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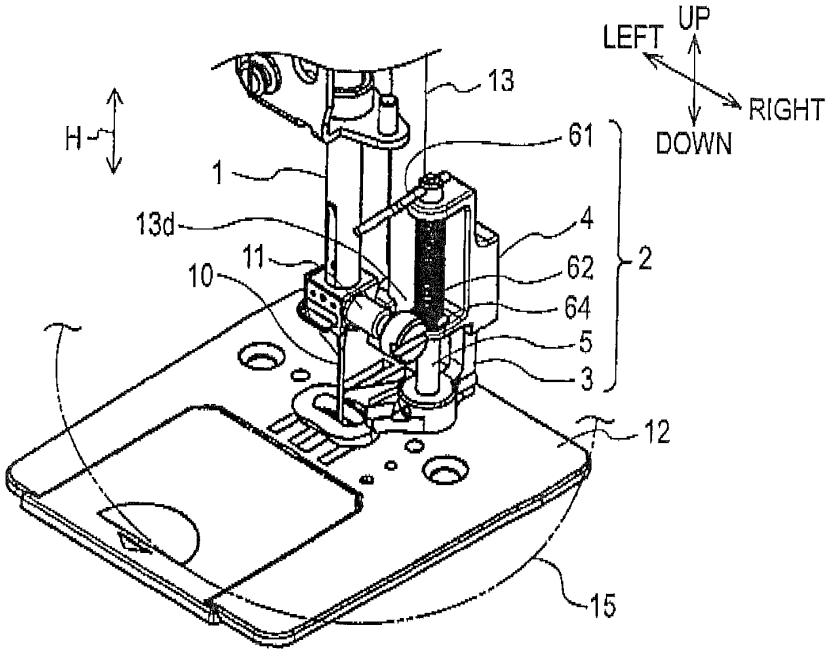
(54) Embroidery presser of sewing machine

(57) An embroidery presser (2) of a sewing machine including a needle rod (1) having a needle holder (11) holding a needle (10) and movable upward and downward and a presser rod (13) movable upward and downward, and mounted on the presser rod, includes: a presser holder (4); an operating arm (61) mounted on the presser holder and movable upward and downward by being lifted by the needle rod or the needle holder; and a presser leg (3) including a fabric presser (32) having a needle hole (13a) formed therethrough, facing a needle plate (12) of the sewing machine and pressing an embroidery object, and being held by the presser holder so as to be movable upward and downward in conjunction with the operating arm; and a pressing spring (62) provided on the presser holder and having an urging force urging the presser leg toward the needle plate.

FIG.1



EP 2 770 099 A1

Description

TECHNICAL FIELD

[0001] This disclosure relates to an embroidery presser of a sewing machine.

BACKGROUND DISCUSSION

[0002] When doing embroidery with a sewing machine, the sewing machine is configured to move a fabric presser upward and downward synchronously with upward and downward movements of a needle.

[0003] A turning presser (embroidery presser) disclosed in JP 62-32549 UM (Reference 1) includes a presser leg 5 including a fabric presser 13 having an elongated needle drop hole (needle hole) 13a formed therethrough and the presser leg 5 is formed of a transparent synthetic resin material. Therefore, when doing embroidery so as to trace a rough design drawn on a fabric (embroidery object) in advance, the usability is improved because a user can see the rough design,

[0004] However, there is a case where part of the rough design can hardly be seen. For example, as illustrated in Fig. 13, there is a case where part of a rough design 14 seen from a needle hole 91a of a fabric presser 91 and part of the rough design 14 located on the near side of the fabric presser 91 (the sewing machine user side) seem to be disconnected, and hence the rough design 14 is less visible. In particular, a side surface 91c on the near side of the needle hole 91a and a side surface 91d on the near side of the fabric presser 91 are less visible in many cases. The reason is that the user sees from an oblique direction even though a surface of the fabric presser 91 formed of a transparent synthetic resin extends perpendicularly, and hence continuity of the image is impaired due to refraction of light at a boundary between the fabric presser 91 and air. Therefore, the rough design 14 is shifted or disconnected, and hence becomes less visible. When an attempt is made to view the rough design 14 pressed by the fabric presser 91 from the oblique direction, light deflects at respective surfaces of the fabric presser 91 as illustrated by a solid line, a dotted line, and a double-dashed line in Fig. 14. Consequently, the rough design drawn on the embroidery object in advance becomes less visible, so that the usability cannot be said to be good.

SUMMARY

[0005] Thus, a need exists for an embroidery presser of a sewing machine which makes an embroidery object on which a rough design or the like is drawn more visible.

[0006] (1) An aspect of this disclosure is directed to an embroidery presser of a sewing machine including a needle rod having a needle holder configured to hold a needle and configured to be movable upward and downward in a height direction and a presser rod configured to be movable upward and downward in the height direction, and configured to be mounted on the presser rod, including: a presser holder; an operating arm mounted on the presser holder and is configured to move upward and downward in the height direction by being lifted by the needle rod or the needle holder; a presser leg including a fabric presser having a needle hole formed therethrough, facing a needle plate of the sewing machine and pressing an embroidery object, and being held by the presser holder so as to be movable upward and downward in conjunction with the operating arm; and a pressing spring provided on the presser holder and having an urging force that urges the presser leg toward the needle plate, wherein the fabric presser has a portion which allows the embroidery object to be seen through on at least on a sewing machine user side of the fabric presser, and at least a side surface on the sewing machine user side of the needle hole of the side surface on the sewing machine user side of the needle hole and a side surface on the sewing machine user side of the fabric presser is inclined so that an upper end is closer to the sewing machine user side than a lower end.

[0007] The aspect (1) of this disclosure described above may employ one or more of the following configurations (2) to (5) added arbitrarily thereto.

[0008] (2) The fabric presser allows the embroidery object to be seen through at least at a portion corresponding to the maximum stitch width of the needle rod.

[0009] (3) At least the side surface on the sewing machine user side of the needle hole of the side surface on the sewing machine user side of the needle hole and the side surface on the sewing machine user side of the fabric presser has an angle of inclination substantially parallel to a line of sight of the user looking the needle hole.

[0010] (4) The fabric presser includes an adjusting portion (8) configured to allow adjustment of the angle of inclination of at least the side surface on the sewing machine user side of the needle hole of the side surface on the sewing machine user side of the needle hole and the side surface on the sewing machine user side of the fabric presser.

[0011] In the aspect (1) of this disclosure described above, at least a portion of the fabric presser that holds the embroidery object on which the rough design of the embroidery is drawn on the sewing machine user side allows the user to see through, and the side surface on the sewing machine user side of the needle hole is inclined. The inclined side surface is inclined so that the upper end is closer to the sewing machine user side than the lower end. By inclining the side surface to be closer to the line of sight of the sewing machine user looking at the needle hole, the portion of the fabric presser that hinders the direct view of the needle hole is eliminated, and the visibility is less affected by light refraction at a boundary surface between the fabric presser and air. Furthermore, by inclining the side surface of the fabric presser on the sewing machine user side so as to get closer to the line of sight of the sewing machine user, the visibility

is further less affected by the light refraction. Therefore, according to the disclosure described in (1), visibility of the embroidery object on which the rough design is drawn is good.

