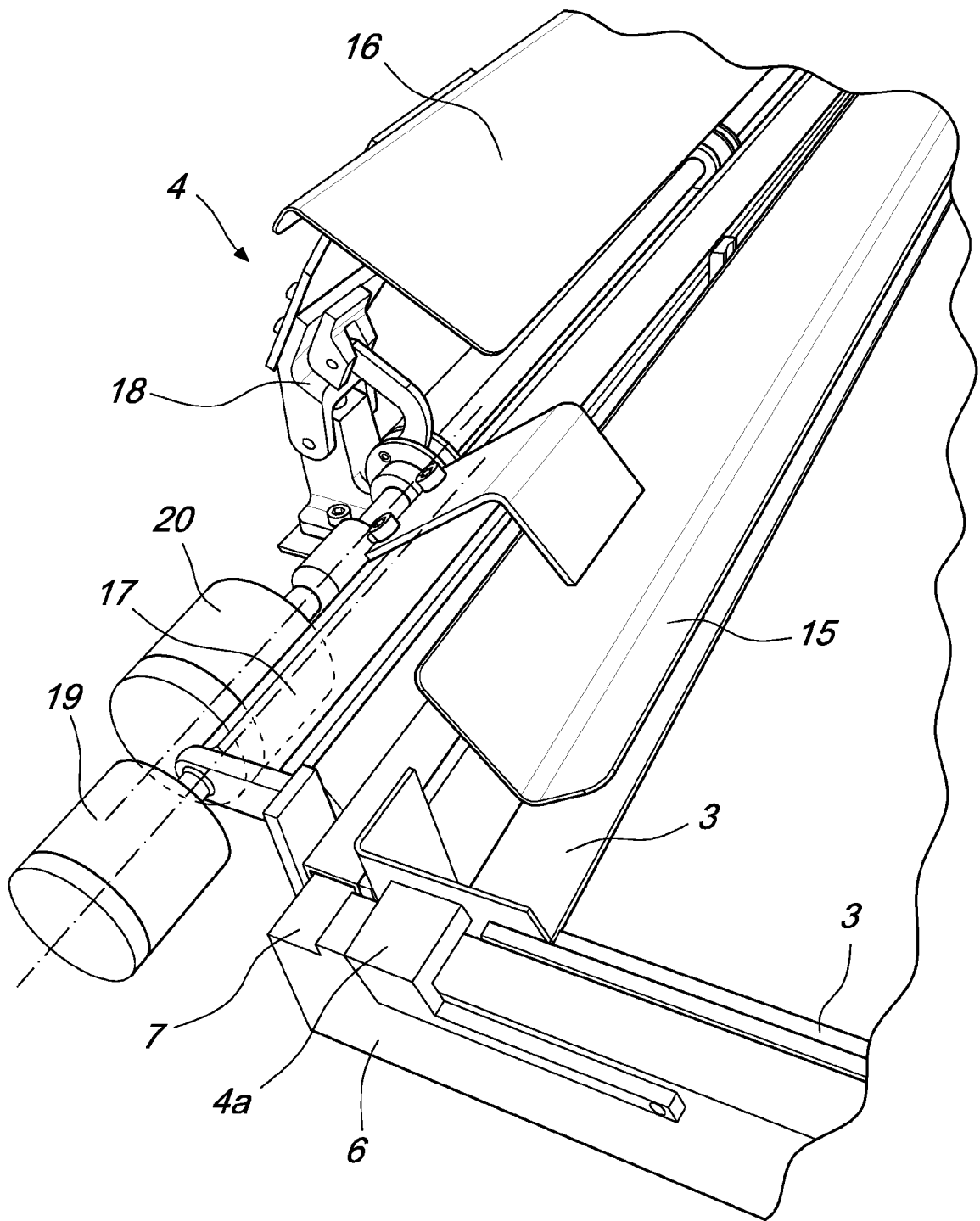


Fig. 6

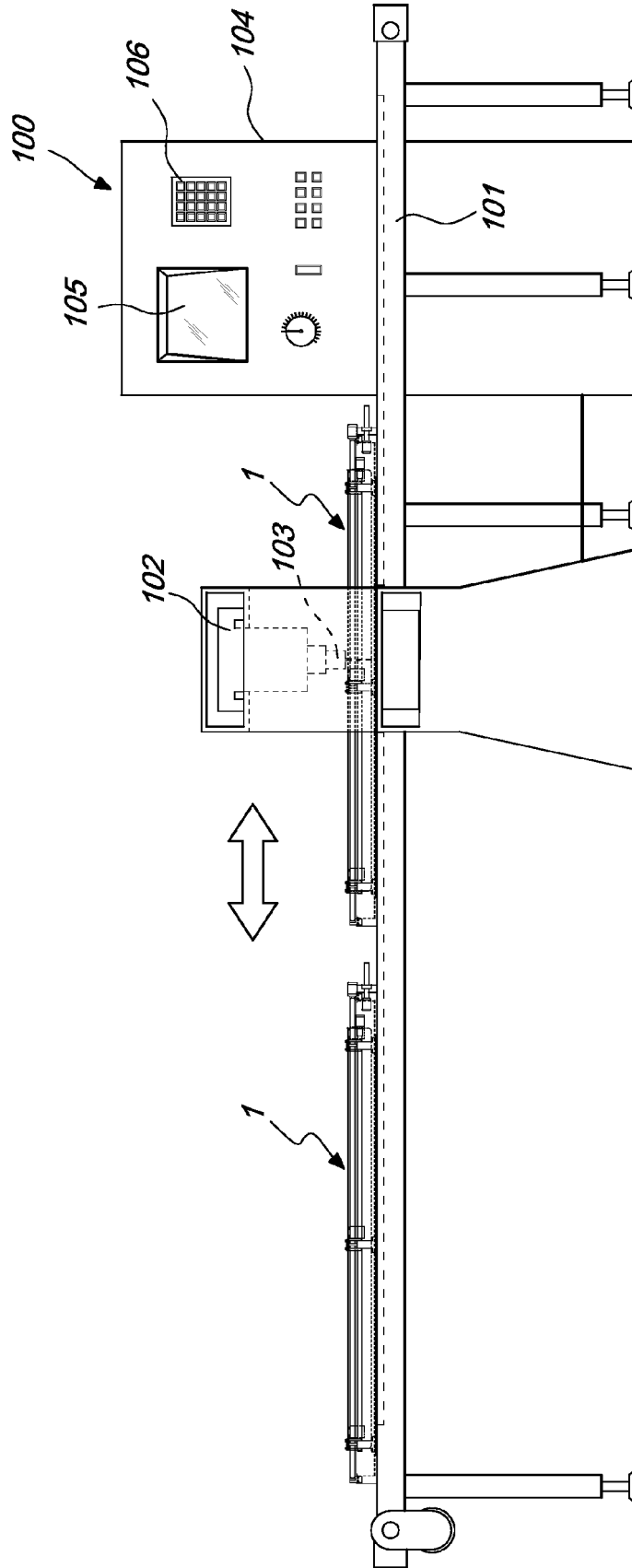


Fig. 7

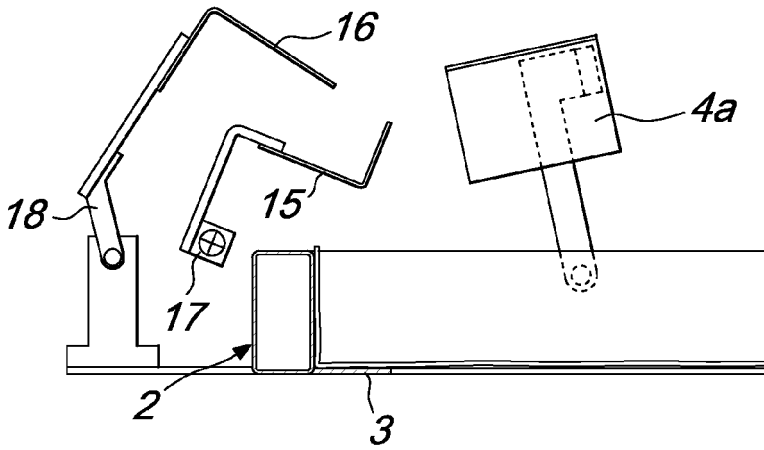


Fig. 8

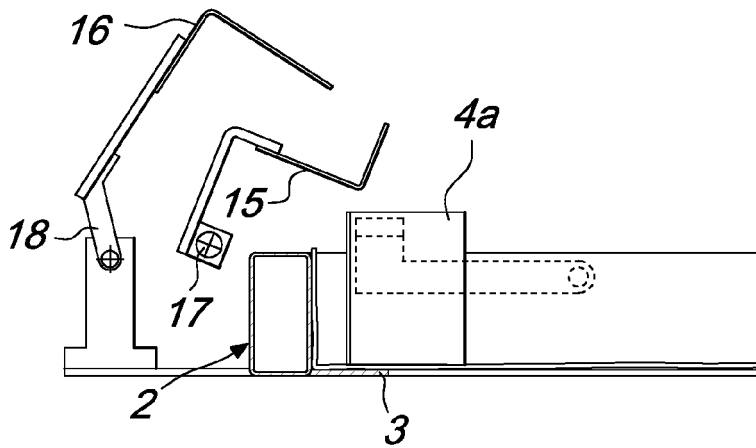


Fig. 9

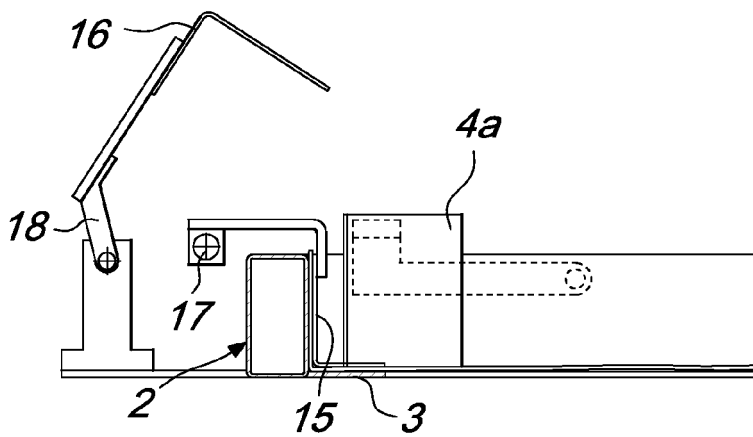


Fig. 10

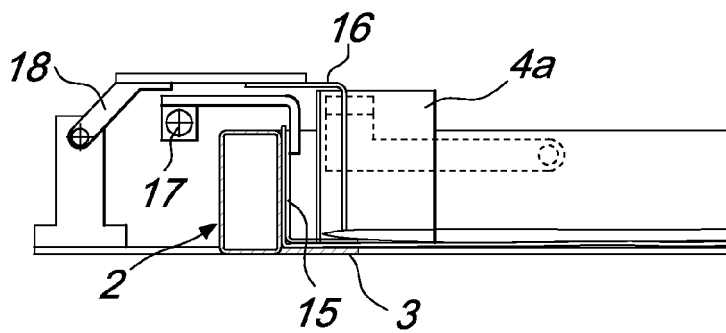


Fig. 11



EUROPEAN SEARCH REPORT

Application Number
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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 3 180 293 A (CASH DAVID R) 27 April 1965 (1965-04-27) * column 4, line 1 - column 12, line 51; figures 1-15 *	1-11	INV. D05B11/00 D05B39/00
A	----- US 3 487 796 A (SANDERS SIDNEY) 6 January 1970 (1970-01-06) * column 3, line 38 - column 9, line 38; figures 1-11 *	1-11	
