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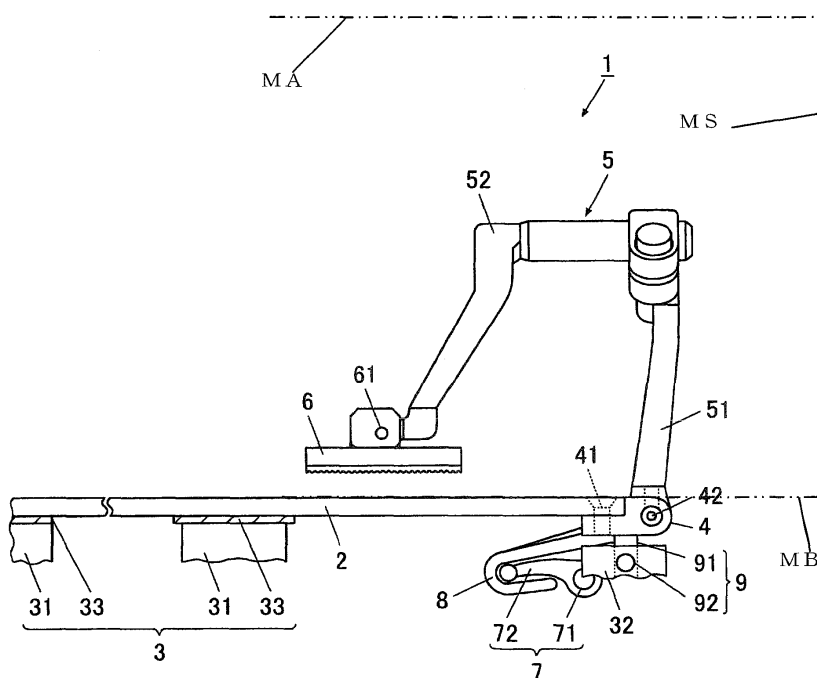
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(54) **Cloth pressing device of buttonholing machine**

(57) A cloth pressing device of a buttonholing machine includes a cloth table on which a cloth is to be mounted, an attaching base attached to the cloth table, a presser arm having a tip portion positioned above the cloth table and a base end portion rotatably coupled to

the attaching base, and a cloth presser attached to the tip portion of the presser arm to press the cloth mounted on the cloth table from above. The attaching base is disposed such that an upper end surface of the attaching base is flush with or lower than an upper surface of the cloth table.

FIG. 1



Description

TECHNICAL FIELD

[0001] The present invention relates to a cloth pressing device of a buttonholing machine.

BACKGROUND ART

[0002] There has been known a buttonholing machine operable to form a straight buttonhole or an eyelet buttonhole on a cloth, and to perform side stitching along the buttonhole. Generally, when forming buttonholes on a body cloth of a jacket for example, the buttonholes is formed as lateral holes B1 which are orthogonal to a cloth end F as shown in Fig. 11A, or as vertical holes B2 along the cloth end F as shown in Fig. 11B.

[0003] In an eyelet buttonholing machine for example, as shown in Fig. 7, a flat cloth table 101 is provided to a bed portion, and a cloth pressing device 102 is provided to press a cloth mounted on an upper surface of the cloth table 101 during a buttonholing (see, e.g., JP 2002-306875 A).

[0004] The cloth pressing device 102 includes an attaching base 105 which is rotatably supported on the cloth table 101, a presser arm 104 which is provided on the attaching base 105 so as to be rotatable around a fulcrum shaft 106, and a cloth presser 103 which is supported at one end of the presser arm 104 to press the cloth.

[0005] As shown in Fig. 8, a transmitting member 107 is integrally provided on a lower end of the presser arm 104, and is coupled to a driving source (not shown) below the cloth table 101. Thus, a through hole 108, through which the transmitting member 107 is inserted, is formed on the cloth table 101. As shown in Fig. 8, the cloth pressing device 102 is provided in a pair on right and left.

[0006] While the cloth pressing device 102 described above is for lateral buttonholes, there is also a cloth pressing device 112 for vertical buttonholes as shown in Fig. 9. A presser arm 114 of the cloth pressing device 112 is arranged to be shifted from a cloth table 111 so that a cloth C can be moved in a leftward direction in Fig. 9 during the buttonholing work.

[0007] The cloth pressing device 112 includes an attaching base 115, and the presser arm 114 is provided on the attaching base 115 so as to be rotatable around a fulcrum shaft 116. A cloth presser 113 is supported on one end of the presser arm 114, and presses the cloth C against an upper surface of the cloth table 111.

[0008] As shown in Fig. 10, also in the cloth pressing device 112 for the vertical buttonholes, a transmitting member 117 for transmitting a power to the presser arm 114 is provided integrally with the presser arm 114. Thus, a through hole 118, through which the transmitting member 117 is inserted, is formed on the cloth table 111.

[0009] In the cloth pressing device 102 shown in Fig. 7, the attaching base 105 and the fulcrum shaft 106 are

provided on the upper surface of the cloth table 101, and the transmitting member 107 is protruded from the cloth table 101. Thus, the cloth on the cloth table 101 cannot be moved toward the attaching base 105.

[0010] Accordingly, when buttonholing a portion positioned away from a cloth end of a business suit for example, there is a problem in that the cloth interferes with the attaching base 105 and cannot be flatly placed on the cloth table 101. In such a case, wrinkles and stains are likely to be generated, resulting in deterioration of a commercial value.

[0011] Also in the cloth pressing device 112 shown in Fig. 9, the attaching base 115 is also disposed to protrude from the upper surface of the cloth table 111. Thus, when feeding the cloth over the attaching base 115, the cloth interferes with the attaching base 115 and cannot be flatly placed on the upper surface of the cloth table 111. As a result, the same problem as in the cloth pressing device shown in Fig. 7 is caused.

