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(54) **DEVICE FOR A SEWING MACHINE, OPERATION METHOD THEREOF AND SEWING MACHINE**

(57) The present description relates to a device and respective method for folding flap of a fabric's side inner seam, for a hemming sewing machine comprising a presser foot and a feed dog in the sewing area for operating the needle or needles, wherein the device comprises: a U-shaped section plate comprising a guide plate equidistantly arranged inside the U-shaped section plate for folding the fabric hem, a support plate 6 arranged between the U-shaped section plate and the sewing area; a compressed air supplying source; a compressed air control mechanism comprising a valve and a plurality of air tubes connecting the valve to the air supply source; wherein the plurality of air tubes is arranged within the support plate; wherein the support plate comprises a plurality of blowing holes for releasing air circulating in the plurality of air tubes, the plurality of blowing holes being oriented towards the sewing area, so that when the fabric to be sewn is arranged on the U-shaped section plate, compressed air flows through the plurality of blowing holes folding the flap of the side inner seam towards the sewing area.

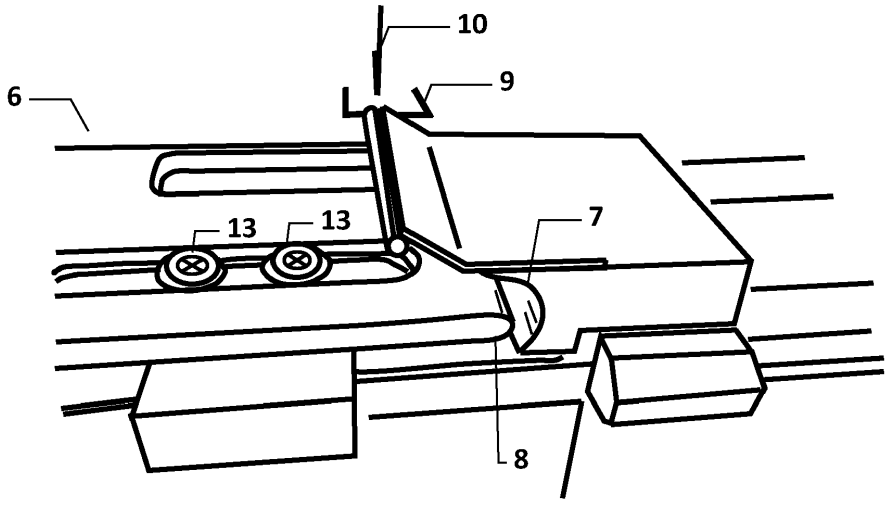

Fig. 5

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Description

TECHNICAL FIELD

[0001] The present description concerns a device and respective method of operation for a sewing machine for guiding a textile seam for a sewing machine.

BACKGROUND

[0002] Sewing machines are known to be used to sew, among other things, hems. Hems are obtained by folding the edges of the fabric, which can be done manually or automatically, being then closed by sewing.

[0003] An automatic way of performing automatic folding is described in utility model TWM307630U which describes a device comprising two blowing blocks, sensors and a hem width adjustment knob. The sensor is used to detect the fabric, and the left blower block is a plate-shaped block with air tubes and blowing holes inside and is connected to compressed air. The blower block sends gas out; and the right blower block comprises a thicker block supported by a column below it, with air tubes and blowing holes inside wherein the gas is sent out of the blower block through communication with compressed air. This device, described in TWM307630U, uses the air flow characteristics to blow and guide the sewing fabric to automatically form a folded shape of the hem, and uses the screw feeding principle, and the position of the left and right air blower blocks can be easily adjusted with the knob to achieve the required width of the bottom hem seam.

[0004] Utility model CN201362787 describes a mechanical seam guide device capable of mechanically sewing a garment material hem, which comprises an air supply, an air control mechanism, a group of cover plates, a folding mechanism and a blowing mechanism. The air control mechanism comprises an electromagnetic valve, a switch and a first air supplying duct. The group of cover plates is mounted on the sewing machine, the folding mechanism comprises a base body and a garment material folding plate, the blowing mechanism comprises a block and a second air supplying duct, an arc-shaped opening and a blowing hole are formed on one side of the block corresponding to the garment material folding plate, and the second air supplying duct communicates with the blowing hole and the electromagnetic valve.

[0005] The need to control the position of the inner flap of the side seam of a sleeve of a t-shirt, shirt, trousers or skirt, when sewing the hem of a fabric is especially relevant to ensure that the flaps of the side seam are tilted on the inside to the correct side, providing a better finish and greater comfort to the user when, for example, it is in direct contact with the user's body. Side inner seam flaps refer to the longitudinal seams joining the fabric, which form a cylindrical body, for example a sleeve, a leg or the torso of a garment.

