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(54) **EMBROIDERY UNIT COVER, SIDE TABLE FOR SEWING MACHINE, AND SEWING MACHINE**

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(57) **ABSTRACT**

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An embroidery unit cover that covers an embroidery unit that is to be attached to a sewing machine for sewing embroidery that includes a planar portion that forms a substantially horizontal surface combined with a bed portion of the sewing machine and a free arm portion provided to the bed portion, a peripheral wall portion that runs continuously along a peripheral border of the planar portion and that extends vertically downward from the planar portion, and a first engagement portion that is disposed on the peripheral wall portion and that is structured to be attached to and detached from a second engagement portion disposed on at least one of the bed portion and the free arm portion. When the first engagement portion and the second engagement portion are engaged with each other, the embroidery unit cover forms a side table with the free arm portion.

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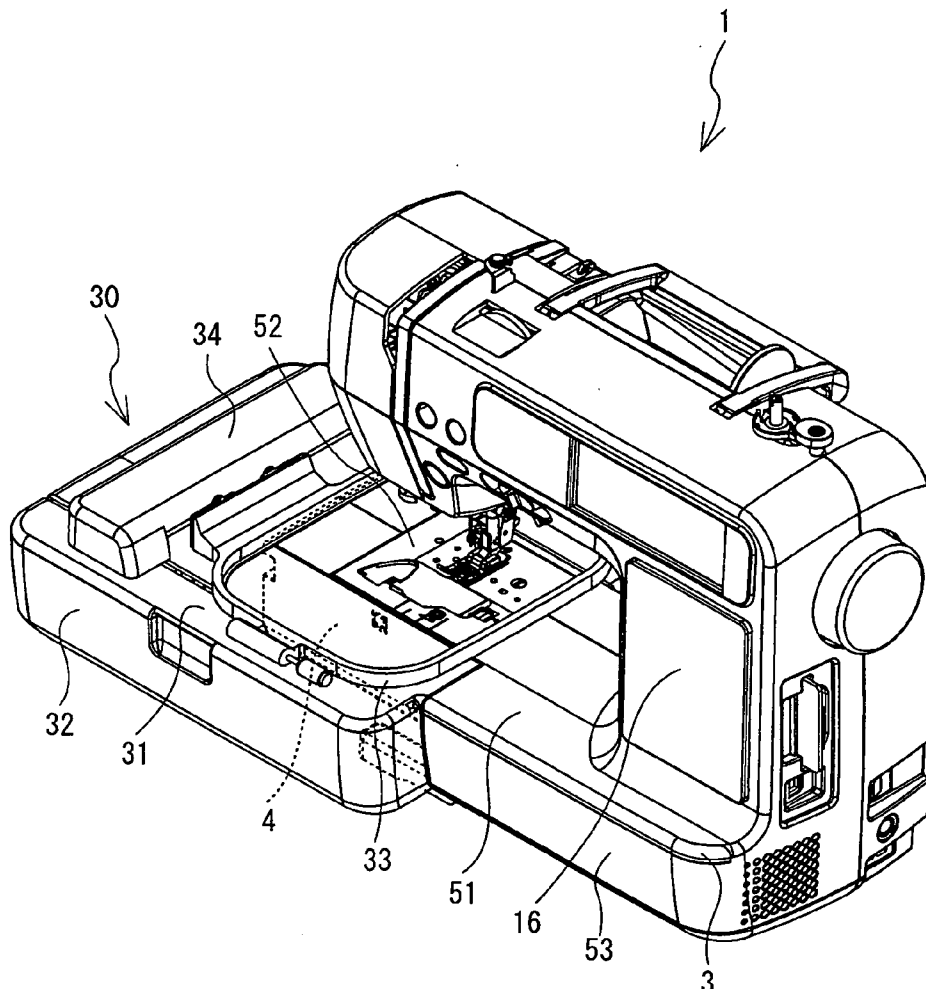