[0012] Moreover, as disclosed in the JP 2002-306875 A, the attaching base 105, 115 is usually disposed on a set up side (a right side in Fig. 9) of the arm portion with respect to the cloth pressers 103, 113. Accordingly, when carrying out a buttonholing for a plurality of vertical buttonholes on a front body of a jacket for example, it is necessary to sequentially move the cloth of the front body toward a vertical drum portion from which the arm portion extends, i.e., toward the attaching base 105, 115. However, because the attaching base 105, 115 obstructs a smooth movement of the cloth, there is a problem in that the sewing work cannot be smoothly carried out, thereby causing a reduction in efficiency, and wrinkles and stains are given to the cloth. As a result, there is deterioration in quality of a sewn product. In an extreme case, there is also a possibility that a cut of a buttonhole might be caught on the attaching base 105, 115, resulting in a damage of the cloth.

SUMMARY OF THE INVENTION

[0013] The present invention has been made in order to solve the problems, and it is an object thereof to provide a sewing machine capable of smoothly carrying out a buttonhole sewing work without deterioration in sewing quality.

[0014] According to first aspect of the invention, a cloth pressing device of a buttonholing machine includes a cloth table (2, 201) on which a cloth (C) is to be mounted, an attaching base (4, 202) attached to the cloth table (2, 201), a presser arm (5, 204) having a tip portion positioned above the cloth table (2, 201) and a base end portion rotatably coupled to the attaching base (4, 202), and a cloth presser (6, 205) attached to the tip portion of the presser arm (5, 204) to press the cloth (C) mounted on the cloth table (2, 201) from above. The attaching base (4, 202) is disposed such that an upper end surface of the attaching base (4, 202) is flush with or lower than an upper surface of the cloth table (2, 201).

[0015] According to a second aspect of the invention, the cloth pressing device further includes a plurality of support members (31, 32) supporting the cloth table (2, 201) from below, and a height adjusting mechanism (9). The plurality of the support members include at least one main support member (32) which supports the attaching base (4, 202) from below, and the height adjusting mechanism (9) is attached to the main support member (32). An upward protruding amount of the height adjusting mechanism (9) from an upper end surface of the main support member (32) is adjustable.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

Fig. 1 is a front view of a cloth pressing device of a sewing machine.

Fig. 2 is a schematic perspective view of a height adjusting mechanism.

Fig. 3 is a side view of the cloth pressing device.

Fig. 4 is a front view of the cloth pressing device, illustrating that a cloth mounting region is enlarged.

Fig. 5 is a side view of a cloth pressing device for vertical buttonholes.

Fig. 6 is a front view of the cloth pressing device for vertical buttonholes.

Fig. 7 is a front view of a conventional cloth pressing device for lateral buttonholes.

Fig. 8 is a perspective view of a portion of the cloth pressing device shown in Fig. 7.

Fig. 9 is a front view of a conventional cloth pressing device for vertical buttonholes.

Fig. 10 is a perspective view of a portion of the cloth pressing device shown in Fig. 9.

Fig. 11A is an explanatory view of lateral buttonholes.

Fig. 11B is an explanatory view of vertical buttonholes.

DETAILED DESCRIPTION

[0017] Hereinafter, embodiments of the invention will be explained with reference to the drawings. The following embodiments do not limit the scope of the invention.

[Structure of Cloth Pressing Device of Sewing Machine]

[0018] As shown in Figs. 1 to 3, a sewing machine 1 (a buttonholing machine) includes a bed portion MB, an vertical drum portion MS set up from a base side of the bed portion MB, and an arm portion MA extending from the vertical drum portion MS so as to be opposed to the bed portion MB. The sewing machine 1 includes a cloth table 2 on which a cloth to be sewn is mounted, a feeding base 3 supporting the cloth table 2 from below and operable to move the cloth table 2 in a cloth feeding direction, an attaching base 4 attached to the cloth table 2 in

such a position that an upper end surface of the attaching base 4 is flush with or lower than an upper surface of the cloth table 2, a presser arm 5 rotatably coupled to the attaching base 4, a cloth presser 6 attached to a tip portion of the presser arm 5 to press the cloth mounted on the cloth table 2 from above, a presser lever 7 (a power transmitting member) disposed below the cloth table 2 and to which a power for rotating the presser arm 5 is transmitted, and a coupling member 8 engaged with the presser lever 7, fixed to the presser arm 5 and rotatably coupled to the attaching base 4.

[0019] The cloth table 2 is a plate member having the upper surface parallel to and substantially flush with the bed portion MB, and a lower surface substantially on the same plane with an upper surface of the feeding base 3.

[0020] The feeding base 3 has the upper surface provided with a plurality of support members 31 for supporting the cloth table 2 from below. At least one of the support members 31 serves as a main support member 32 for supporting the attaching base 4 from below. The support members 31 other than the main support member 32 are formed with upper surfaces on the level with each other, and a plate 33 is attached to an upper surface of each of the support members 31 and the cloth table 2 is disposed on an upper surface of the plate 33.

[0021] The main support member 32 is formed to be lower than the other support members 31. The reason is that a thickness of the attaching base 4 is taken into consideration.

[0022] An upper end portion of the main support member 32 is provided with a height adjusting mechanism 9, an amount of an upward protrusion of which from an upper end surface of the main support member 32 being adjustable.

[0023] As shown in Fig. 2, the height adjusting mechanism 9 includes a bar-shaped member 91 provided on the upper end portion of the main support member 32 and inserted to be freely advanced and retreated in a vertical direction, and a setscrew 92 provided to be screwable into the main support member 32 to press the bar-shaped member 91 at a tip, thereby positioning the bar-shaped member 91 in the main support member 32.