[0012] According to the aspect (2) of this disclosure described above, the portion of the fabric presser which allows the user to see through is increased, so that the embroidery object which is pressed by the fabric presser and on which the rough design is drawn is more visible.

[0013] According to the aspect (3) of this disclosure described above, since the inclination of the inclined side surface has the angle of inclination substantially parallel to the line of sight of the user looking the needle hole, the line of the rough design drawn on the embroidery object is seen as a continuous line without being affected by the light refraction at the boundary surface between the fabric presser and air, so that usability is improved and an operation efficiency is also improved.

[0014] According to the aspect (4) of this disclosure described above, since the angle of inclination of the side surface may be adjusted by the adjusting portion, the angle of inclination of the side surface can be adjusted so as to match the angle of the line of sight of the sewing machine user to improve the visibility or to be less affected by the light refraction.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The foregoing and additional features and characteristics of this disclosure will become more apparent from the following detailed description considered with the reference to the accompanying drawings, wherein:

Fig. 1 is a perspective view of a state in which an embroidery presser of a sewing machine is mounted on a presser rod and a needle rod is at a lower position viewed from the front side of the sewing machine;

Fig. 2 is a perspective view of a state in which the embroidery presser of the sewing machine is mounted on the presser rod and the needle rod is at an upper position viewed from the front side of the sewing machine;

Fig. 3 is a left side view of an embroidery presser of a sewing machine according to Embodiment 1;

Fig. 4 is a right side view of the embroidery presser of the sewing machine according to Embodiment 1;

Fig. 5 is a plan view of the embroidery presser of the sewing machine according to Embodiment 1;

Fig. 6 is an exploded view of the embroidery presser of the sewing machine according to Embodiment 1;

Fig. 7 is a cross-sectional view taken along a line VII-VII in Fig. 4.

Fig. 8 is a side view of the sewing machine on which the embroidery presser of the sewing machine according to Embodiment 1 is mounted;

Fig. 9 is an explanatory drawing showing how a rough design looks from a sewing machine user when doing embroidery using the embroidery presser of the sewing machine according to Embodiment 1;

Fig. 10 is a perspective view of an embroidery presser of a sewing machine, partly broken and viewed from the front side according to Embodiment 2;

Fig. 11 is a perspective view of the embroidery presser of the sewing machine viewed from the front side according to Embodiment 2;

Fig. 12 is a cross-sectional view of a principal portion of an embroidery presser of a sewing machine according to Modification 1;

Fig. 13 is an explanatory drawing showing how the rough design looks from the sewing machine user when doing embroidery using an embroidery presser of a sewing machine of the related art; and

Fig. 14 is a cross-sectional view of a fabric presser of the embroidery presser of the sewing machine of the related art.

DETAILED DESCRIPTION

[0016] A presser holder is mounted on a lower portion of a presser rod by a fixture. An operating arm is mounted on the presser holder, and moves upward and downward by being lifted by part of a needle rod or a needle holder in a height direction. A presser leg is held by the presser holder so as to move upward and downward in conjunction with the operating arm, faces a needle plate of the sewing machine, and presses an embroidery object. A pressing spring is provided on the presser holder and has an urging force to urge the presser leg toward the needle plate.

[0017] Referring now to Fig. 1 to Fig. 12, representative embodiments of this disclosure will be described below. An embroidery presser of a sewing machine according to this disclosure is mounted on the presser rod of the sewing machine. First of all, the sewing machine includes a microcomputer mounted thereon, and, as illustrated in Fig. 1 and Fig. 2, holds a needle holder 11 configured to hold a needle 10, and includes a needle rod 1 configured to move upward and downward along the height direction (the direction indicated by an arrow H), a presser rod 13 configured to move upward and downward in the height direction, and an embroidery presser 2 demountably mounted on a lower end portion 13d of the presser rod 13. The needle holder 11 is fixed to a lower extremity of the needle rod 1 so as to project in the substantially orthogonal direction with respect to the needle rod 1. The embroidery presser 2 is configured to press and hold a fabric as an embroidery object 15 on which embroidery is to be done and the embroidery formed on the fabric at the time of doing embroidery.

Embodiment 1

[0018] The embroidery presser 2 of the sewing machine of Embodiment 1 includes a presser holder 4, a

sliding shaft 5, an operating arm 61, a pressing spring 62 and a presser leg 3 as illustrated in Fig. 1 and Fig. 2. The presser holder 4 includes a handle portion 41 to be mounted on the lower end portion 13d of the presser rod 13, and a supporting portion 42 configured to support the sliding shaft 5, which will be described later. The supporting portion 42 includes bearing portions 43 and 44 at upper and lower ends as illustrated in Fig. 6. The bearing portions 43 and 44 have holes 45 and 46 through which the sliding shaft 5 penetrates in a height direction H formed therein. The sliding shaft 5 includes a securing hole 51 penetrating through a lower end thereof substantially in the perpendicular direction with respect to the direction of an axial line, a spring pin 63 is inserted into the securing hole 51, and the presser leg 3 is secured to the sliding shaft 5 (see also Fig. 4).

[0019] The sliding shaft 5 includes a securing hole 52 penetrating through an upper end thereof substantially in the perpendicular direction with respect to the direction of an axial line, the operating arm 61 is inserted into the securing hole 52, and the operating arm 61 is secured to the sliding shaft 5 (see also Figs. 3 to 5). The sliding shaft 5 includes an annular groove 53 depressed over the entire circumference at a midpoint in the direction of an axial line, and an E-ring 64 is fitted in the annular groove 53 in the direction substantially perpendicular to the direction of an axial line (see Fig. 3 and Fig. 4 as well). The pressing spring 62 is fitted on the sliding shaft 5 as illustrated in Fig. 3 and Fig. 4, and is assembled between the bearing portion 43 on the upper portion of the presser holder 4 and the E-ring 64 in a compressed state. The E-ring 64 is positioned between the bearing portion 44 on the lower portion of the presser holder 4 and the pressing spring 62, and the sliding shaft 5 and the presser leg 3, which will be described later, are urged downward by the pressing spring 62 via the E-ring 64.