[0006] A situation that makes it difficult to control the orientation of the inner flaps of the side seams in the hem sewing process is the movement of the machine part and the movement orientation of the hem seam relative to the sewing area.

[0007] In some garments it is possible to see that the inner flaps of the side seam are inverted, that is, they are in opposite directions between the seams; in other words, they are in the same rotational direction, like a 'weather vane'. However, there are some cases where it is desired to keep the flaps of the two side inner seams in the same orientation, requiring the sewing machine operator to advance the seam while manually ensuring that the ends of both side inner seams of the seam are facing the same direction, which causes the sewing machine operator to waste time orienting these flaps during the process of sewing the fabric hem.

[0008] There is additional equipment that could be used in this regard, holding the fabric to allow movement of an additional element to push the flap in the intended direction. However, this would make the hemming sewing process more time-consuming as it would involve stopping the movement of the fabric and reducing the pace of operation.

[0009] None of the previously identified documents describes a device that controls the orientation of the inner ends of the side seam when the hem is being sewn.

[0010] These facts are described in order to illustrate the technical problem solved by the embodiments of the present document.

GENERAL DESCRIPTION

[0011] The present description concerns a device and respective method of operation for a sewing machine for guiding a textile seam. More specifically, it concerns a compressed air-based device that allows controlling the orientation of the inner flaps of the side seam of cylindrical pieces, more specifically the orientation of the end fold, during the formation of the hem stitch when using a sewing machine for sewing sleeves or trousers.

[0012] The present description aims to guide the inner flaps of the side seam in the same direction, when the hem of said garment is being sewn. More specifically, it aims at folding the inner end of the side seam in the direction opposite to the movement of the feed dog, when the sewing machine starts sewing the hem.

[0013] The inner flaps of the side seam, by being oriented into the same direction next to the hem, provide a better finish to the garment and greater comfort for the user.

[0014] The present description relates to a device for folding the flap of a fabric's side inner seam, for a hemming sewing machine comprising a presser foot and a feed dog in the sewing area for operating the needle or needles, wherein the device comprises:

a U-shaped section plate comprising a guide plate equidistantly arranged inside the U-shaped section

plate for folding the fabric hem,
a support plate arranged between the U-shaped section plate and the sewing area;
a compressed air supplying source;
a compressed air control mechanism comprising a valve and a plurality of air tubes connecting the valve to the air supplying source;
wherein the plurality of air tubes is arranged inside the support plate;
wherein the support plate comprises a plurality of blowing holes for releasing air circulating in the plurality of air tubes, the plurality of blowing holes being oriented towards the sewing area, so that when the fabric to be sewn is arranged on the U-shaped section plate, compressed air flows through the plurality of blowing holes folding the flap of the side inner seam towards the sewing area.

[0015] In an embodiment, the plurality of blowing holes is arranged on a side surface of the support plate.

[0016] In an embodiment, the plurality of blowing holes is arranged on the surface closest to the presser foot.

[0017] In an embodiment, the air flow flows from the plurality of blowing holes towards the presser foot, folding the flap of the side inner seam in the desired direction.

[0018] In an embodiment, the guide plate is the support plate, that is, they are the same part.

[0019] In an embodiment, the support plate is integrally formed with air transmission channels and the plurality of blowing holes.

[0020] In an embodiment, the support plate is integrally formed by machining and/or welding.

[0021] In an embodiment, the device comprises a pair of scissors with a mechanically actuated blade for cutting fabric.

[0022] In an embodiment, the scissor blade is arranged at one end of the U-shaped section plate, arranged perpendicular to the side surface of the plurality of blowing holes.

[0023] In an embodiment, the scissor blade is arranged between the U-shaped section plate and the support plate that comprises a plurality of blowing holes.

[0024] In an embodiment, the device comprises a sensor for detecting the end of the hem seam, which will promote the movement of the device to perform the final finish.

[0025] In an embodiment, the source for compressed air is selected from a connection to a compressed air system, an air compressor pump, or a compressed air distribution branch.

[0026] In an embodiment, the device comprises an actuator for activating the valve.

[0027] In an embodiment, the number of holes of the plurality of blowing holes is at least two.

[0028] In an embodiment, the number of holes of the plurality of blowing holes is between 2 and 10, preferably 4 to 8, more preferably 6.

[0029] One of the advantages of this device is that a single piece simultaneously folds a fabric for hem sewing, as well as guides the folding direction of the inner seam flap at the beginning of hem sewing through the plurality of blowing holes.