FIG. 1

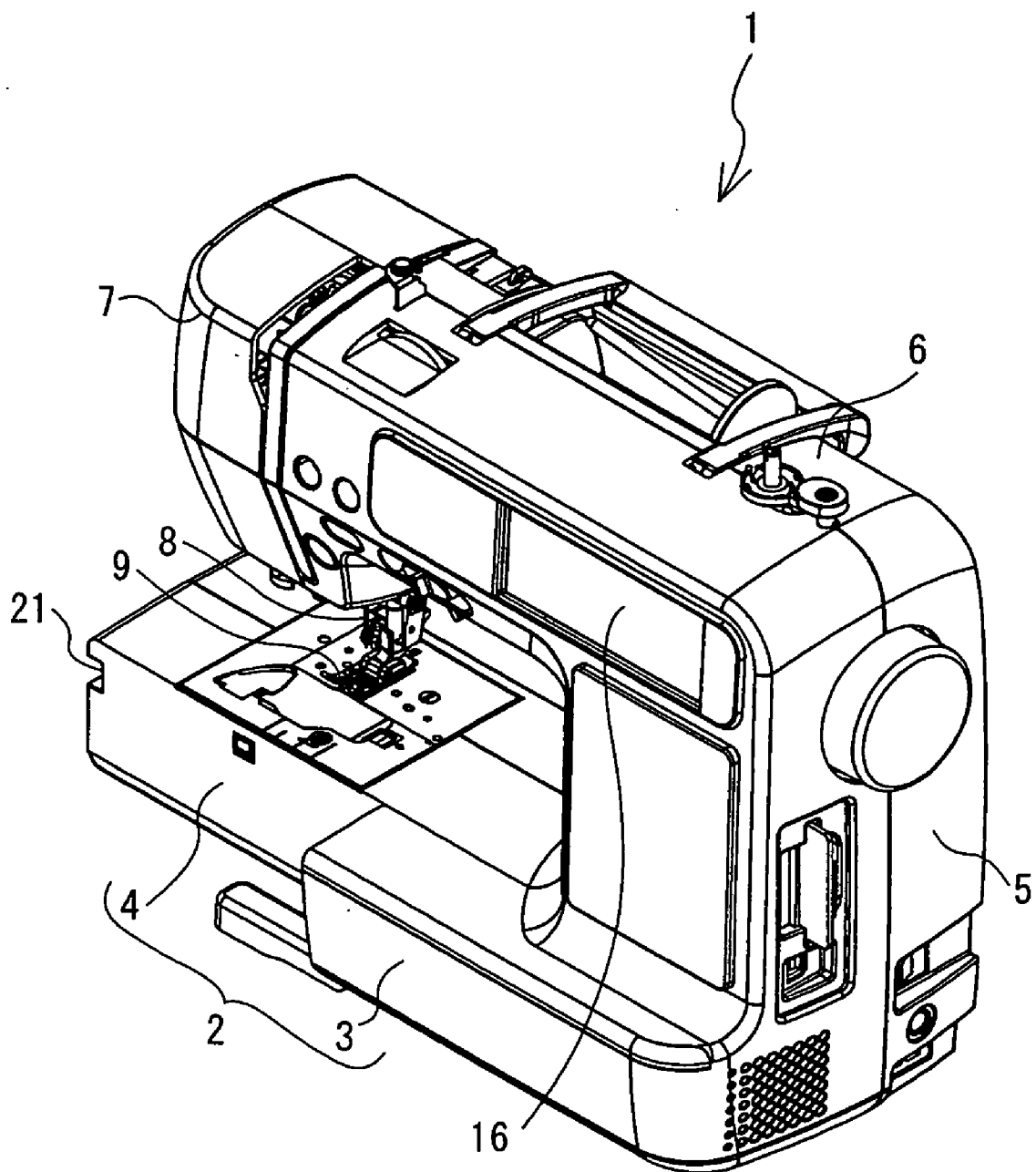


FIG. 2