[0024] The bar-shaped member 91 is movably inserted into an insertion hole formed to be extended in a vertical direction at an upper end portion of the main support member 32. A screw hole formed to be extended in an almost orthogonal direction to the insertion hole communicates with the insertion hole, and the setscrew 92 is screwed into the screw hole. The setscrew 92 is advanced into the screw hole so that a tip thereof is protruded into the insertion hole, and a side surface of the bar-shaped member 91 can be pressed against the insertion hole.

[0025] Accordingly, it is possible to determine an amount of a protrusion of the bar-shaped member 91 from the upper end of the main support member 32 depending on any position of the insertion hole to which the bar-shaped member 91 is to be fixed. At this time, an

upper end surface of the bar-shaped member 91 abuts on the attaching base 4. The upper end surface of the bar-shaped member 91 is formed almost along a horizontal plane.

[0026] The attaching base 4 is attached to the cloth table 2 via a setscrew 41. When the attaching base 4 is attached to the cloth table 2, the upper end surface of the attaching base 4 is flush with or lower than the upper surface of the cloth table 2. Moreover, the attaching base 4 is formed such that a lower end face thereof is provided almost along a horizontal plane when the attaching base 4 is attached to the cloth table 2.

[0027] The attaching base 4 is provided with a fulcrum shaft 42 which is rotatable with respect to the attaching base 4. The presser arm 5 is coupled to the fulcrum shaft 42.

[0028] The presser arm 5 includes a base arm 51 fixed to the fulcrum shaft 42 and extended upward, and a support arm 52 coupled to an upper end of the base arm 51, extended along the upper surface of the cloth table 2 and formed to be inclined downward in a middle thereof, and serving to support the cloth presser 6.

[0029] The cloth presser 6 is coupled to a tip of the support arm 52 with a fixing screw 61.

[0030] The fulcrum shaft 42 is provided with the coupling member 8 which is formed integrally with the presser arm 5, is fixed to the fulcrum shaft 42 and is rotatable with respect to the attaching base 4. The coupling member 8 has a base end fixed to the fulcrum shaft 42 and is disposed to be downward inclined toward a tip. More specifically, the coupling member 8 is provided to be wholly positioned below the cloth table 2.

[0031] As shown in Fig. 3, moreover, a pair of attaching bases 4 is attached to the cloth table 2 at both sides with the presser arm 5 and the coupling member 8 interposed therebetween. A collar 44 for preventing the fulcrum shaft 42 from slipping from the attaching base 4 is provided on an outside of one of the attaching bases 4, and the collar 44 is fixed to the fulcrum shaft 42 with a setscrew 45. Furthermore, an E ring 46 is provided on the fulcrum shaft 42 in a position to be an inside of the attaching base 4.

[0032] The coupling member 8 has a tip formed like a hook and the presser lever 7 which is provided below the cloth table 2 and to which a power for rotating the presser arm 5 is transmitted is engaged with the hook-shaped tip. In the presser lever 7, a lever body 72 attached to a driving shaft 71 is also rotated through a rotation of the driving shaft 71 around its own axis, and the coupling member 8 to be engaged with the lever body 72 can be operated through the rotation of the lever body 72.

[0033] More specifically, when the power for moving the presser arm 5 is transmitted to the presser lever 7, the coupling member 8 is rotated around the fulcrum shaft 42 through a driving operation of the presser lever 7. By the rotation of the coupling member 8, the fulcrum shaft 42 is also rotated. Consequently, the presser arm 5 fixed to the fulcrum shaft 42 is also rotated around the fulcrum shaft 42, and the cloth presser 6 is vertically moved with

respect to the cloth table 2 through the rotation of the presser arm 5.

[0034] According to the sewing machine 1, thus, when the power is transmitted to the presser lever 7, it is transmitted to the presser arm 5 through the coupling member 8. The coupling member 8 is formed integrally with the presser arm 5. Therefore, the presser arm 5 is also rotated around the fulcrum shaft 42 provided on the attaching base 4 interlockingly with the operation of the coupling member 8 so that the cloth presser 6 in the tip portion of the presser arm 5 is moved to press the cloth against the cloth table 2 or to release the press.

[0035] The attaching base 4 is attached to the cloth table 2 such that the upper end surface of the attaching base 4 is flush with or lower than the upper surface of the cloth table 2. Therefore, the attaching base 4 does not protrude from the upper surface of the cloth table 2.

[0036] When placing the cloth on the cloth table 2, consequently, the cloth is not lifted up by the attaching base 4 so that it can be flatly placed on the cloth table 2. Accordingly, it is possible to prevent deterioration in sewing quality due to a floating of the cloth.

[0037] Moreover, the coupling member 8 is coupled to the fulcrum shaft 42. Therefore, the coupling member 8 is not protruded from the upper surface of the cloth table 2, and does not obstruct the cloth from being flatly placed on the cloth table 2.

[0038] In a case in which the attaching base 4 is disposed on the upper surface of the cloth table 2, a region R surrounded by a two-dotted chain line and the presser arm 5 in Fig. 4 cannot be utilized as a space for mounting the cloth thereon. However, according to the embodiment, the cloth can also be mounted flatly on the region R. Therefore, it is possible to enlarge the region of the cloth table 2 having an equal size on which the cloth can be mounted.

[0039] Differently from the cloth pressing device in the conventional sewing machine (see Figs. 7 and 8), moreover, it is not necessary to form the through hole (see the through hole 108 in Fig. 8) for inserting the coupling member 8 from the upper surface of the cloth table 2 into the lower surface side.

[0040] Since there has been employed the structure in which the respective ends of the fulcrum shaft 42 is supported by the pair of attaching bases 4 as shown in Fig. 3, furthermore, it is possible to suppress the flexure or fall-down of the fulcrum shaft 42.