[0030] The present disclosure further relates to a sewing machine comprising the device for folding the flap of a fabric's side inner seam.

[0031] The present disclosure further relates to a method for sewing a hem of a sleeve fabric, on a sewing machine comprising the device for folding the flap of a fabric's side inner seam, comprising the following steps:

placing the fabric on the U-shaped section plate to fold the fabric;
activating the device valve for passing air flow through the air tubes;
starting movement of the presser foot at a predetermined distance from the end of a first side seam flap;
deactivating the device valve after passing the presser foot through the first side seam;
sewing the end of a second side seam flap;
removing the fabric from the sewing machine.

BRIEF DESCRIPTION OF THE DRAWINGS

[0032] For an easier understanding, figures are herein attached, which represent preferred embodiments which are not intended to limit the object of the present description.

Figure 1: Schematic representation of a prior art sewing machine, wherein the machine comprises a seam guide device.

Figure 2: Schematic representation of a prior art sewing machine, wherein the machine comprises a seam guide device.

Figure 3: Schematic representation of a prior art sewing machine, wherein the machine comprises a seam guide device.

Figure 4: Schematic representation of an embodiment of the device for folding side inner seam flaps.

Figure 5: Schematic representation of an embodiment of the device for folding the side inner seam flaps.

Figure 6: Schematic representation of an embodiment of the device for folding the side inner seam flaps.

DETAILED DESCRIPTION

[0033] The present description relates to a device and respective method for folding the flap of a fabric's side inner seam, for a hemming sewing machine comprising

a presser foot and a feed dog in the sewing area for operating the needle or needles, wherein the device comprises:

a U-shaped section plate comprising a guide plate equidistantly arranged inside the U-shaped section plate for folding the fabric hem;
a support plate arranged between the U-shaped section plate and the sewing area;
a compressed air supplying source;
a compressed air control mechanism comprising a valve and a plurality of air tubes connecting the valve to the air supplying source;
wherein the plurality of air tubes is arranged within the support plate;
wherein the support plate comprises a plurality of blowing holes for releasing air circulating in the plurality of air tubes, the plurality of blowing holes being oriented towards the sewing area, so that when the fabric to be sewn is arranged on the U-shaped section plate, compressed air flows through the plurality of blowing holes folding the flap of the side inner seam towards the sewing area.

[0034] **Figures 1, 2** and **3** represent a prior art sewing machine, wherein the sewing machine comprises a seam guide device. This sewing machine has a fabric folding mechanism and a blowing mechanism, wherein the air guides the folding of the fabric for sewing the hem. In **Figure 1, 1** represents a U-shaped section plate, **2** represents a support plate and **3** the machine platform. In **Figure 2,** the fabric **4** that will be sewn is represented, with **1** being a U-shaped section plate, and **2** representing a support plate.

[0035] In **Figure 3, 1** represents a U-shaped section plate, **2** a support plate, **4** the fabric and **5** the blowing mechanism.

[0036] **Figure 4** represents a top view of an embodiment of the device, with the support plate **6** being shown, wherein the blowing holes **12** are arranged on a side surface of the support plate. The support plate comprises at least two screws **13** for fixing to the machine.

[0037] **Figure 5** represents an embodiment of the device fixed to the sewing machine through the screws **13.** In this figure, a presser foot **9** and a needle **11,** the support plate **6,** the U-shaped section plate **7** and the guide plate **8** are also represented. Preferably, the guide plate **8** is the support plate **6,** that is, they are the same part.

[0038] **Figure 6** represents an embodiment of the device fixed to the sewing machine, with the U-shaped section plate **7** being visible and the plurality of holes **12** being oriented towards the presser foot **9** and its feed dog **11.** The sewing needle **10** is also visible in this embodiment.

[0039] In an embodiment, the plurality of blowing holes **12** is arranged on a side surface of the support plate **6.** Preferably, the plurality of blowing holes **12** is arranged on the support plate, on the surface closest to the presser foot **9.**

[0040] In an embodiment, the air flow flows from the plurality of blowing holes **12** towards the presser foot, folding the flap of the side inner seam in the desired direction.

[0041] In an embodiment, the air flow exiting the plurality of holes **12** guides the inner seam flaps so that they are oriented towards the same direction close to the hem, which provides a better finish to the garment and greater user comfort. For example, on a sleeve, the fold of the two inner seam flaps is oriented toward the back of the respective inner seam or the fold of the two inner seam flaps is oriented toward the front of the respective inner seam. The orientation of the fold of one of the inner seam flaps results from the air flow exiting through the plurality of blowing holes, while the fold of the second side inner seam flap results from the movement of the fabric during sewing.