A	----- DE 100 33 017 A1 (JANOME SEWING MACHINE CO LTD [JP]) 1 March 2001 (2001-03-01) * column 3, line 26 - column 10, line 1; figures 1-17 *	1-11	
A	----- US 4 788 921 A (CODOS RICHARD N [US]) 6 December 1988 (1988-12-06) * column 9, line 49 - column 18, line 52; figures 1-30 *	1-11	
			TECHNICAL FIELDS SEARCHED (IPC)
			D05B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 11 July 2014	Examiner Herry-Martin, D
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	

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EPO FORM 1503 03.82 (P04C01)

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

EP 14 17 0058

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

11-07-2014

10

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
US 3180293	A	27-04-1965	NONE	

US 3487796	A	06-01-1970	DE 1946069 A1	26-03-1970
			FR 2018627 A1	26-06-1970
			GB 1225934 A	24-03-1971
			US 3487796 A	06-01-1970

DE 10033017	A1	01-03-2001	CA 2312447 A1	09-01-2001
			DE 10033017 A1	01-03-2001
			TW 500134 U	21-08-2002
			US 6435115 B1	20-08-2002

US 4788921	A	06-12-1988	NONE	

15

20

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EPO FORM P0459

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- IT BO20130211 A [0015] [0038]
- IT BO20130374 A [0085]