[0020] The presser leg 3 includes a fixing portion 31 and a fabric presser 32 as illustrated in Fig. 3 to Fig. 6, and is formed integrally of a transparent synthetic resin, for example, polycarbonate. The fixing portion 31 includes a sliding shaft hole 311 through which the sliding shaft 5 is inserted in the direction of an axial line and a fixing hole 312 through which the spring pin 63 is inserted substantially in the vertical direction with respect to the direction of an axial line as illustrated in Fig. 6, and the presser leg 3 is fixed to the sliding shaft 5 by the spring pin 63 (see also Fig. 4). The operating arm 61 is secured to the sliding shaft 5, and the presser leg 3 is held by the presser holder 4 via the sliding shaft 5. The presser leg 3 moves upward and downward in conjunction with upward and downward movements of the operating arm 61 together with the sliding shaft 5.

[0021] The fabric presser 32 of the presser leg 3 is positioned on the user side of the sewing machine with respect to the fixing portion 31, faces a needle plate 12 of the sewing machine, and holds a fabric (see Fig. 1 and Fig. 2). The fabric presser 32 includes an elongated needle hole 320 formed therethrough as illustrated in Figs. 5 and 6. The needle hole 320 is laterally elongated when viewed from the sewing machine user, and has a gentle arcuate shape slightly depressing toward the inside at a center portion thereof. The outline of the fabric presser 32 is also an elongated hole elongated in the lateral direction like the needle hole 320, and has a gentle arcuate shape similar to and larger than the needle hole 320. A side surface of the needle hole 320 on the user side of the sewing machine (hereinafter referred to as a "needle hole near side surface") 3c and a side surface of the fabric presser 32 on the user side of the sewing machine (hereinafter referred to as a "fabric presser near side surface") 3d are inclined so that the upper sides are positioned on the user side of the sewing machine as illustrated in Fig. 6 and Fig. 7. The needle hole near side surface 3c and the fabric presser near side surface 3d are inclined substantially parallel to each other.

[0022] When the embroidery presser 2 of the sewing machine of the embodiment is mounted on the presser rod 13 as illustrated in Fig. 1 and Fig. 2, a distal end of the operating arm 61 secured to an upper end of the sliding shaft 5 is positioned on the up-down trace of the needle holder 11, and hence an upwardly moving action of the needle rod 1 is transmitted to the sliding shaft 5. Then, when doing the embroidery with the sewing machine by mounting the embroidery presser 2 of the sewing machine, feed teeth (which are not illustrated) of the sewing machine are normally prevented from projecting from the needle plate 12. The embroidery presser 2 of the sewing machine presses the fabric downward by a spring force of the pressing spring 62 while the needle rod 1 is at the lower position and the needle 10 picks through the fabric. However, when the needle 10 is moved upward, the the needle holder 11 causes the sliding shaft 5 and the presser leg 3 to move upward via the operating arm 61 against the spring force of the pressing spring 62, and does not press the fabric downward any longer. Accordingly, a pressing force with respect to the fabric is released, so that the sewing machine user is allowed to move the fabric freely.

[0023] Fig. 8 is a side view of the sewing machine and a line of sight of the sewing machine user is illustrated by a double-dashed line. An angle α of the line of sight of the sewing machine user with reference to the needle plate 12 is on the order of 30 degrees to 60 degrees although varying among different individuals. The fabric presser 32 of the embroidery presser 2 of the sewing machine of the Embodiment 1 is inclined so that upper ends of the needle hole near side surface 3c and the fabric presser near side surface 3d of the needle hole 320 get closer to the sewing machine user than the lower end as illustrated in Fig. 7, and hence the inclination is almost the same as, or close to the angle of the line of sight of the sewing machine user. Consequently, the rough design 14 drawn on the fabric in advance is highly visible without shifting or disconnection as illustrated in Fig. 9 without being affected by the refraction of light to allow the user to do embroidery easily.

Embodiment 2

[0024] An embroidery presser 7 of a sewing machine of Embodiment 2 basically has the same configuration and the same effects and advantages as the embroidery presser 2 of Embodiment 1 as illustrated in fig. 10 and Fig. 11. In the following description, different configurations are focused.

[0025] In the configuration of the embroidery presser 7 of the sewing machine of Embodiment 2, part of the fabric presser 32 on the user side, that is, an adjusting portion 8 is a separate member. The adjusting portion 8 includes the needle hole near side surface 3c and the fabric presser near side surface 3d of the needle hole 320 of the fabric presser 32 and includes supporting portions 81 and 82 on left and right side surfaces so as to project therefrom as illustrated in Fig 10. The fabric presser 32 includes engaging portions 321 and 322 depressed leftward and rightward, with which the supporting portions 81 and 82 of the adjusting portion 8 are engaged. The adjusting portion 8 rotates about a line extending in parallel to the substantially lateral direction connecting the supporting portions 81 and 82 as an axis of rotation upon engaging the fabric presser 32 as illustrated in Fig. 11. The adjusting portion 8 changes an angle of inclination of the needle hole near side surface 3c and the fabric presser near side surface 3d of the needle hole 320 by rotating.

[0026] Therefore, with the embroidery presser 7 of the sewing machine of Embodiment 2, the adjusting portion 8 is aligned easily with the angle of the line of sight of the sewing machine user by rotating the adjusting portion 8 without changing the angle of the line of sight of the sewing machine user or without changing the height of a base on which the sewing machine is placed. Consequently, visibility of the rough design 14 is improved and working efficiency is improved.

Modification 1

[0027] An embroidery presser of Modification 1 basically has the same configuration and the same effects and advantages as the embroidery presser 2 of Embodiment 1. In the following description, different configurations are focused.

[0028] In the embroidery presser of the sewing machine of Modification 1, of a side surface (needle hole near side surface) 3e on the sewing machine user side of the needle hole 320 of the fabric presser 32 and a side surface (fabric presser near side surface) 3f on the sewing machine user side of the fabric presser 32, the needle hole near side surface 3e is inclined and the fabric presser near side surface 3f is perpendicular as illustrated in Fig. 12. The needle hole near side surface 3e is inclined so that an upper end is located on the side of the sewing machine user than a lower end.

Other Embodiments

[0029] Although preferred embodiments disclosed here have been described thus far, this disclosure is not limited to the embodiments described above. For example, a configuration in which the needle hole near side surface 3c (3e) and the fabric presser near side surface 3d may not be a strict straight line from the lower end to the upper end, and may be gently curved, or partly inclined in parallel to the line of sight may be employed.

[0030] The principles, preferred embodiment and mode of operation of the present invention have been described in the foregoing specification. However, the invention which is intended to be protected is not to be construed as limited to the particular embodiments disclosed. Further, the embodiments described herein are to be regarded as illustrative rather than restrictive. Variations and changes may be made by others, and equivalents employed, without departing from the spirit of the present invention. Accordingly, it is expressly intended that all such variations, changes and equivalents which fall within the spirit and scope of the present invention as defined in the claims, be embraced thereby.

