



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
10.08.2022 Bulletin 2022/32

(51) International Patent Classification (IPC):
D05B 35/04 (2006.01)

(21) Application number: **22152810.2**

(52) Cooperative Patent Classification (CPC):
D05B 35/04

(22) Date of filing: **21.01.2022**

(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
Designated Validation States:
KH MA MD TN

(71) Applicant: **Tor.Mec Ambrosi S.r.l.**
37059 Santa Maria Di Zevio (Verona) (IT)

(72) Inventor: **MORANDIN, Dario**
36059 SANTA MARIA DI ZEVIO (Verona) (IT)

(74) Representative: **Sandri, Sandro**
Bugnion S.P.A.
Via Pancaldo 68
37138 Verona (IT)

(30) Priority: **05.02.2021 IT 202100002663**

(54) **MEANS FOR RETAINING FABRIC EDGES TO BE FOLDED OVER FOR A FOLDING SYSTEM**

(57) A folding plate (10) for folding inwardly, by means of a template (11), edges of pockets of the patch type applicable by sewing on a base fabric of items of clothing, said plate being made by combining several superimposed layers:

- a first support layer (12), forming the supporting base for pressing cylinders;
- at least a second support layer (13), superimposable on the first layer (12) and having a perimeter edge substantially corresponding to that of said first layer (12),

said second layer being made of plastic material; said plate (10) comprising a further layer (15), superimposable on the other layers, but in this case made of ferromagnetic metal material, wherein said further layer (15) is associated with a plurality of shaped magnetic abutments (17), which are removably applied and secured onto the layer itself so as to determine the area of folding of the pocket based on the conformation of said template (11).

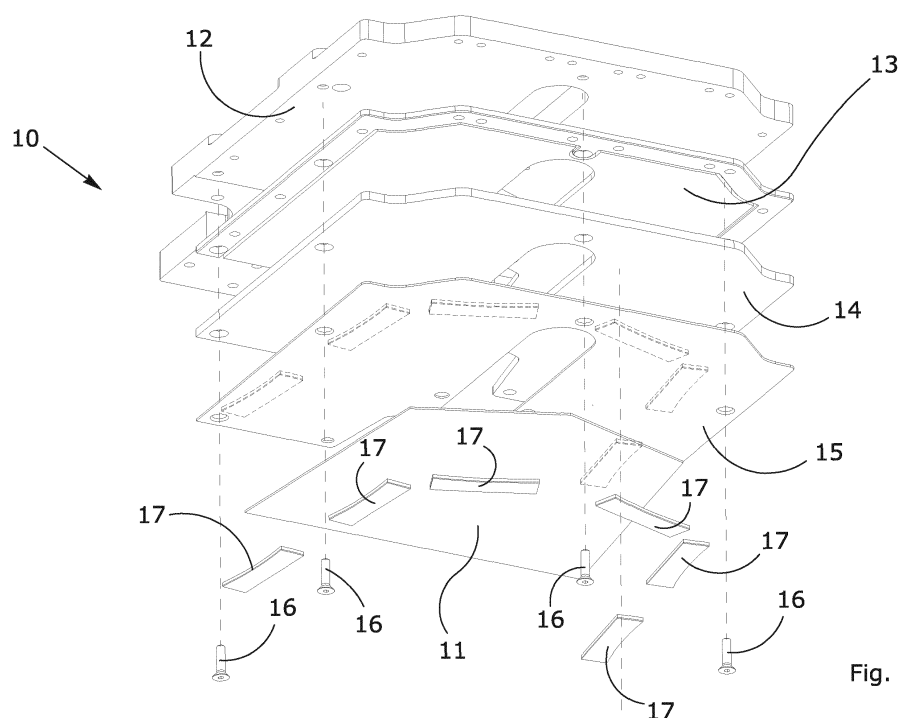


Fig. 1

Description

FIELD OF APPLICATION

[0001] The present invention regards the relative means for retaining fabric edges to be folded over on a folding system with adjustable elements.

[0002] It is a method that relies on suitable means which determine the retention of pockets of the patch type inserted on a flat auxiliary metal plate applied to a folding system.

[0003] This plate is complementary and is applied in the lower part of a traditional folding system. In order to contain the inwardly folded outer edges of the desired shape, independently of the shape and dimensions of the folded edge, magnets endowed with an external plastic casing are applied; they are applied to the outermost metal plate of a folding plate, where such magnets are intended to keep the edge of the material in position in order to have a perfect quality of sewing on items of clothing.