[0041] In general, the upper surface of the cloth table 2 is set to be horizontal in an equal height. In the main support member 32, however, a position of the upper end surface is lower than the other support members 31 because of a thickness of the attaching base 4 so that heights of all the support members 31 and 32 cannot be made uniform.

[0042] In this case, it is necessary to accurately set the height of the main support member 32 in order to uniformly support the cloth table 2 through each of the support members 31. Therefore, a great deal of time and

labor is required for a processing. As in the invention, however, by providing the height adjusting mechanism 9, it is possible to cancel a slight error through the height adjusting mechanism 9 if any.

[0043] Therefore, it is possible to uniformly support the cloth table 2 through the support member 31 and the main support member 32.

[Modified Embodiment]

[0044] According to the present invention, a cloth pressing device for vertical buttonholes may be configured as follows.

[0045] As shown in Figs. 5 and 6, a sewing machine 200 includes a pair of attaching bases 202 provided on a lower surface of a cloth table 201, a fulcrum shaft 203 which is rotatably supported on the attaching bases 202, a presser arm 204 fixed to the fulcrum shaft 203, and a cloth presser 205 attached to a tip of the presser arm 204.

[0046] When the attaching base 202 is attached to the cloth table 201, an upper end surface of the attaching base 202 is substantially flush with upper surfaces of the cloth table 201 and the bed portion MB.

[0047] The fulcrum shaft 203 is provided on the attaching base 202. Therefore, the presser arm 204 is fixed to the fulcrum shaft 203 below the upper surface of the cloth table 201.

[0048] Although a coupling member 206 is fixed to the fulcrum shaft 203, a fixing point is positioned apart from the cloth presser 205 toward a side with respect to a straight line in the bed portion MB direction. A power for driving the presser arm 204 is transmitted to the presser arm 204 through the coupling member 206 so that the presser arm 204 is rotated around the fulcrum shaft 203. Therefore, it is possible to operate the cloth presser 205 in the tip between a position in which the cloth presser 205 is pressed against a cloth N and a position in which the press is released.

[0049] Also in the sewing machine 200 comprising the cloth pressing device having the vertical hole specification, thus, the attaching base 202 is attached to the cloth table 201 such that the upper end surface is flush with or lower than the upper surface of the cloth table 201. Therefore, the attaching base 202 can be prevented from being protruded from the upper surface of the cloth table 201.

[0050] When placing the cloth on the cloth table 201, consequently, the cloth is not lifted up by the attaching base 202, and can be flatly placed on the cloth table 202. Accordingly, it is possible to prevent deterioration in sewing quality due to the floating of the cloth.

[0051] Differently from the cloth pressing device in the conventional sewing machine (see Figs. 9 and 10), moreover, it is not necessary to form the through hole (see the through hole 118 in Fig. 10) for inserting the coupling member 206 from the upper surface of the cloth table 201 into the lower surface side.

Claims

1. A cloth pressing device of a buttonholing machine, the cloth pressing device comprising:

a cloth table (2, 201) on which a cloth (C) is to be mounted;
 an attaching base (4, 202) attached to the cloth table (2, 201);
 a presser arm (5, 204) comprising a tip portion positioned above the cloth table (2, 201) and a base end portion rotatably coupled to the attaching base (4, 202); and
 a cloth presser (6, 205) attached to the tip portion of the presser arm (5, 204) to press the cloth (C) mounted on the cloth table (2, 201) from above,

characterized in that the attaching base (4, 202) is disposed such that an upper end surface of the attaching base (4, 202) is flush with or lower than an upper surface of the cloth table (2, 201).

2. The cloth pressing device according to claim 1, further comprising:

a plurality of support members (31, 32) supporting the cloth table (2, 201) from below; and
 a height adjusting mechanism (9),
 wherein the plurality of the support members include at least one main support member (32) which supports the attaching base (4, 202) from below,
 the height adjusting mechanism (9) is attached to the main support member (32), and
 an upward protruding amount of the height adjusting mechanism (9) from an upper end surface of the main support member (32) is adjustable.