Claims

1. An embroidery presser (2) of a sewing machine including a needle rod (1) having a needle holder (11) configured to hold a needle (10) and configured to be movable upward and downward in a height direction and a presser rod (13) configured to be movable upward and downward in the height direction, and configured to be mounted on the presser rod, comprising:

   a presser holder (4);
   an operating arm (61) mounted on the presser holder and movable upward and downward in the height direction by being lifted by the needle rod or the needle holder; and
   a presser leg (3) including a fabric presser (32) having a needle hole (13a) formed therethrough, facing a needle plate (12) of the sewing machine and pressing an embroidery object, and being held by the presser holder so as to be movable upward and downward in conjunction with the operating arm; and
   a pressing spring (62) provided on the presser holder and having an urging force that urges the presser leg toward the needle plate, wherein
   the fabric presser has a portion which allows the embroidery object to be seen through on at least on a sewing machine user side of the fabric presser, and
   at least a side surface on the sewing machine user side of the needle hole of the side surface on the sewing machine user side of the needle

hole and a side surface on the sewing machine user side of the fabric presser is inclined so that an upper end is closer to the sewing machine user side than a lower end.

2. The embroidery presser of the sewing machine according to Claim 1, wherein the fabric presser allows the embroidery object to be seen through at least at a portion corresponding to the maximum stitch width of the needle rod.

3. The embroidery presser of the sewing machine according to Claim 1 or 2, wherein at least the side surface on the sewing machine user side of the needle hole of the side surface on the sewing machine user side of the needle hole and the side surface on the sewing machine user side of the fabric presser has an angle of inclination substantially parallel to a line of sight of the user looking the needle hole.

4. The embroidery presser of the sewing machine according to any one of Claims 1 to 3, wherein the fabric presser includes an adjusting portion (8) configured to allow adjustment of the angle of inclination of at least the side surface on the sewing machine user side of the needle hole of the side surface on the sewing machine user side of the needle hole and the side surface on the sewing machine user side of the fabric presser.