[0004] In particular, the invention relates to a system for folding and then sewing patch pockets which relies on a metal plate, or template, having the dimensions of the pockets to be folded, so that the pockets themselves can be inserted into a system for the folding thereof, and subsequent sewing on a base fabric, as could occur in the typical case of back patch pockets on a pair of jeans or other similar components intended for the formation of items of clothing.

[0005] According to the present invention it is envisaged to use said delimiting magnetic elements, which are positioned on the support plate around the pocket to be folded, and which, thanks to the possibility of being moved as desired, can be rapidly adapted according to the format of the pocket itself, so as to increase the versatility of the folding system and simultaneously simplify adjustment operations, which must be performed by the assigned personnel every time it is necessary to change the pocket format.

[0006] The present invention is advantageously applied in the sector of industrial devices for the manufacture of items of clothing, in particular for the application of pockets on quarters of jeans-style trousers or other similar applications on items of clothing of various kinds.

PRIOR ART

[0007] It is known that different types of machines are used for the manufacture of items of clothing based on the task they have to perform. For example, in the sector of production of jeans-style trousers, use is made of machines that automate the processes of forming the various pieces to be composed and the application thereof on the base fabric, which, in the specific case, can be represented by a quarter of trousers on which patch pockets are applied.

[0008] The machines that presently enable the forma-

tion of pockets to be applied on quarters of trousers are of different types, and in general they provide for the use of several components, including a mobile pocket carrying template capable of moving from a position of loading the fabric to one of folding the edges thereof; the template is delimited by an outer edge having a profile corresponding to the one of the pocket to be formed.

[0009] According to one of the solutions presently known in the art, said mobile template is associated with a folding body made of soft material, against which the template, during operation, pushes the fabric in order to determine the raising of the edges, which are intercepted by folding blades adapted to intervene when the edges are raised, allowing them to be folded over by making each of them complete a 180° inward rotation.

[0010] In this case, the length of the edges of material to be folded over is decisive for the success of the folding operation, and in order to have a perfectly formed "sharp" edge around the shape of the pocket, during their movement towards the inside of the pocket, the folding blades must be capable of pushing the material, and therefore they exert a force or pressure on the material itself to fold it over inside the pocket.

[0011] In the case of elasticised fabrics all this causes loosening or creases or in any case problems that negatively impact the quality of the finished product. Subsequently, during the opposite opening movement of the folding blades, if the edge of material is too short, the friction of the folding blades on the material itself will drag the folded material out again and thus the material will not be folded over or will not maintain a sharp angle.

[0012] In order to make the folded material remain in position, the prior art envisages the addition of two possible variants:

- a) according to the solution DERIM 2010201700007377820 of 30.06.2017, a further counter-folding forming element is added on top of the classic system, wherein in the aforesaid forming element an opening is created which is shaped with the same profile as the pocket shape to be obtained;
- b) according to a further solution, dedicated abutments of material are added and they are glued onto the upper support of the folding unit.

[0013] In both of these methods, in the event that the thickness of the material changes and the hole of the forming element is too wide, supports made of easily workable material as per solution b) are applied to solution a) to keep the material still.

[0014] The added forming element of material is then mechanically fixed to the folding system by means of fastening screws or this forming element is anchored by means of a rapid-release system with permanent magnets that keep it in a certain position against the folding unit.

[0015] It should be noted that solution a) or solution b) imply that for every pocket forming element and/or

change in thickness of the material used on the same pocket forming element an additional dedicated metal piece or various pieces of easily workable material must be created so as to be applied to the existing folding system, with a considerable waste of time and with the need to construct dedicated interchangeable pieces.

[0016] According to a further solution presently known in the art, said template is associated with a folding body made of rigid material. In this case, a well made of easily workable metal is created in the folding body; the profile of the pocket enters into the well, which contains the edges of material when the folding blades are reopened.

[0017] In this case as well, besides the cost for creating this special well with numerical control milling machines, the final result depends not only on the physical shape of the pocket but also on the thickness of the material used, as the dedicated free space around the pocket forming element must be perfectly calculated, since the fabric must not have the possibility of shifting and must be free to enter into the dedicated well.