FIG. 1

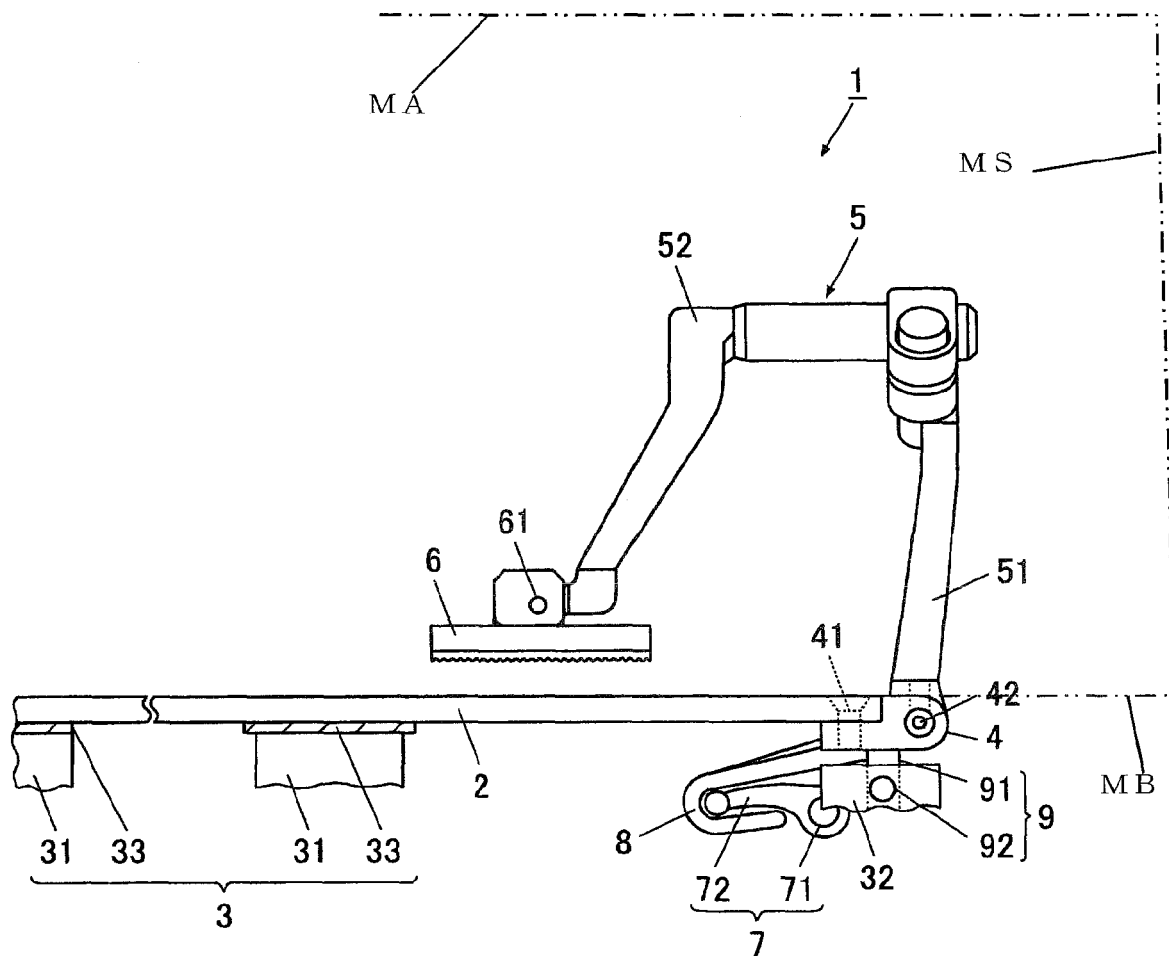


FIG. 2

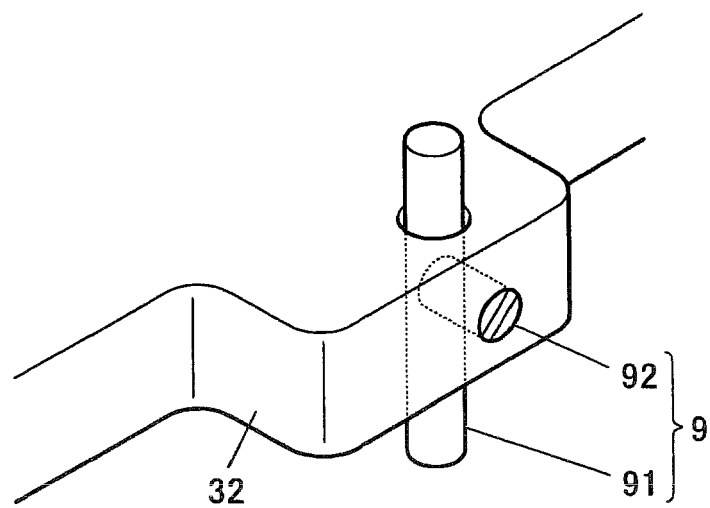


FIG. 3

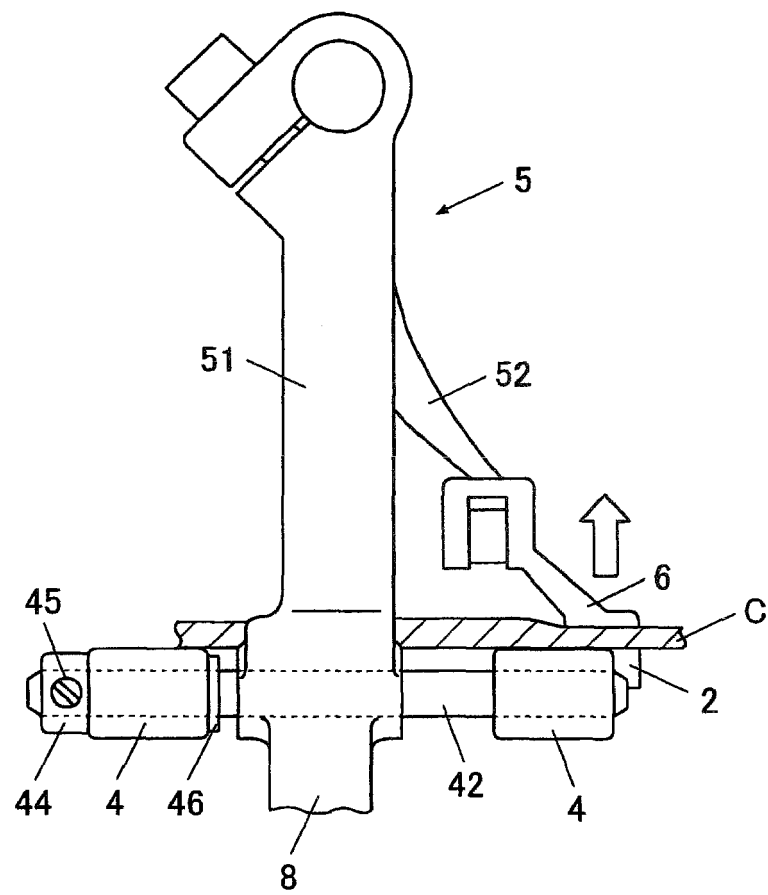


FIG. 4

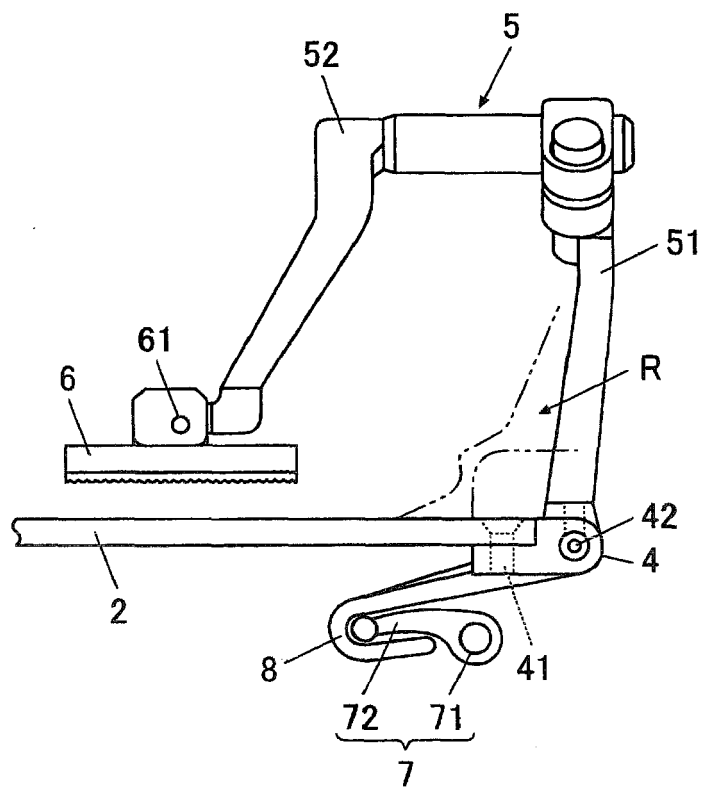