[0042] In an embodiment, the number of holes of the plurality of holes **12** is between 2 and 10. Preferably, the number of holes is between 4 and 8.

[0043] In an embodiment, the support plate **6** is integrally formed with air transmission channels and a plurality of holes, for release of air flow and respective folding of the flap of the side inner seam to the desired side.

[0044] In an embodiment, the device comprises a pair of scissors wherein the respective blade is arranged at one end of the U-shaped section plate **7,** arranged perpendicularly to the side surface of the plurality of blowing holes.

[0045] In an embodiment, the scissor blade is arranged between the U-shaped section plate and the support plate comprising a plurality of blowing holes.

[0046] In an embodiment, the method for sewing a hem of a sleeve fabric, on a sewing machine comprising the described device comprises the following steps:

placing the fabric on the support plate **6** to fold the fabric;
activating the valve of the device for passing the air flow through the air tubes to the plurality of blowing holes **12,** so as to fold the first flap of the side inner seam in the direction of the air flow;
starting the movement of the presser foot **9** and feed dog **11** at a predetermined distance from the end of the first flap of the side inner seam to sew the respective fold, which is in the desired orientation;
deactivating the device valve after passing the presser foot through the first flap of the side seam, that is, after the fold of the first flap has been sewn;
sewing the end of the second flap of the side seam to fold the second flap of the side inner seam;
removing the fabric from the sewing machine.

[0047] The term "comprises" or "comprising" when used herein is intended to indicate the presence of the features, elements, integers, steps and components mentioned, but not to preclude the presence or addition

of one or more other features, elements, integers, steps and components, or groups thereof.

[0048] The present invention is of course in no way restricted to the embodiments described herein and a person of ordinary skill in the art can foresee many possibilities of modifying it and replacing technical features with equivalents ones, depending on the requirements of each situation as defined in the appended claims.

[0049] The following claims define additional embodiments of the present description.

Claims

1. Device for folding the flap of a fabric's side inner seam, for a hemming sewing machine comprising a presser foot (9) and a feed dog (11) in the sewing area for operating the needle or needles, wherein the device comprises:

   a U-shaped section plate (7) comprising a guide plate equidistantly arranged inside the U-shaped section plate for folding the fabric hem;
   a support plate (6) arranged between the U-shaped section plate and the sewing area;
   a compressed air supplying source;
   a compressed air control mechanism comprising a valve and a plurality of air tubes connecting the valve to the air supplying source;
   wherein the plurality of air tubes is arranged within the support plate (6);
   wherein the support plate (6) comprises a plurality of blowing holes (12) for releasing air circulating in the plurality of air tubes, the plurality of blowing holes (12) being oriented towards the sewing area, so that when the fabric to be sewn is arranged on the U-shaped section plate (7), compressed air flows through the plurality of blowing holes (12) folding the flap of the side inner seam towards the sewing area.

2. Device according to the previous claim wherein the plurality of blowing holes (12) is arranged on a side surface of the support plate.

3. Device according to the previous claim wherein the plurality of blowing holes (12) is arranged on the surface closest to the presser foot (9).

4. Device according to any one of the previous claims wherein the air flow flows from the plurality of blowing holes (12) towards the presser foot (9), folding the flap of the side inner seam to the desired direction.

5. Device according to any one of the previous claims wherein the guide plate (8) is the support plate (6), that is, they are the same part.

6. Device according to any one of the previous claims wherein the support plate (6) is integrally formed with air transmission channels and the plurality of blowing holes (12).

7. Device according to the previous claim wherein the support plate (6) is integrally formed by machining and/or welding.

8. Device according to any one of the previous claims wherein the device comprises a pair of scissors with a mechanically actuated blade for cutting fabric.

9. Device according to the previous claim wherein the scissor blade is arranged at one end of the U-shaped section plate (7), arranged perpendicularly to the side surface of the plurality of blowing holes (12).

10. Device according to claim 8 wherein the scissor blade is arranged between the U-shaped section plate (7) and the support plate (6) that comprises the plurality of blowing holes (12).

11. Device according to any one of the previous claims comprising a sensor configured for detecting the completion of the hem seam.

12. Device according to any one of the previous claims wherein the compressed air supplying source is selected from a connection to a compressed air system, an air compressor pump, or a compressed air distribution branch.

13. Device according to any one of the previous claims wherein the number of holes of the plurality of blowing holes (12) is at least two, preferably between 2 and 10, preferably 4 to 8, more preferably 6.