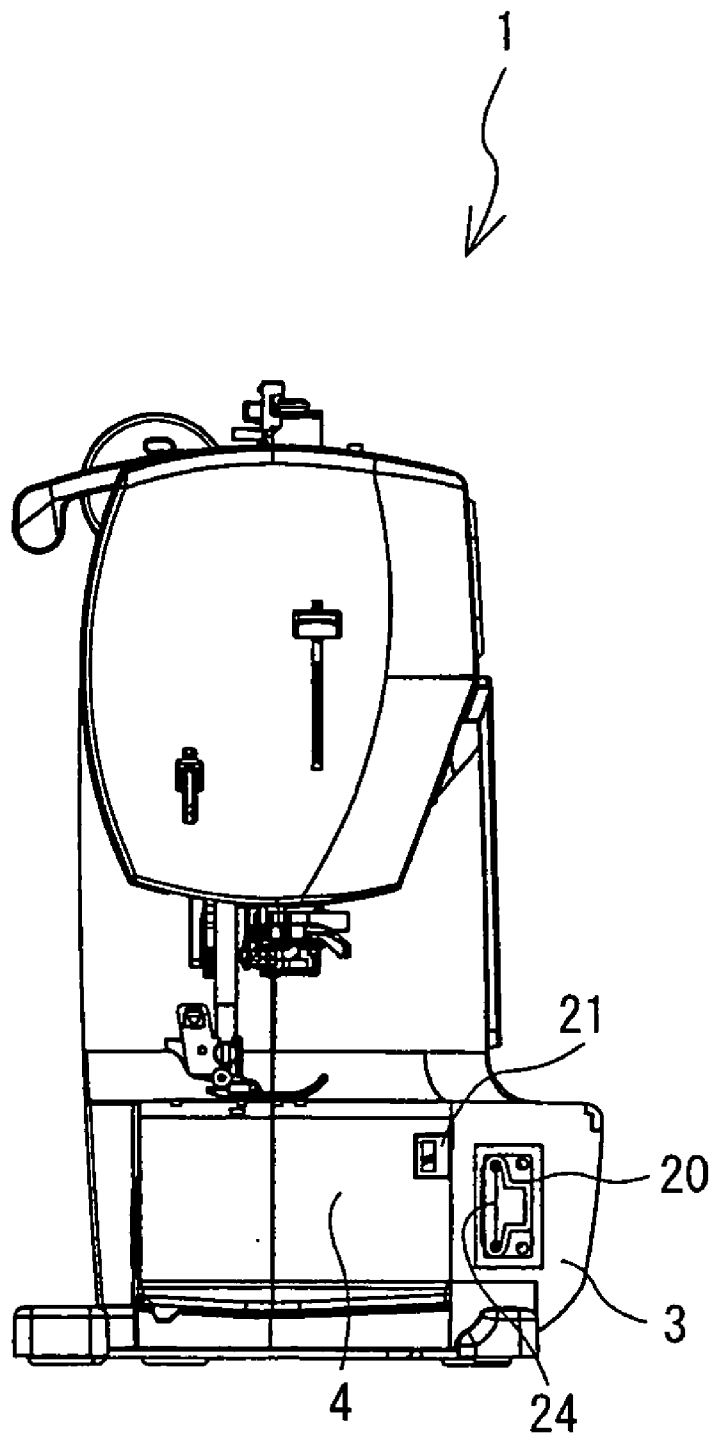


FIG. 3