[0018] Therefore, this solution is not universal and every pocket shape must have corresponding to it a different folding body with a well shaped according to the conformation of the pocket and of the respective template.

[0019] Consequently, it is necessary to have several folding bodies corresponding to the different pocket shapes.

[0020] Summing up, therefore, if it is necessary to have a pocket forming element with the outer edges folded over perfectly inside it, so as to form a "sharp" angle on the outer part of the pocket, in the event that the edges to be folded over must have a length of less than 12 mm, for example, with a folding body made of elastic, deformable material, it will be necessary to supplement the system with a further flat forming element produced with the well of the pocket obtained therewithin, and/or to add and glue a whole series of elements to the folding system in order to contain the edge of the folded material.

[0021] In the case of a rigid folding body with a shaped recess, by contrast, every time the need arises to change the shape or dimensions of the pocket to be made, it will be necessary to replace not only the template but also the folding body of the machine.

[0022] Moreover, the use of a folding body made of elastic material results in the formation, during the manufacturing process, of anomalous tensions of the fabric, especially in the case of elastic fabric, while it is being compressed against the elastic folding body, making it extremely difficult to maintain the perfect planarity of the fabric and compromising the manufacturing process.

DESCRIPTION OF THE INVENTION

[0023] The present invention aims to provide a modular system for folding patch pockets of any shape and size, with the use of a plate for folding fabric edges intended for the application thereof by sewing on items of clothing, wherein the folding plate in contact with the material is

made up, on the top, of a flat metal plate, which is fixed to the folding unit by means of screws.

[0024] This plate comprises a series of universal magnetic abutments, which have a rectilinear shape on one side and an arched one on the other. These abutments made of rigid material have the possibility of adapting their position to the profile of the central shape of the pocket, with characteristics of rapid changeover and complete universality, thus creating a condition able to eliminate or at least reduce the drawbacks highlighted above.

[0025] The invention aims in particular to provide a plate for folding fabric edges, typically trouser pockets, which combines the advantages of the manufacturing precision obtained with the use of a folding body made of a rigid material with the advantages obtained by using a system for rapid adjustment of the various formats, so as to obtain manufacturing of utmost quality with manufacturing times, and above all times necessary for size changes, that are extremely short and without additional costs since there is no need to create or add any further mechanical part besides the ones used.

[0026] Another object of the invention is to provide a folding device for fabric edges that is simple and economical to produce and comprises means for containing the pockets which are suitable for being rapidly adjusted based on the different formats and/or dimensions of the fabric to be folded, while limiting the time necessary for replacement operations, which are carried out in an extremely fast manner, with the sole replacement of the template supporting the pocket material to be folded over and the respective folding blades in the event of a new model, replacements that are unnecessary in the event of a change in material with the same pocket forming element.

[0027] This is obtained by means of a plate for folding fabric edges intended for the application thereof by sewing on items of clothing, whose features are described in the main claim.

[0028] The dependent claims of the solution in question outline advantageous embodiments of the invention.

[0029] According to the invention it is substantially envisaged that the plate of the folding device is made in at least three parts, that is, by reciprocal assembly between an upper supporting flat metal part with pressing cylinders, at least one intermediate plate made of plastic material, and a further lower flat part, this time made of metal material, on which special shaped magnetic abutments are positioned; the latter can be adjusted based on the shape and dimensions of the pocket being manufactured, thus making it possible to use a universal plate suitable for all pocket sizes and shapes.

ILLUSTRATION OF THE DRAWINGS

[0030] Additional features and advantages of the invention will become clear upon reading the following description of one embodiment of the invention, provided

by way of non-limiting example, with the aid of the drawings illustrated in the appended figures, of which:

- figure 1 represents an exploded schematic bottom view of a folding plate for folding fabric edges composed of several components, including at least one metal layer on which magnetic abutments may be positioned, the magnetic abutments being placed with the inner edge thereof set on the template having the shape and the dimensions of the pocket being manufactured;
- figure 2 is a schematic view referring to a folding plate according to the invention taken as a whole, seen from the top, i.e. from the opposite side relative to the preceding exploded view;
- figure 3 illustrates a schematic plan view showing the plate according to the invention assembled and provided with the magnetic abutments set on the metal layer around the template supporting the pocket;
- figure 4 is a schematic axonometric perspective view of the folding plate on whose metal layer the magnetic delimiting elements are positioned.