FIG.1

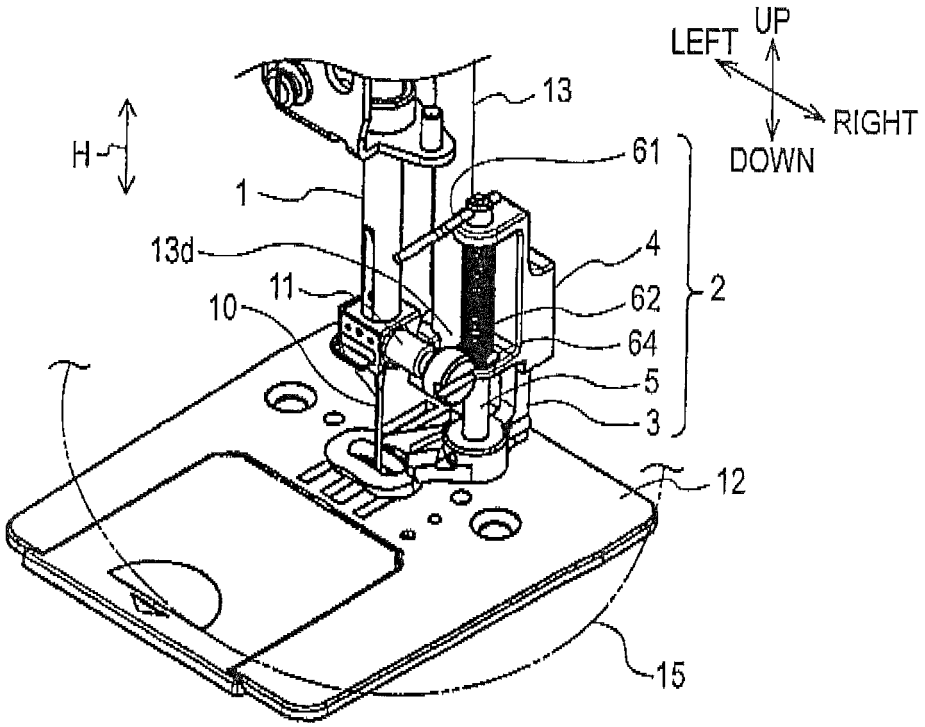

UP
LEFT
RIGHT
DOWN
H
13
61
1
13d
4
11
62
2
10
64
5
3
12
15

FIG.2

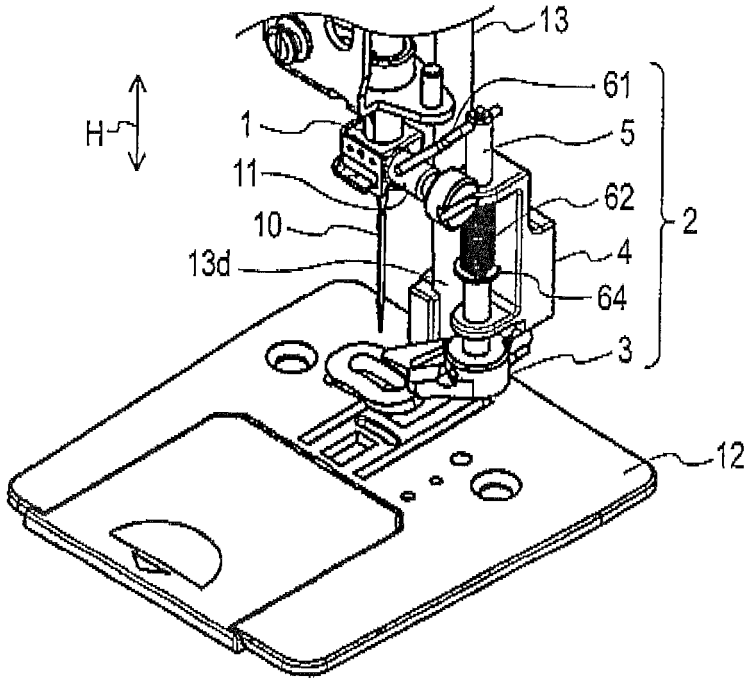

13
H
61
1
5
11
62
2
10
4
13d
64
3
12

FIG.3

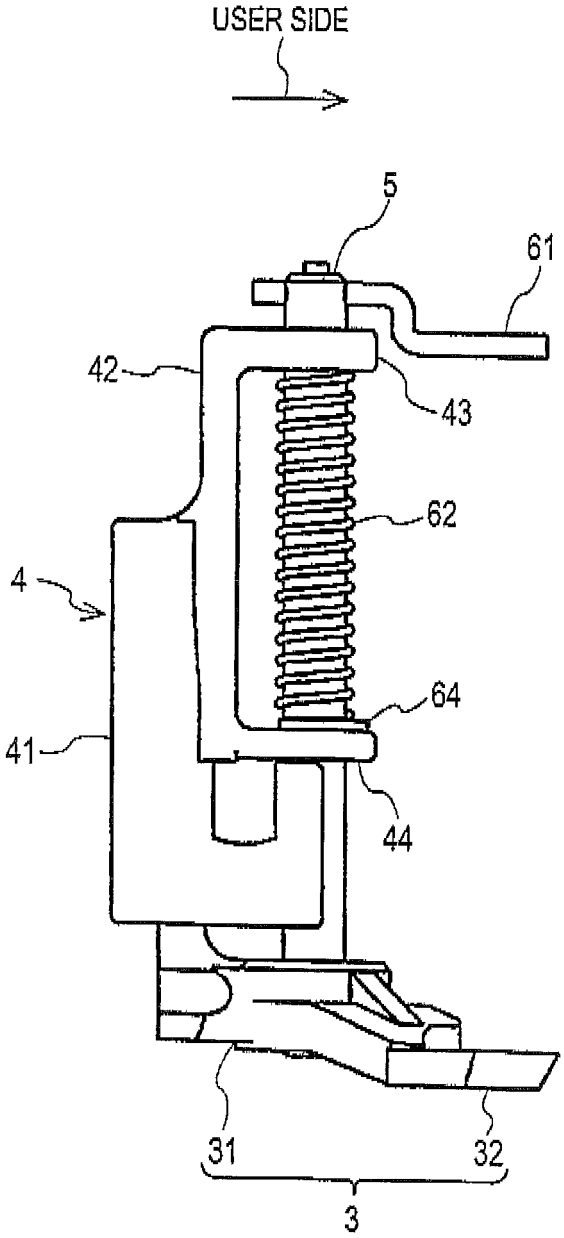


FIG.4

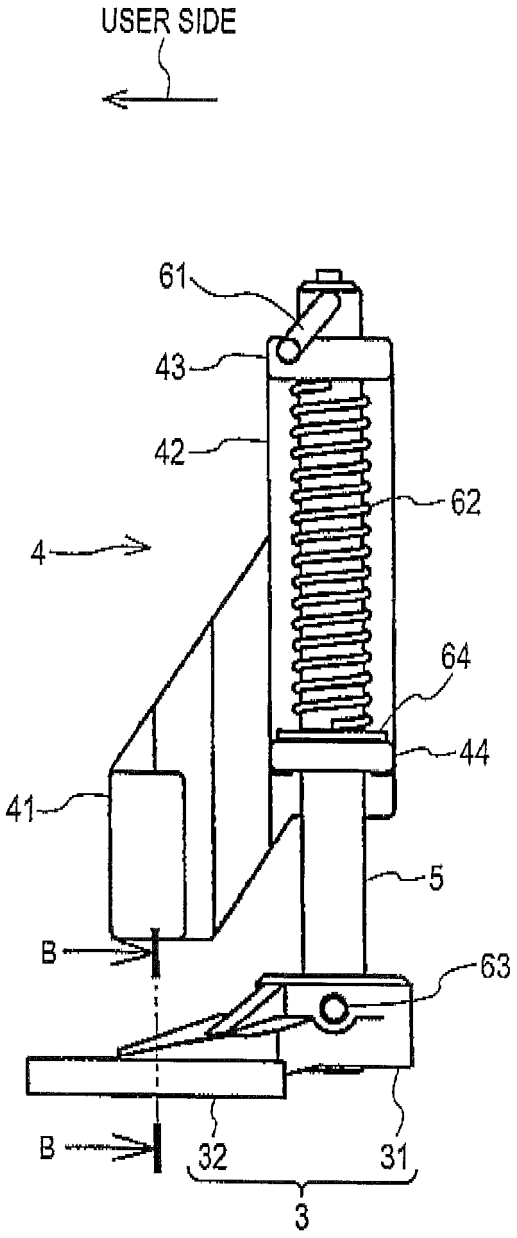


FIG.5

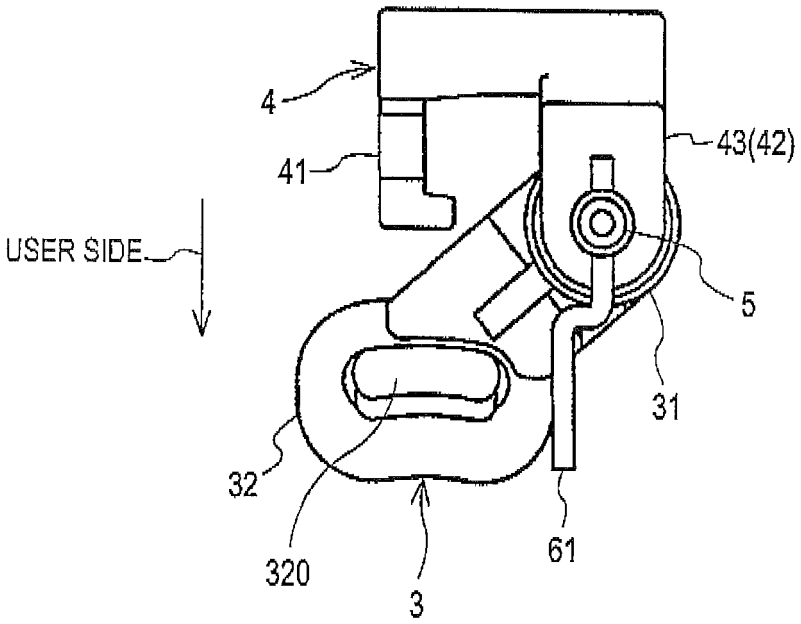


FIG.6

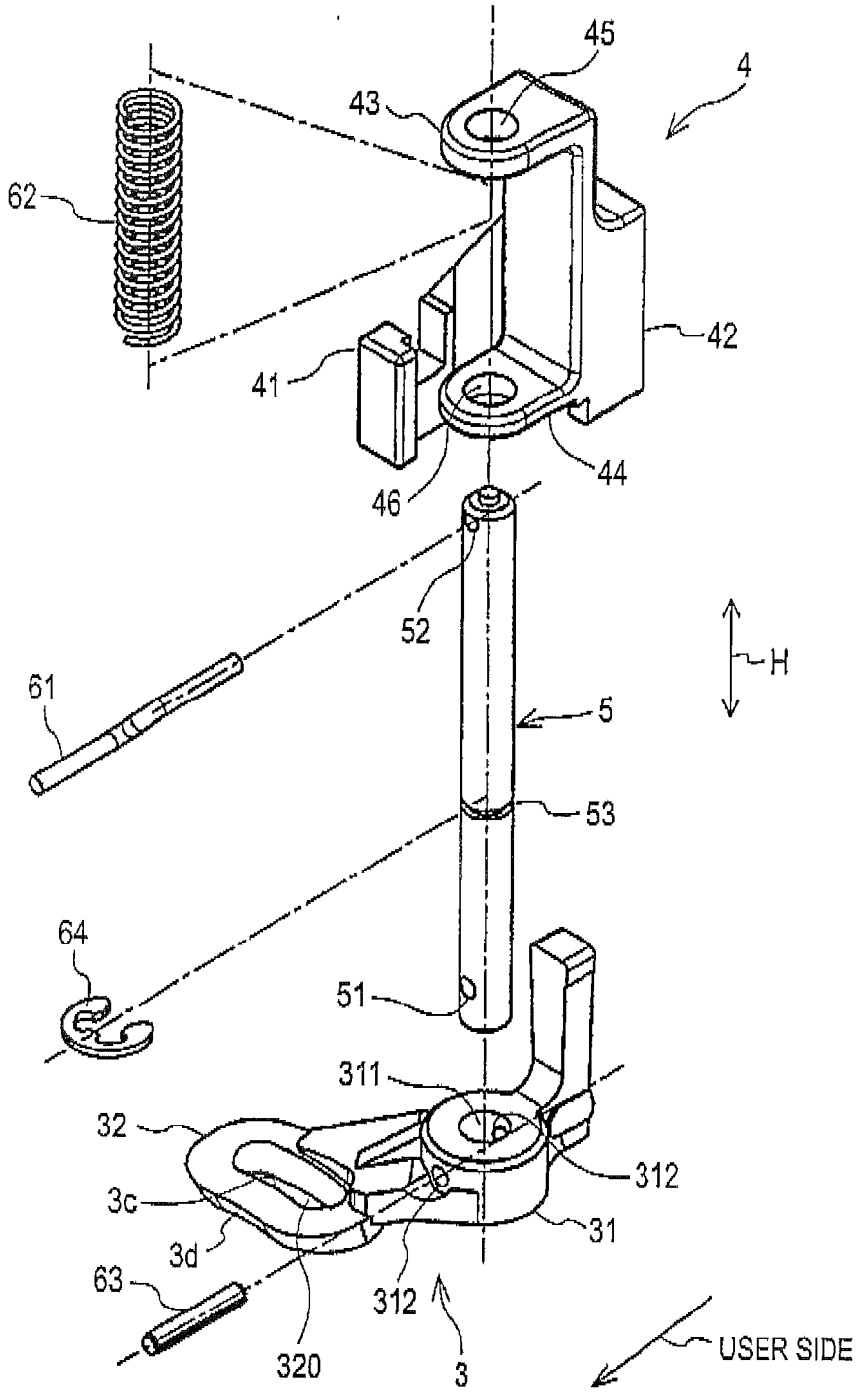

45
4
43
62
42
41
44
46
52
H
61
5
53
64
51
311
32
312
3c
31
3d
63
312
320
3
USER SIDE

FIG.7

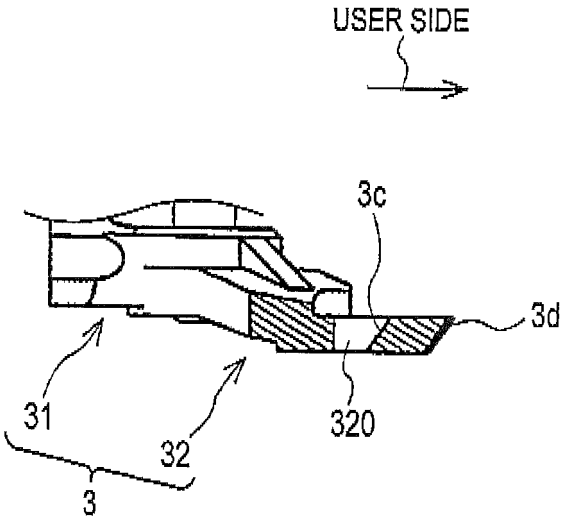


FIG.8

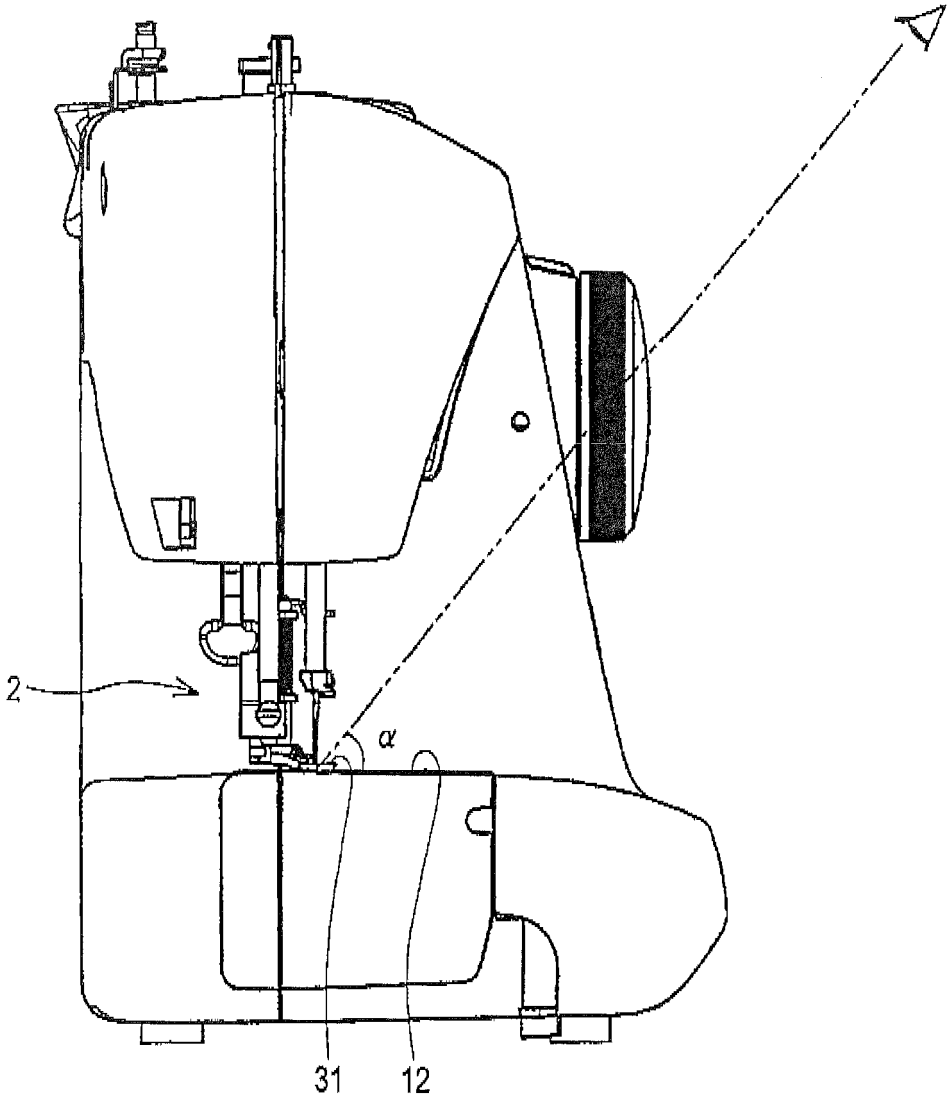