FIG. 5

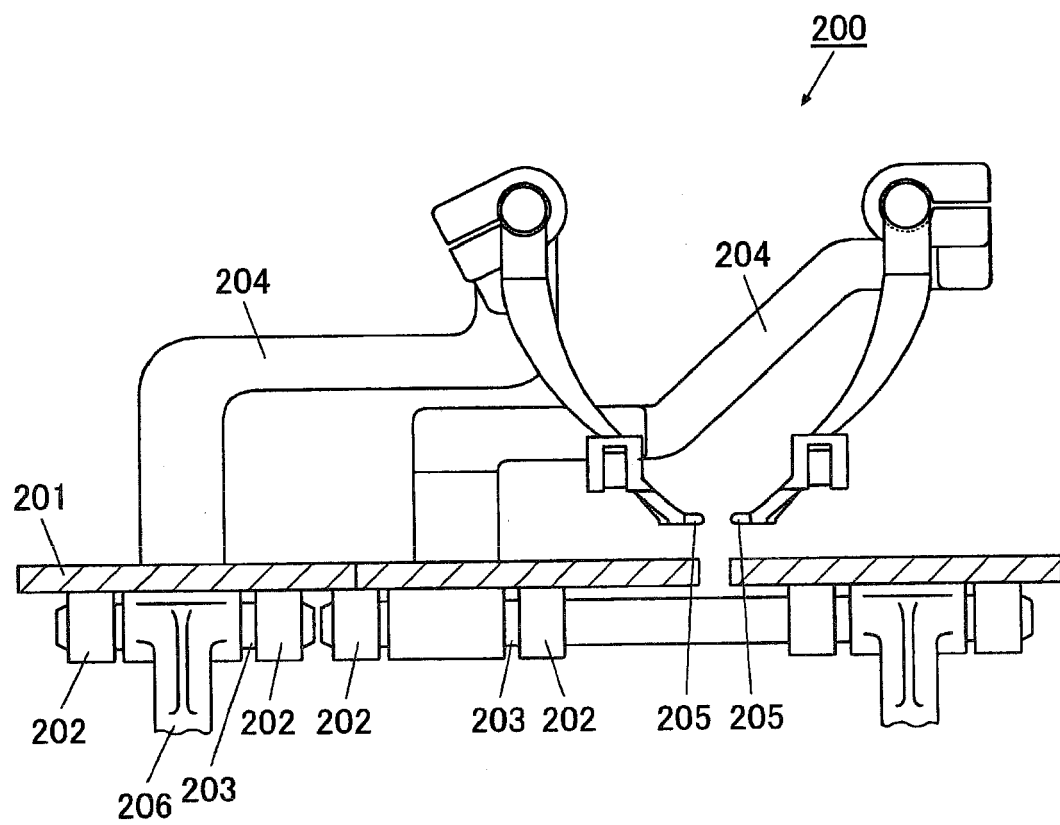


FIG. 6

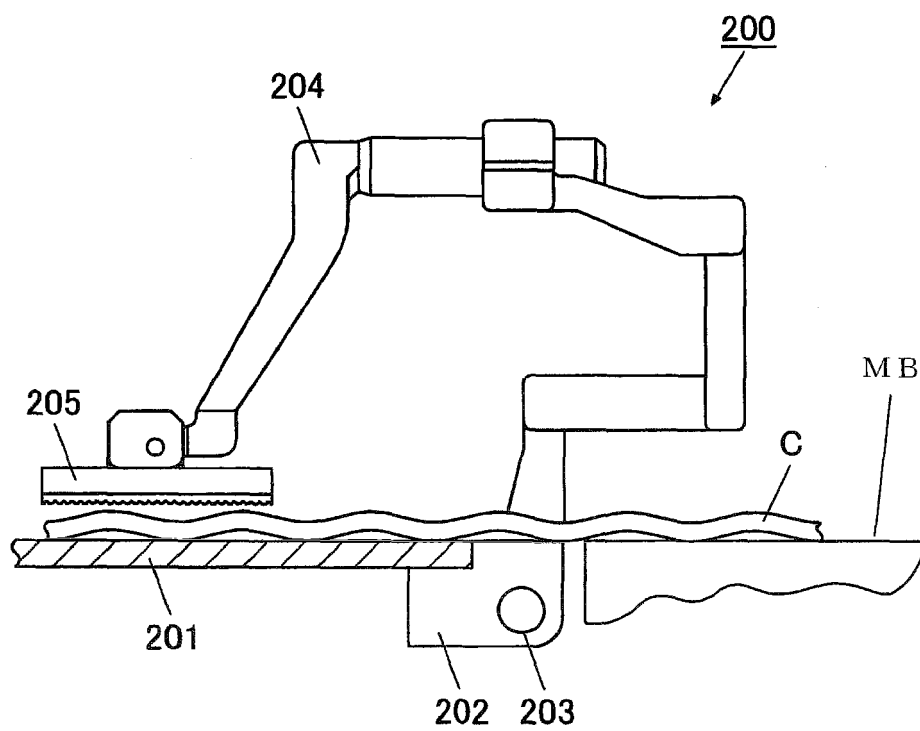


FIG. 7

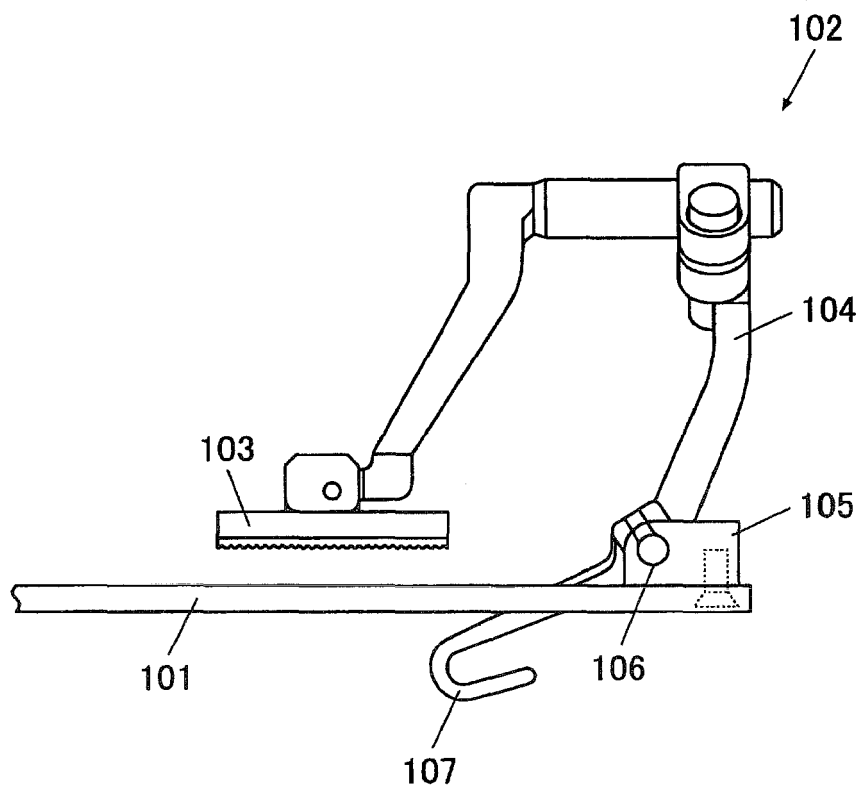


FIG. 8

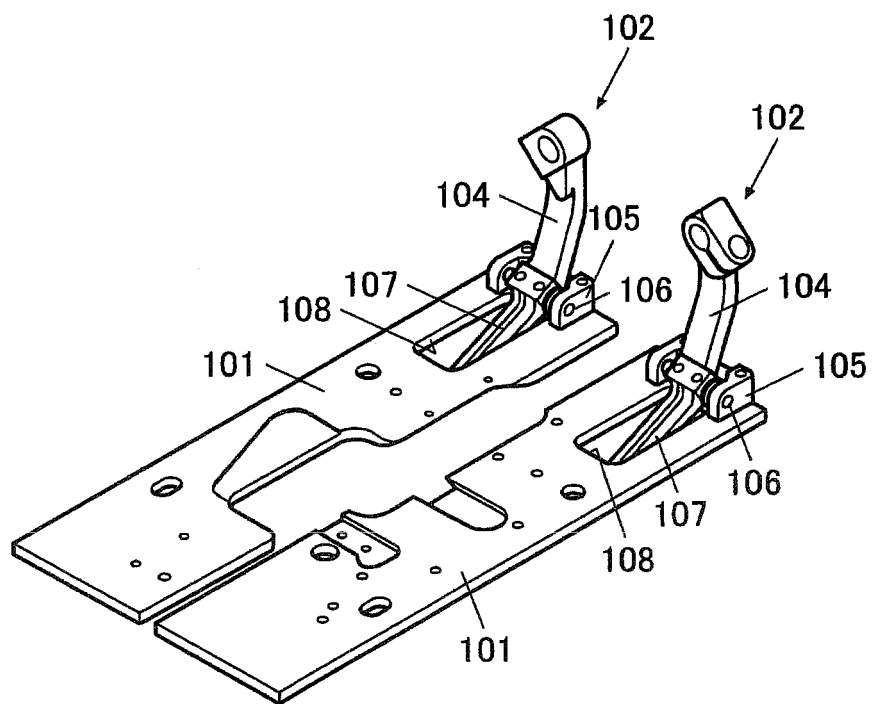