DESCRIPTION OF ONE EMBODIMENT OF THE INVENTION

[0031] Making reference to the appended figures, and initially in particular to figure 1, 10 generally indicates a plate according to the invention for folding pockets of the patch type, suitable for collaborating with a template 11 for supporting the fabric to be folded, wherein said template has an outer edge having a profile corresponding to the one of the pocket to be formed.

[0032] The template 11 is associable with said folding plate 10 since on the latter the edge of a shaped recess is made, the recess being made to determine the containment of the edges which are intercepted by folding blades, not shown, which in turn intervene in order to fold over said edges by making each of them complete a 180° rotation towards the central part.

[0033] More precisely, the folding plate 10, in the best performing configuration thereof, is made using the following superimposed components:

1. a first support layer 12, forming the base of the folding plate and having a substantially flat conformation, on one face of which seats are fashioned for the coupling thereof with the movement means of the folding blades (not shown), whilst the opposite face is substantially flat;
2. a second support layer 13, superimposable on the first layer 12 and having a fixed perimeter edge substantially corresponding to that of said first cylinder support layer 12, and which is made of plastic material;
3. an optional third layer 14, likewise made of plastic material, superimposable on the other two layers;

4. a fourth layer 15, superimposable on the other layers, but in this case made of ferromagnetic metal material.

[0034] The joining, obtained by means of screws 16, between said components 12 to 15 which compose the folding plate 10 results in the formation of a single body, which forms a single substantially flat plate 10, on which the edge of the pocket to be folded will go to rest while it is supported by the respective template 11.

[0035] According to a preferred embodiment of the invention represented in figure 1, it is envisaged that the means for delimiting the area on which the template with the pocket will rest, and which determines the operations of containing the material of the edges folded over by 180°, is obtained using special shaped magnetic abutments 17, which are removably applied and secured onto the metal layer 15, so as to be able to be easily moved according to need, that is, according to the format changes for the different types of pockets.

[0036] More in particular, the shaped magnetic abutments 17, which are optionally provided with an external plastic casing, are made with a thickness such as to enable the folding blades (not shown), which cooperate to fold the edges on said template, to move reciprocally nearer so as to push the edges of the pocket from the template containing them and push them folded by 180° in concentric directions.

[0037] In other words, the thickness of the magnetic abutments 17 must be calculated on the basis of the free space between the folding blades and the metal plate 15, which is at least equal to the sum of the double thickness of the fabric of the pocket and the thickness of the pocket support template 11.

[0038] It should be noted that the magnetic abutments 17 are always positioned around the shape of the pocket corresponding to the template 11, but at the least possible distance in order to keep the material still during the re-opening of the folding blades. This least possible distance corresponds to the thickness of the material used on the pocket forming element of the template 11.

[0039] Moreover, the magnetic abutments 17, which have a substantially elongate rectangular shape, are shaped so as to be able to contain the edges of pockets of any conformation whatsoever, and for this reason one of the two long sides is rectilinear and the other is curved, so that they can be adapted also to pockets with curved edges.

[0040] According to the invention it is envisaged that one or more magnetic abutments can be used for every side of the pocket, or that a certain number can be used which can vary also based on the length of each abutment.

[0041] From the tests carried out it was found that given an average length of the abutments 17, two, or if necessary three, can be used for every side.

[0042] This allows the abutments to be easily moved as needed based on the shape and dimensions of the

pocket being manufactured, thus making it possible to use a universal plate suitable for all pocket sizes and conformations.

[0043] According to the invention it is also envisaged that visual references corresponding to the most common shapes and dimensions of the pockets used are applied on the adhesion surface of the metal layer 15, so that the abutments 17 can be moved with utmost simplicity.

[0044] In order to vary the conformation of the pocket to be treated, it is sufficient to replace the template 11 and then rest the new template on the folding plate 10, move the magnetic abutments 17 to 1 millimetre from the template 11 or position the magnetic abutments 17 along the reference corresponding to the profile of the new batch of pockets to be manufactured, and possibly choose the rectilinear or curved edge of each, and, finally, apply the template 11, with extremely simple, fast operations, to the movement base thereof.