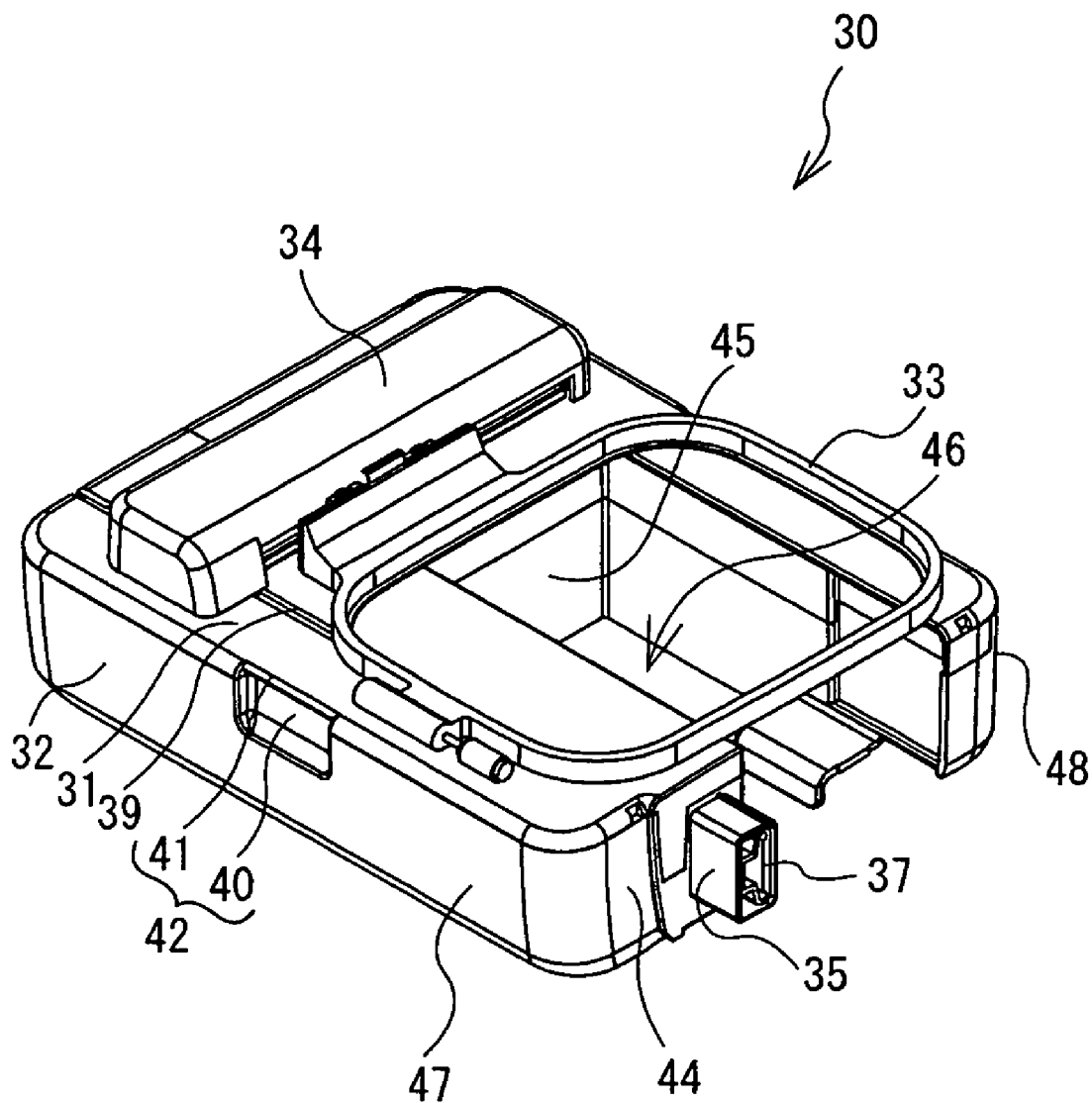


FIG. 4

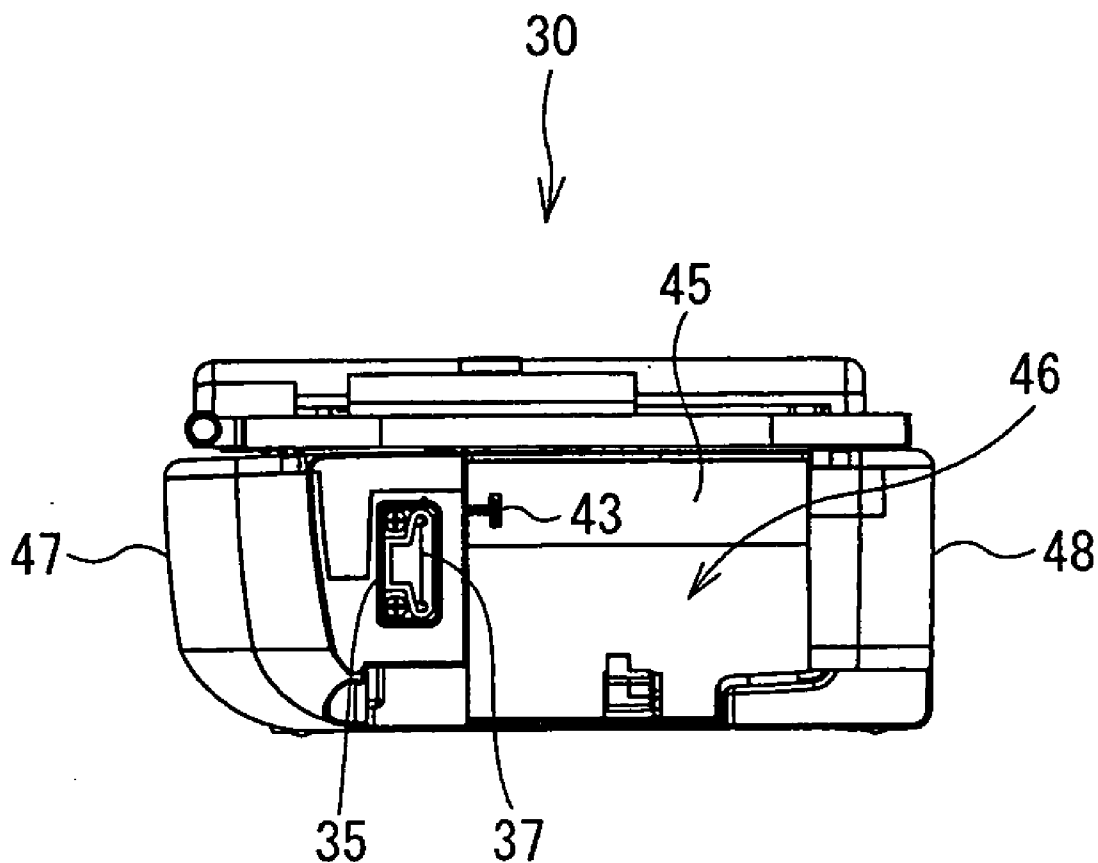