FIG. 9

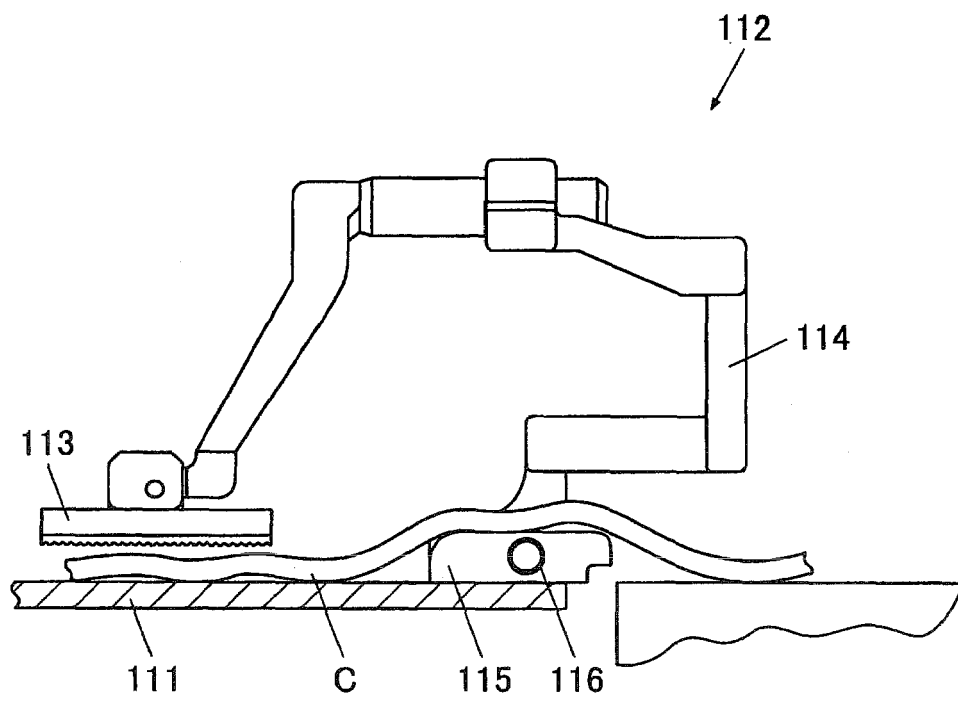


FIG. 10

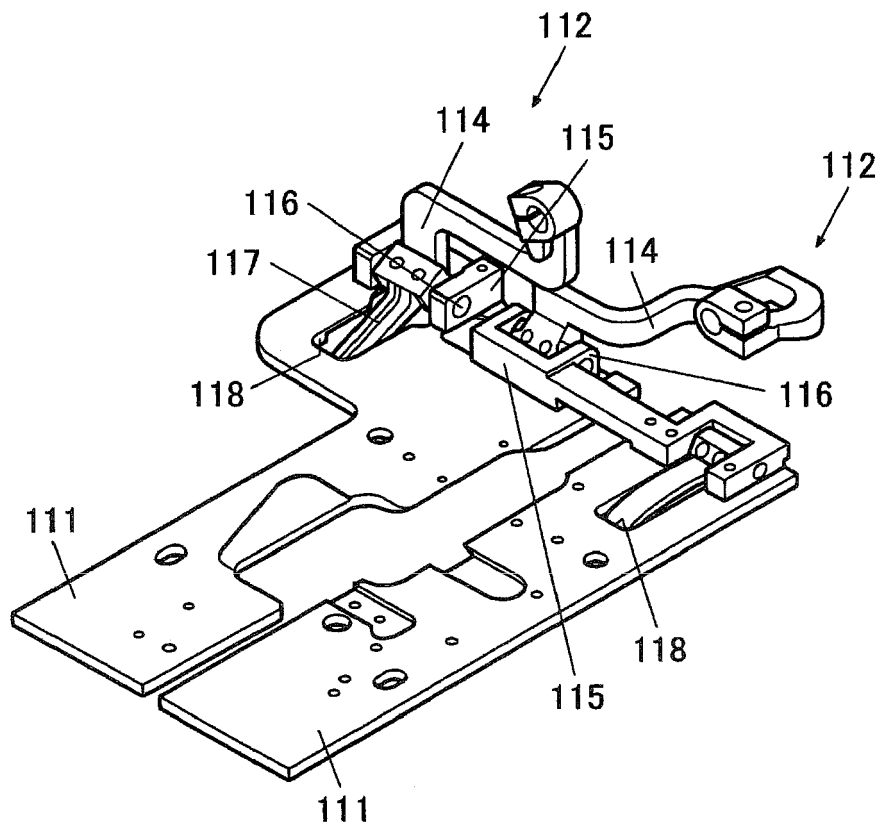


FIG. 11A

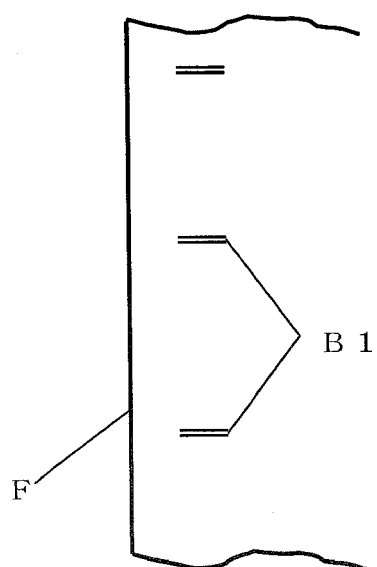
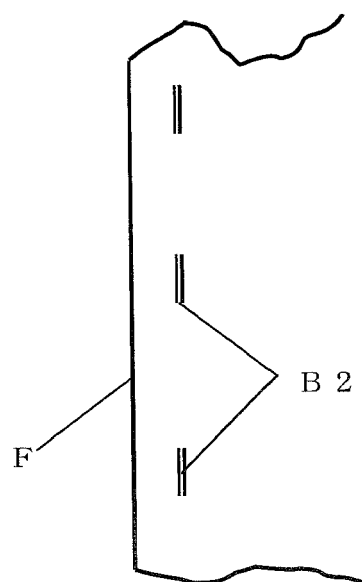


FIG. 11B





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 08 15 7441

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 08 15 7441

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