[0045] As may be noted, the system described makes it possible to obtain all of the above-described advantages related to the use of said magnetic delimiting elements, which are positioned on the support plate around the pocket to be folded, and which, thanks to the possibility of being moved as desired, can be rapidly adapted according to the size of the pocket itself, so as to increase the versatility of the folding system and simultaneously simplify the adjustment operations which must be carried out by the assigned personnel every time the pocket size has to be changed

[0046] The invention has been previously described with reference to a preferred embodiment thereof. However, it is clear that the invention is susceptible of numerous variants falling within the scope thereof, in a context of technical equivalence.

Claims

1. A folding plate (10) for folding inwardly, by means of a template (11) and folding blades, edges of pockets of the patch type applicable by sewing on a base fabric of items of clothing, said plate being made by combining several superimposed layers:

- a first support layer (12), forming the supporting base for pressing cylinders;
- at least a second support layer (13), superimposable on the first layer (12) and having a perimeter edge substantially corresponding to that of said first layer (12), said second layer being made of plastic material;

said folding plate (10) being **characterised in that** it comprises a further layer (15), superimposable on the other layers and made of ferromagnetic metal material, and **in that** a plurality of shaped magnetic abutments (17) is applicable on said further layer

(15), the abutments (17) being removably applied and secured onto the plate itself so as to determine the area of folding of the pocket which corresponds to the conformation of said template (11).

2. The folding plate (10) according to the preceding claim, **characterised in that** said shaped magnetic abutments (17) are made with a thickness such as to allow said folding blades, which cooperate to fold the pieces on said template, not to interfere during their movement and to move reciprocally closer so as to fold over the edges of the pocket from the template containing them and push them inwardly, folded by 180°, contacting the magnetic abutments.
3. The folding plate (10) according to one of the preceding claims, **characterised in that** said shaped magnetic abutments (17) are provided with an external plastic casing.
4. The folding plate (10) according to one of the preceding claims, **characterised in that** the thickness of the magnetic abutments (17) corresponds to the free space between said folding blades and the layer 15 and is at least equal to the sum of the double thickness of the fabric of the pocket, to which the thickness of the pocket support template (11) is added.
5. The folding plate (10) according to one of the preceding claims, **characterised in that** said magnetic abutments (17), which have a substantially elongate rectangular shape, comprise two long sides, at least one of which is rectilinear while the other is curved.
6. The folding plate (10) according to one of the preceding claims, **characterised in that** a number of magnetic abutments (17) suited to the dimensions of the pocket can be used.
7. The folding plate (10) according to one of the preceding claims, **characterised in that** said magnetic abutments (17) can be moved on the surface of said further layer (15) for the adjustment thereof based on the shape and dimensions of the pocket being manufactured.
8. The folding plate (10) according to one of the preceding claims, **characterised in that** visual references corresponding to the most common shapes and dimensions of the pockets used are applied on the adhesion surface of the metal layer (15), so that the abutments (17) can be moved with utmost simplicity and precision.