FIG. 5

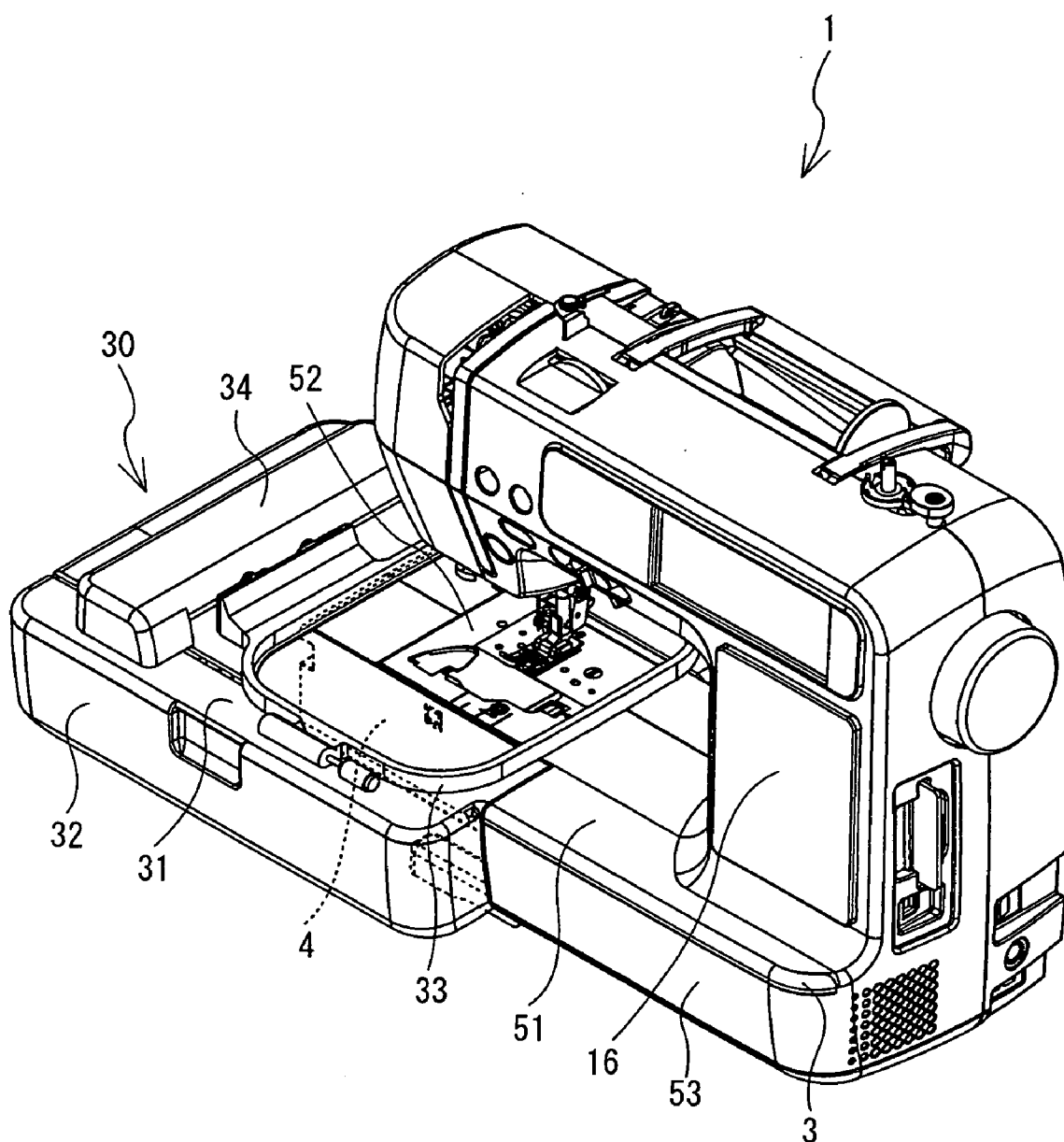