FIG.9

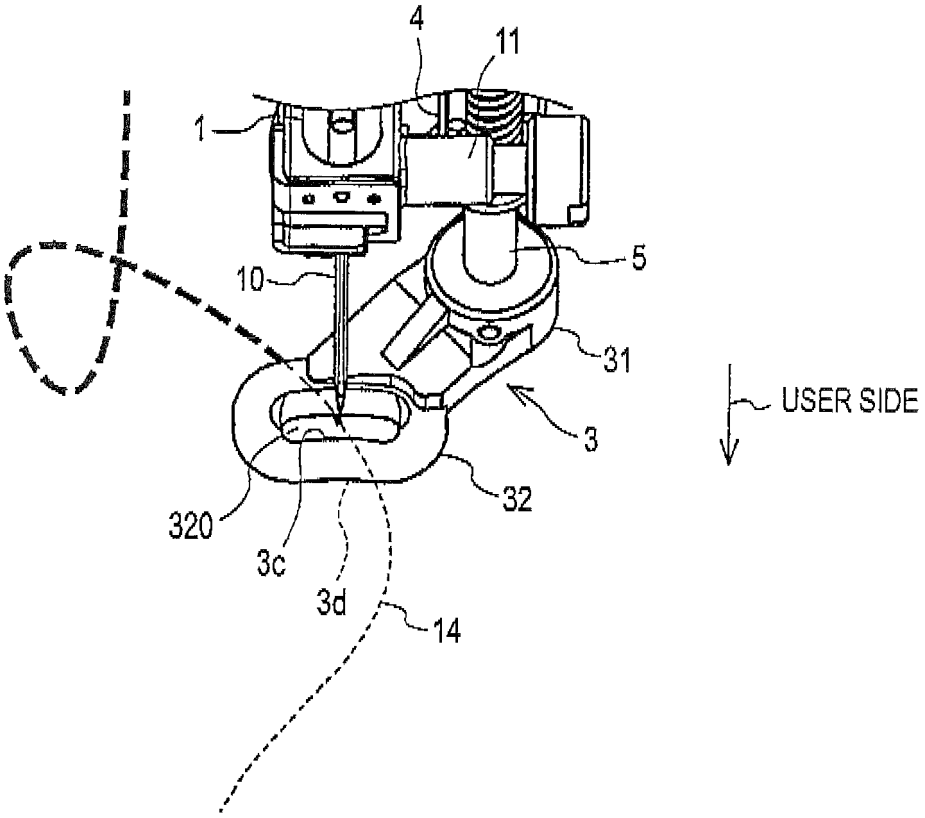


FIG.10

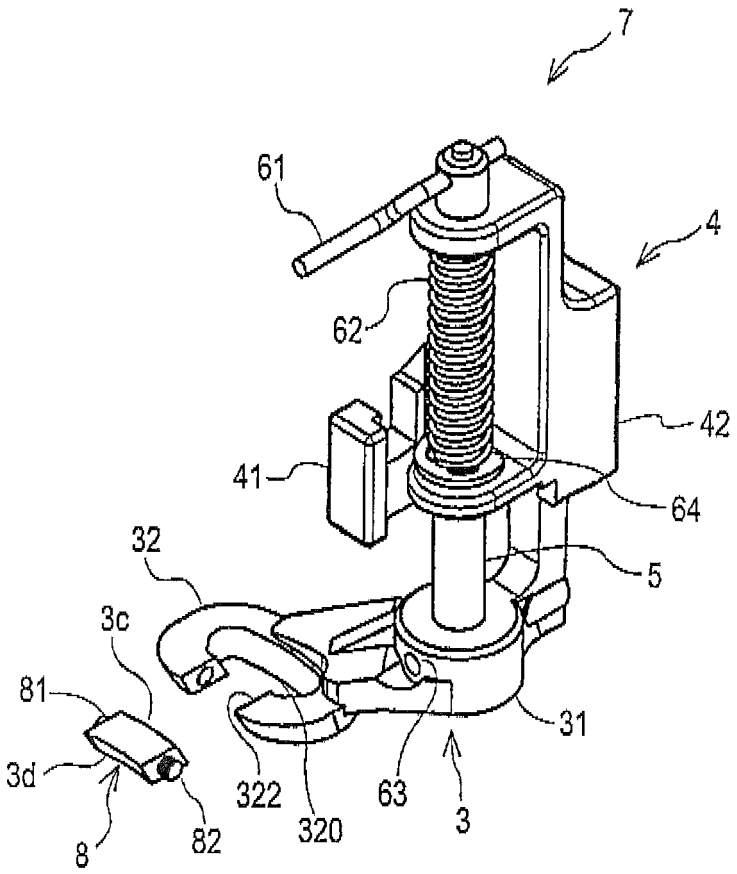


FIG.11

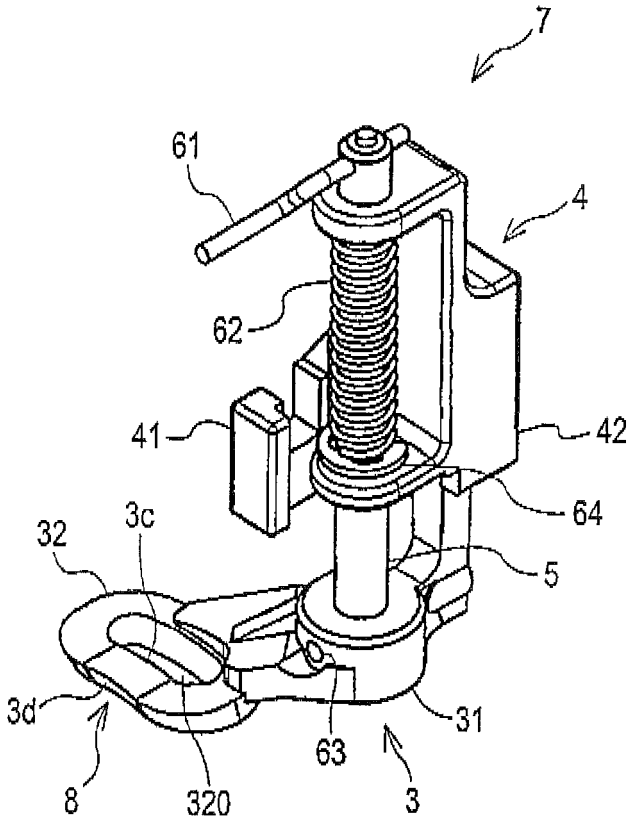


FIG.12

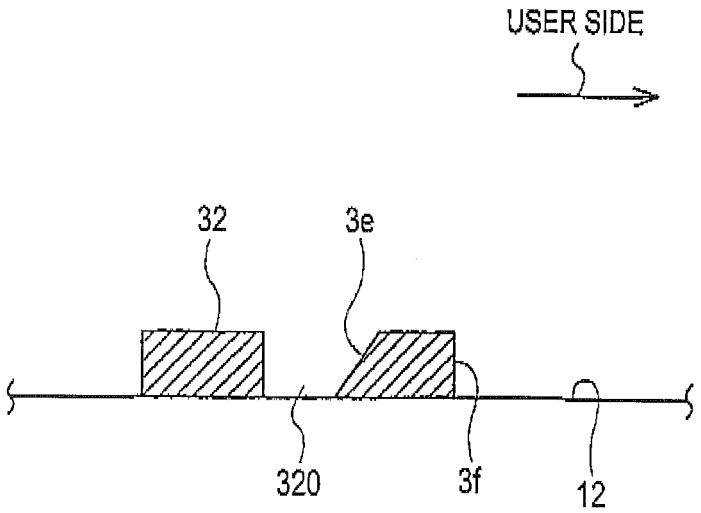


FIG.13

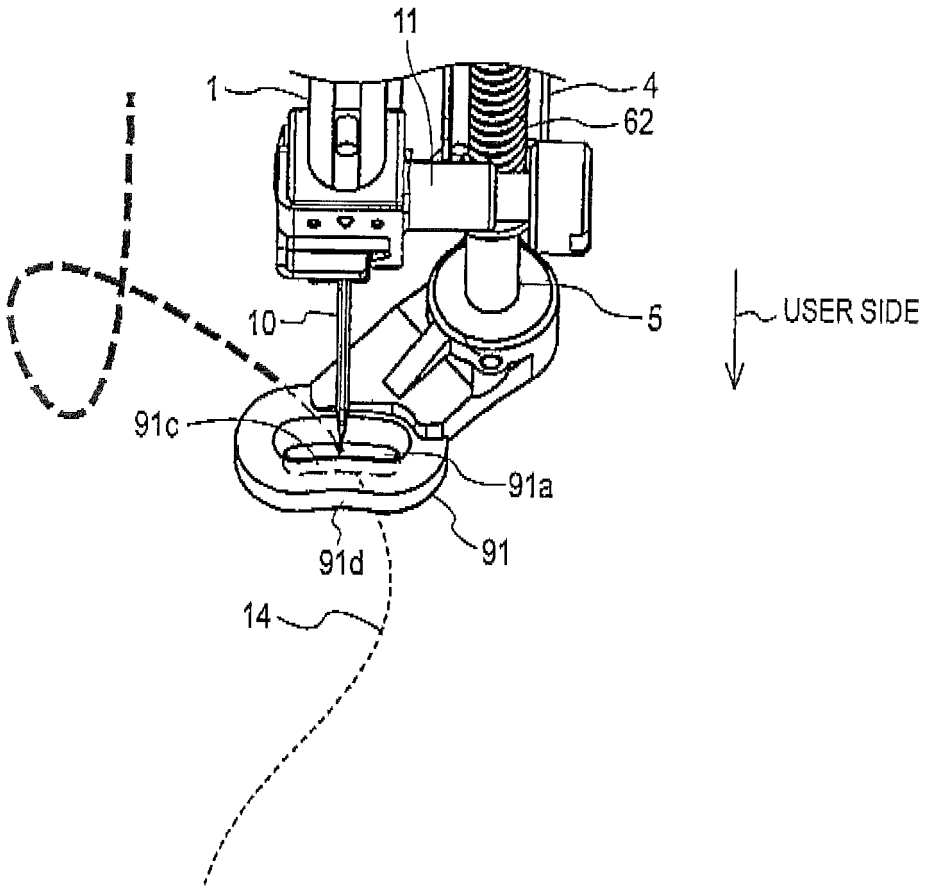
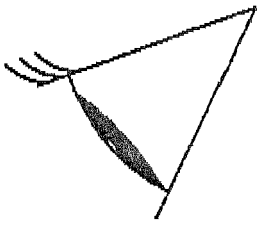
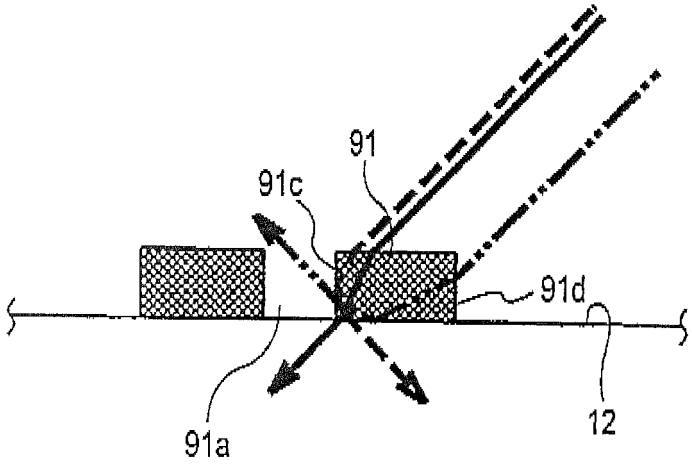


FIG.14





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European Patent Office
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EUROPEAN SEARCH REPORT

Application Number
EP 14 15 6086