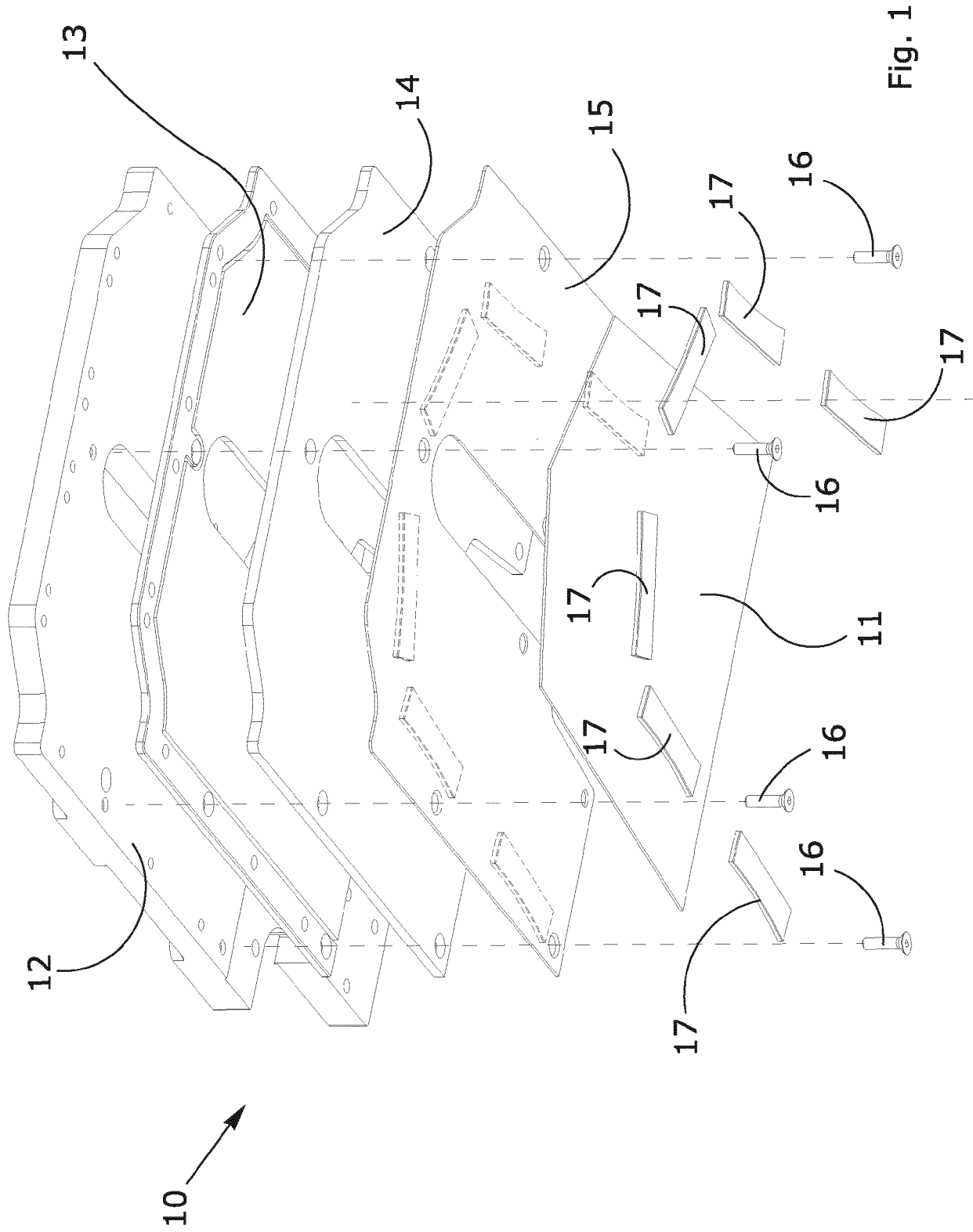


Fig. 1

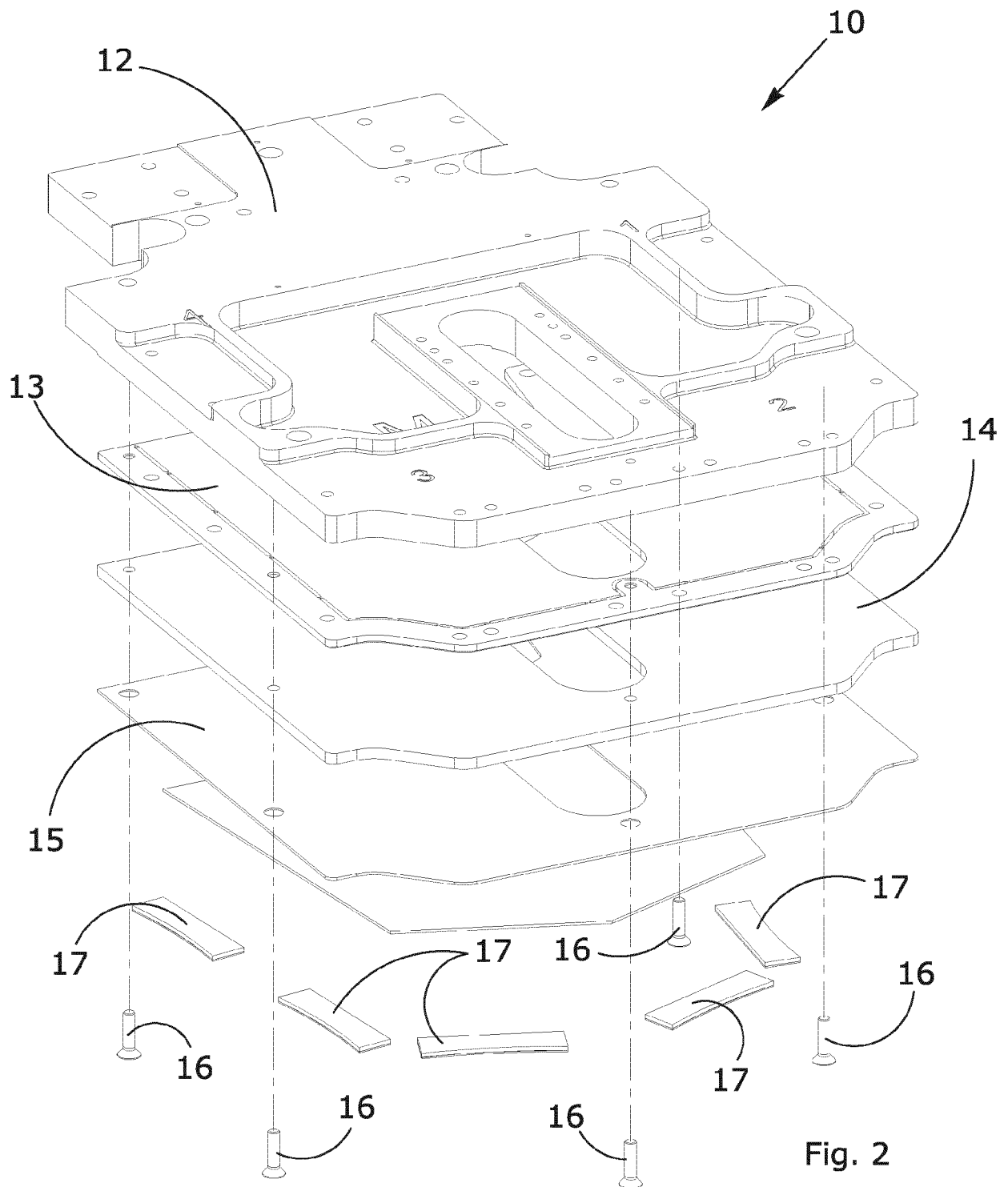


Fig. 2

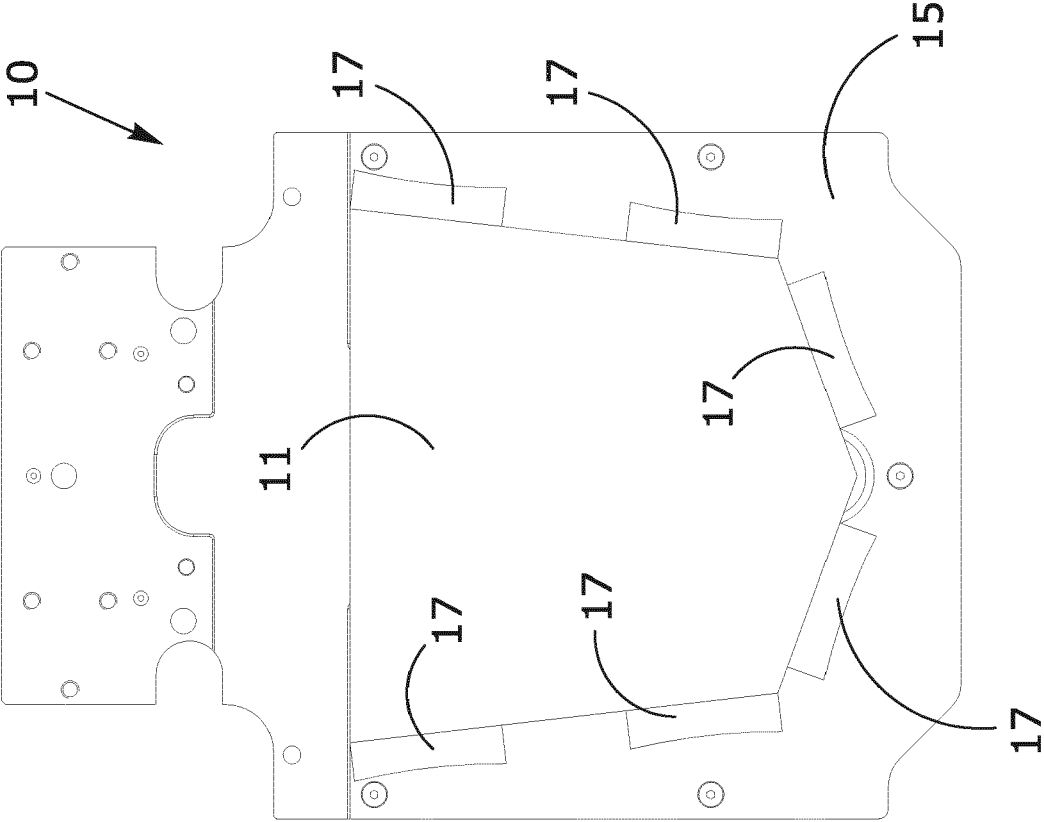


Fig. 3

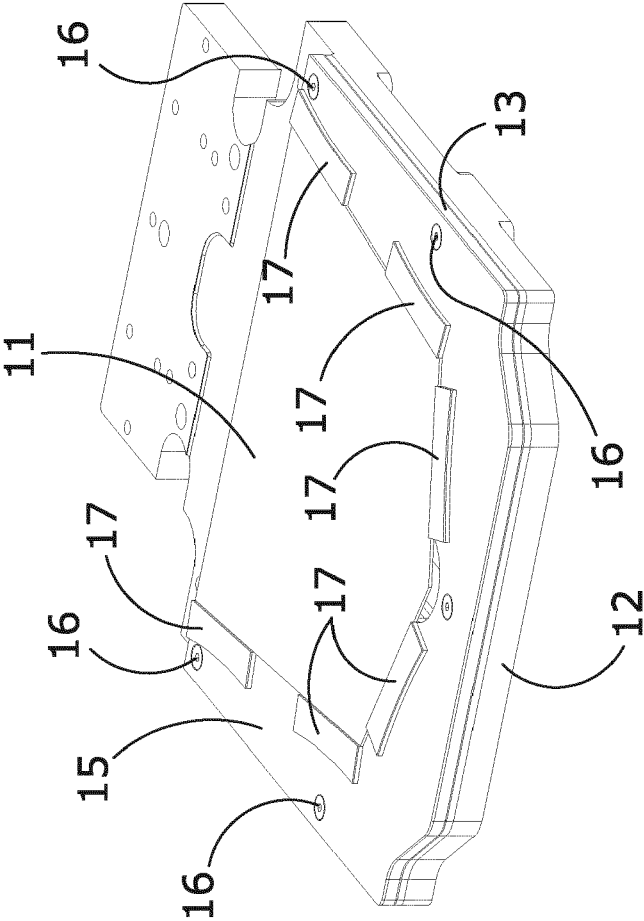


Fig. 4



EUROPEAN SEARCH REPORT

Application Number

EP 22 15 2810

5

10

15

20

25

30

35

40

45

50

55

1

EPO FORM 1503 03.82 (P04C01)

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2018/134246 A1 (DERIM S R L [IT]) 26 July 2018 (2018-07-26) * abstract * * claims 1,2,7 * * figures 4,4A-4E, 5, 6 5A-5E, * * page 1, line 1 - line 10 * * page 3, line 24 - page 7, line 6 * * page 7, line 18 - page 