FIG. 6

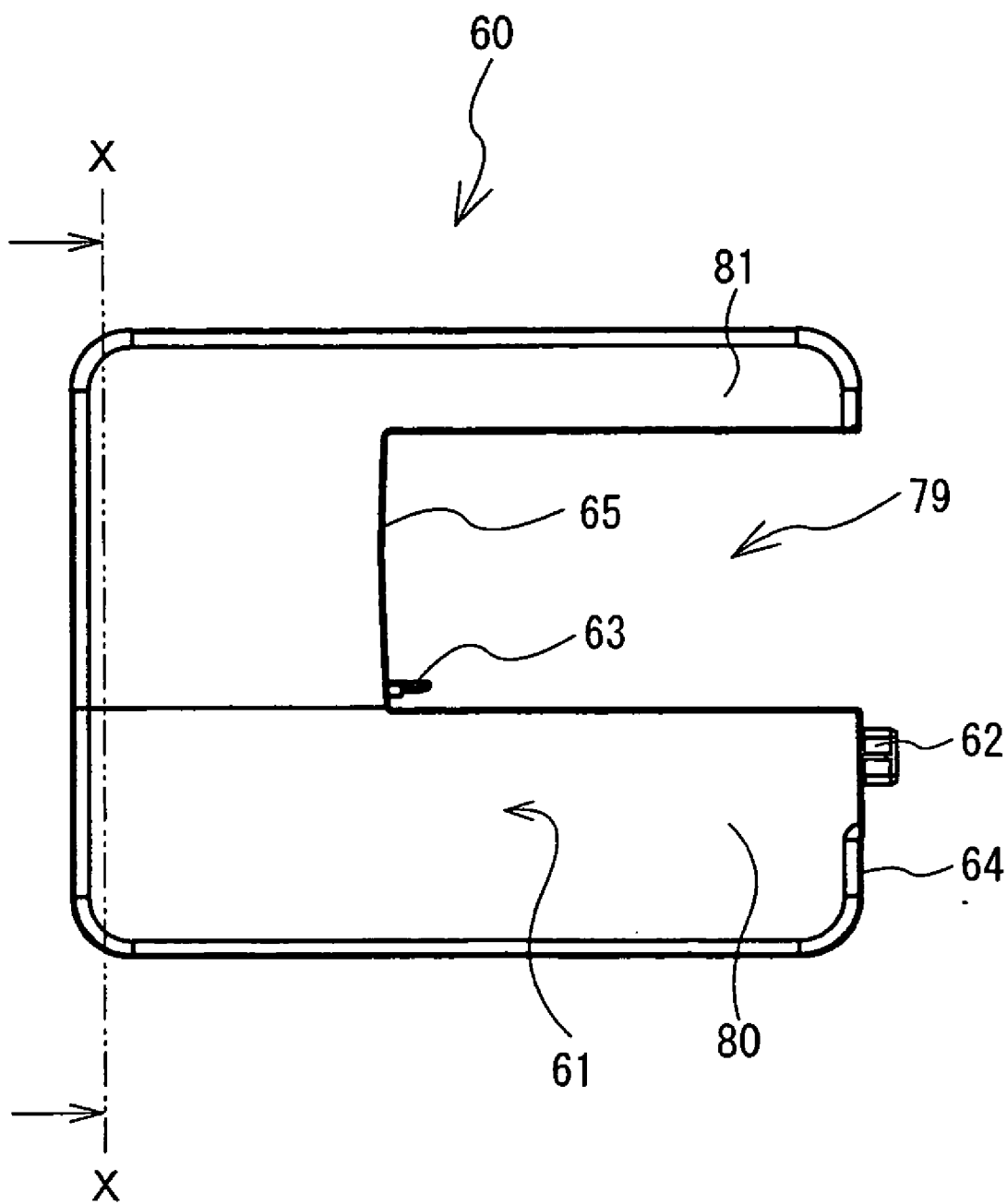