14. Sewing machine comprising the device described in any one of claims 1 to 13.

15. Method for sewing a hem of a sleeve fabric, on a sewing machine comprising the device according to any one of claims 1 to 13, comprising the following steps:

   placing the fabric on the support plate to fold the fabric;
   activating the device valve for passing air flow through the air tubes;
   starting the movement of the presser foot at a predetermined distance from the end of a first flap of a side inner seam to undertake the folding of the first flap of the side inner seam;
   deactivating the device valve after passing the presser foot through the first side seam flap;
   sewing the end of the second flap of the side seam to fold the second flap of the side inner

seam;
removing the fabric from the sewing machine.

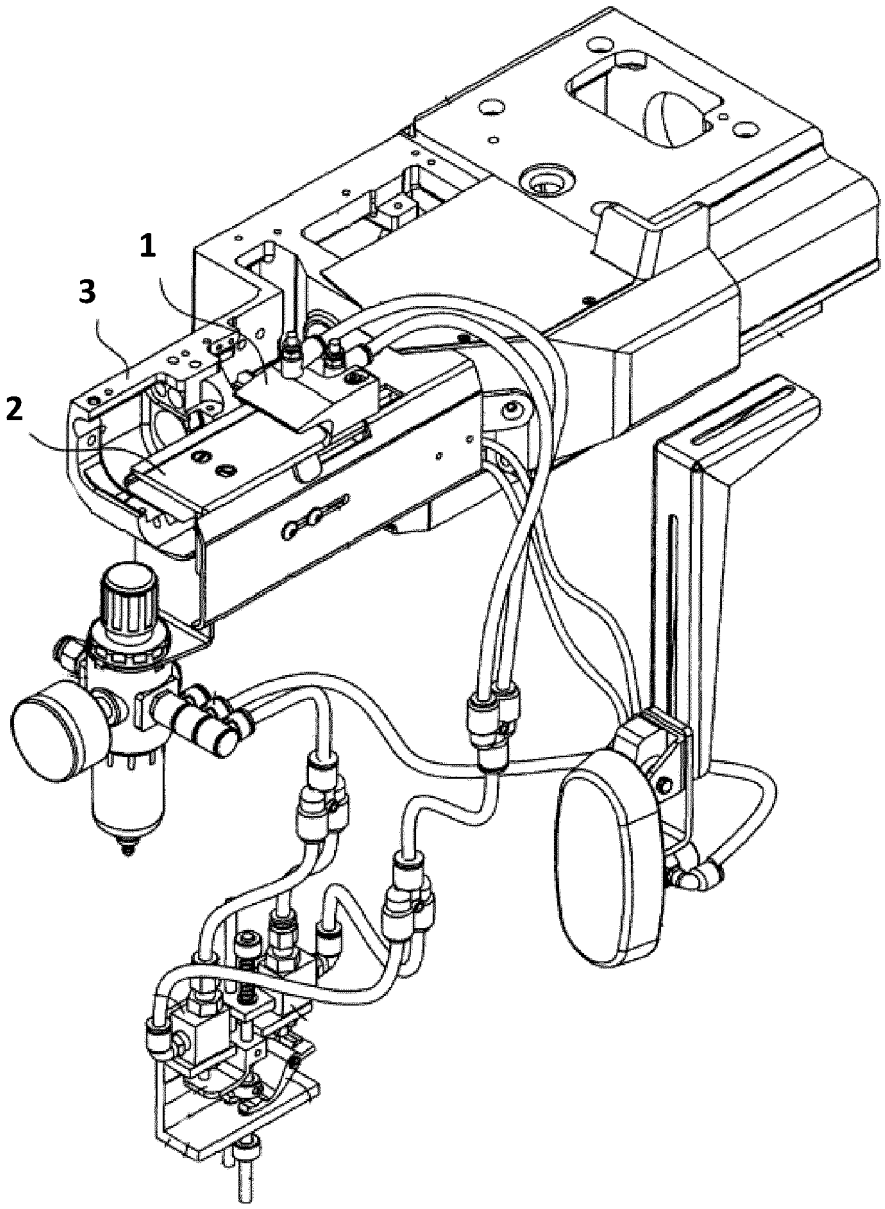

Fig. 1