9, line 15 * * page 9, line 25 - page 10, line 12 * * page 10, line 27 - page 11, line 2 * -----	1-8	INV. D05B35/04
A	JP 2000 308779 A (JUKI KK) 7 November 2000 (2000-11-07) * claim 1 * * figures 1-4 * * paragraph [0001] - paragraph [0004] * * paragraph [0006] * * paragraph [0011] * * paragraph [0012] * * paragraph [0013] - paragraph [0015] * * paragraph [0017] * * paragraph [0019] * * paragraph [0020] * -----	1-8	TECHNICAL FIELDS SEARCHED (IPC) D05B A41D A41H
A	CN 208 395 424 U (ZHEJIANG BAIHUI SEWING MACHINE CO LTD) 18 January 2019 (2019-01-18) * the whole document * -----	1-8	
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 23 June 2022	Examiner Heinzelmann, Eric
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	

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

EP 22 15 2810

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.

23-06-2022

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2018134246 A1	26-07-2018	US 2020367591 A1	26-11-2020
		WO 2018134246 A1	26-07-2018
		WO 2018134247 A1	26-07-2018
JP 2000308779 A	07-11-2000	NONE	
CN 208395424 U	18-01-2019	NONE	

15

20

25

30

35

40

45

50

55

EPO FORM P0459

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