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	EP 2 518 200 A2 (AISIN SEIKI [JP]) 31 October 2012 (2012-10-31) * paragraph [0036] - paragraph [0067]; figures 1-8 *	1-4	INV. D05B29/06 D05C9/02
Y	EP 2 233 628 A2 (AISIN SEIKI [JP]) 29 September 2010 (2010-09-29) * paragraph [0078] - paragraph [0119]; figures 1-35 *	1-4	
Y	US 6 273 013 B1 (CAREY JR SNEAD HENRY [US]) 14 August 2001 (2001-08-14) * column 2, line 48 - column 5, line 11; figures 1-5 *	1-4	

TECHNICAL FIELDS SEARCHED (IPC)

D05B
D05C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	22 May 2014	Herry-Martin, D

CATEGORY OF CITED DOCUMENTS

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22-05-2014

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2518200 A2	31-10-2012	CN 202913202 U	01-05-2013
		EP 2518200 A2	31-10-2012
		JP 2012228431 A	22-11-2012
EP 2233628 A2	29-09-2010	CN 101845717 A	29-09-2010
		EP 2233628 A2	29-09-2010
		JP 2010246897 A	04-11-2010
US 6273013 B1	14-08-2001	AU 4563301 A	24-09-2001
		CA 2402649 A1	20-09-2001
		EP 1280953 A2	05-02-2003
		MX PA02009092 A	12-03-2003
		US 6273013 B1	14-08-2001
		WO 0168968 A2	20-09-2001

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 62032549 A **[0003]**