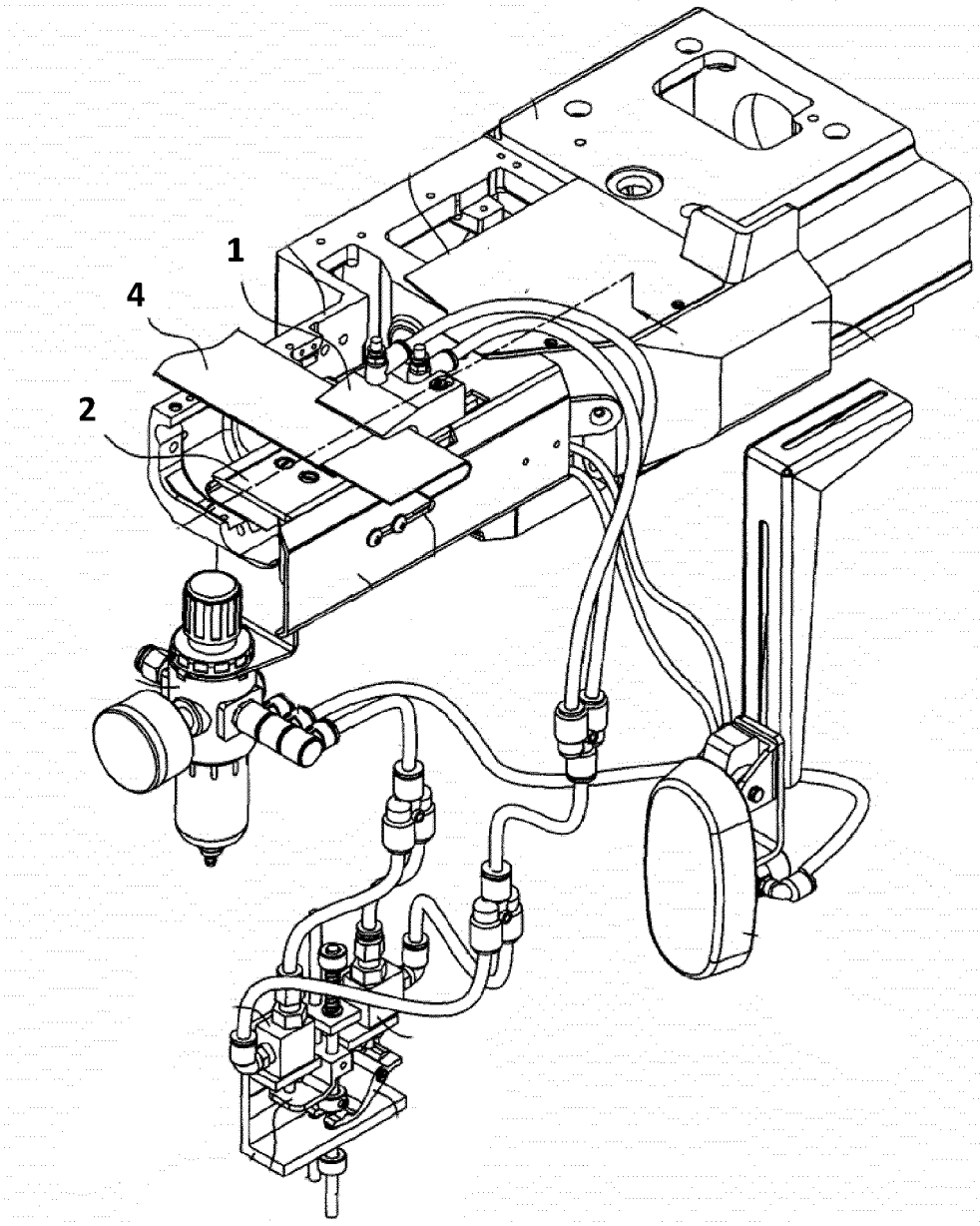

Fig. 2

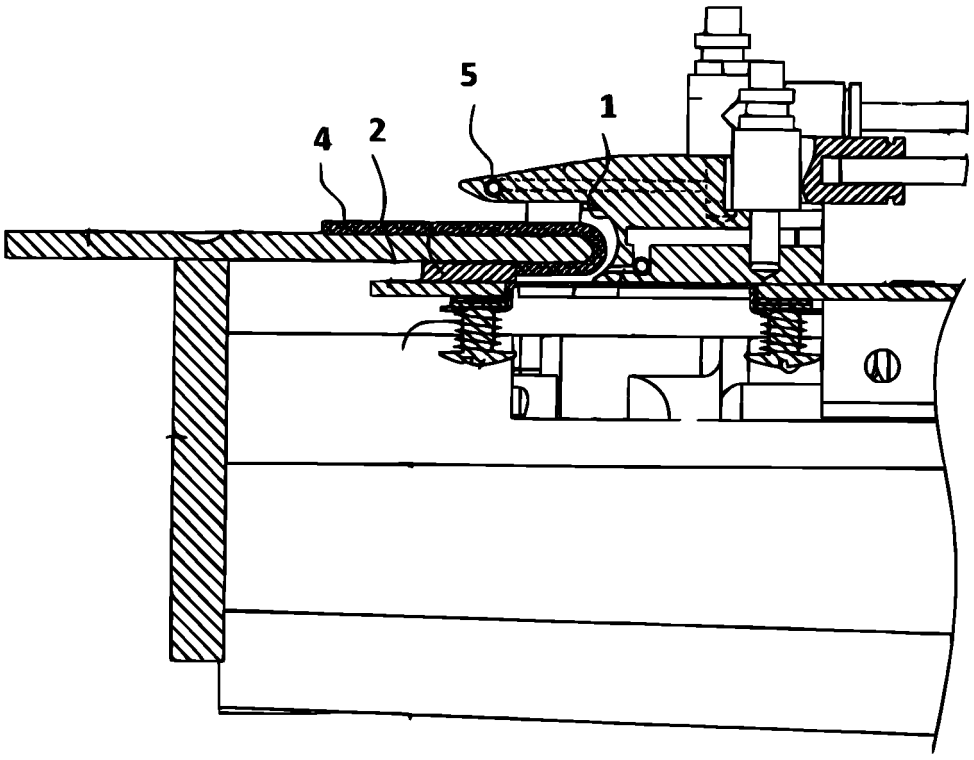

Fig. 3

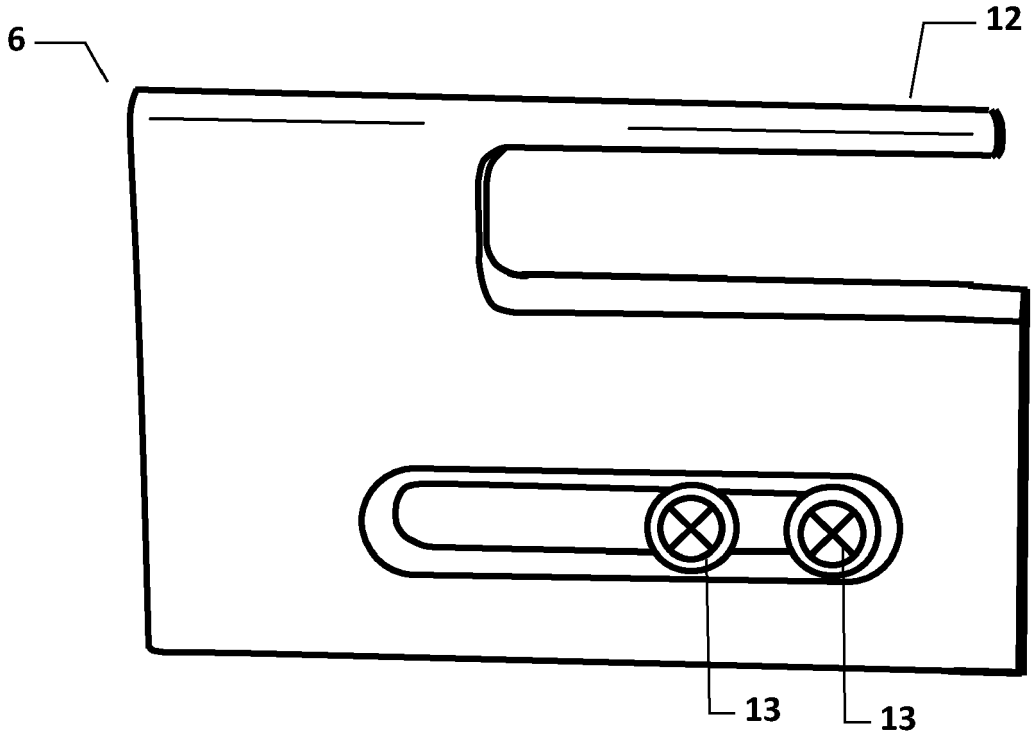

Fig. 4

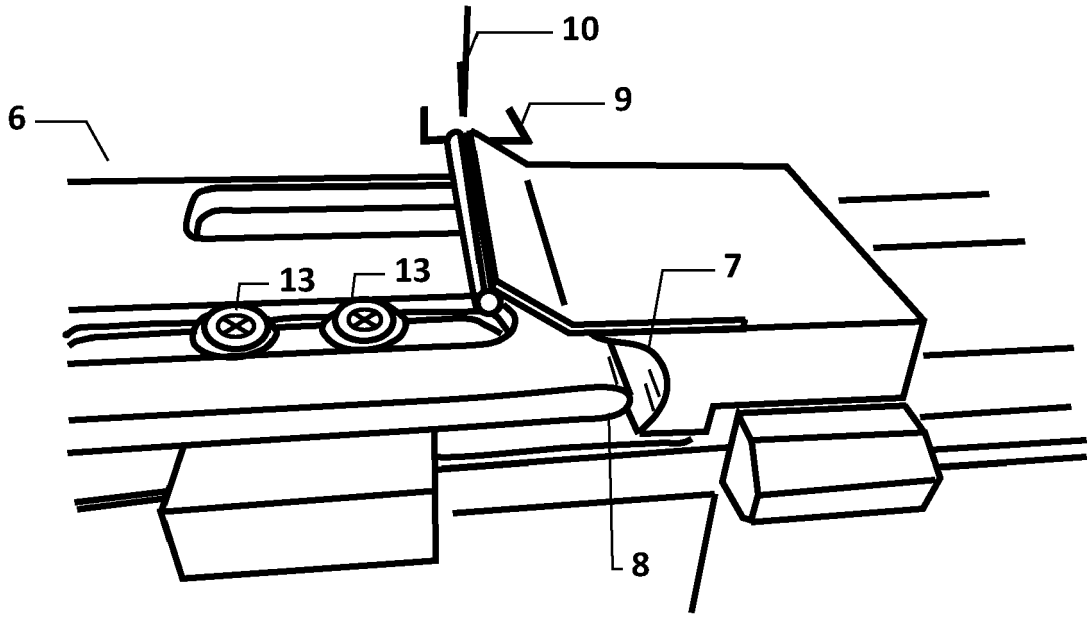

Fig. 5

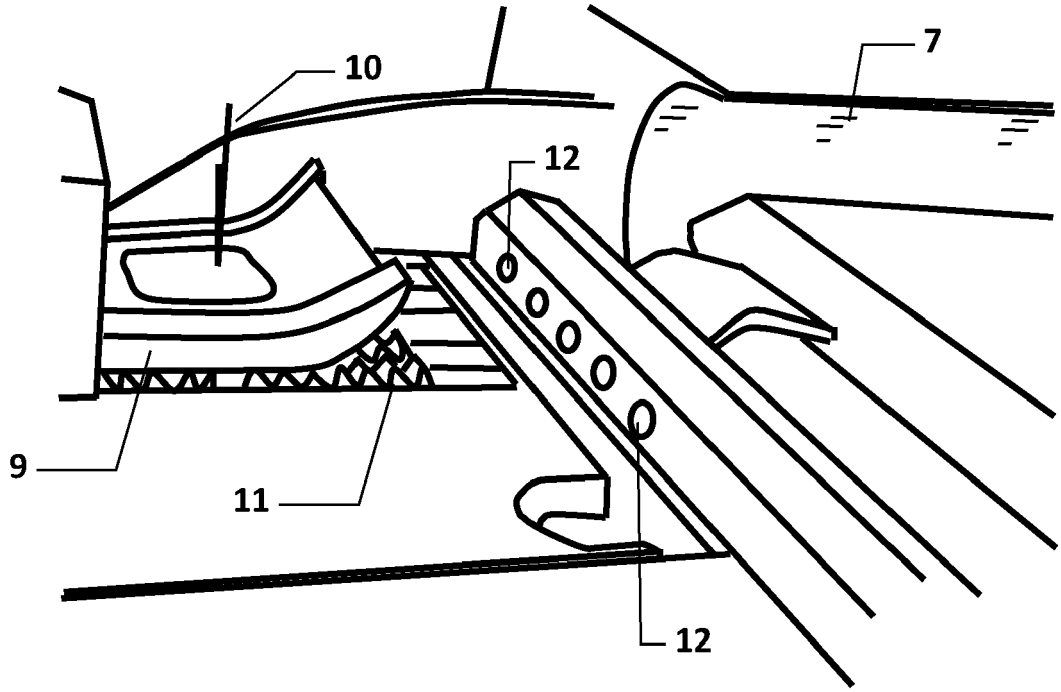

Fig. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 24 15 5101

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 5 373 797 A (BOTTOMS JOSEPH A [US] ET AL) 20 December 1994 (1994-12-20) * abstract; figures 1-8 *	1-15	INV. D05B35/02
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A	US 2015/083033 A1 (HAYASHIDA TAKAYUKI [JP] ET AL) 26 March 2015 (2015-03-26) * paragraph [0029] - paragraph [0058]; figures 1-7 *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			D05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	10 June 2024	Braun, Stefanie

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