FIG. 7

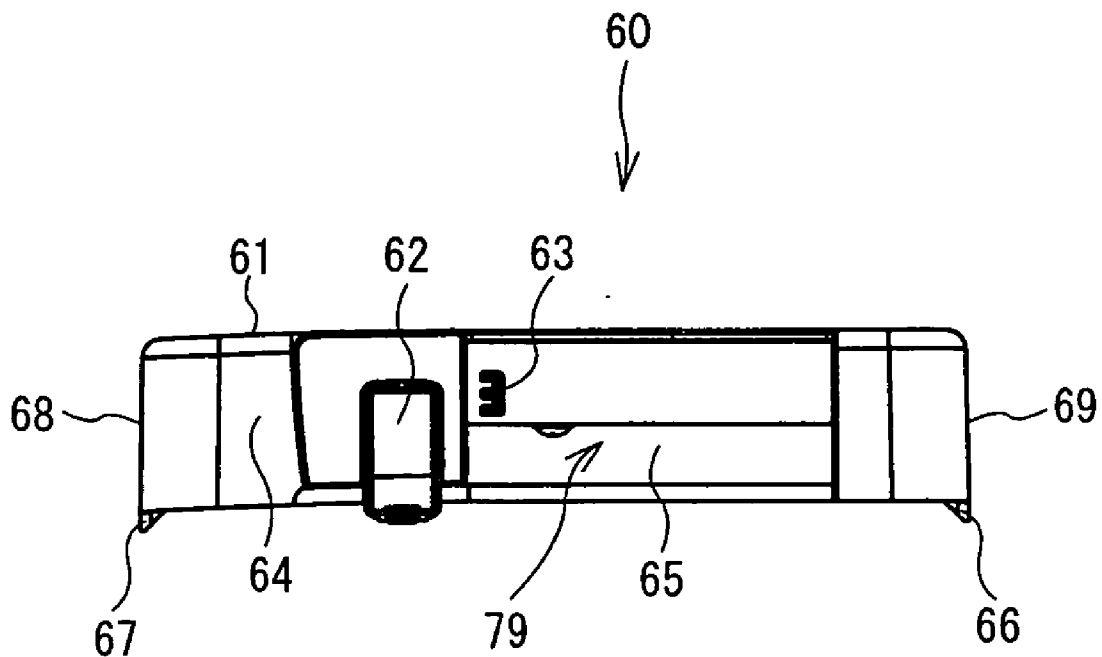


FIG. 8

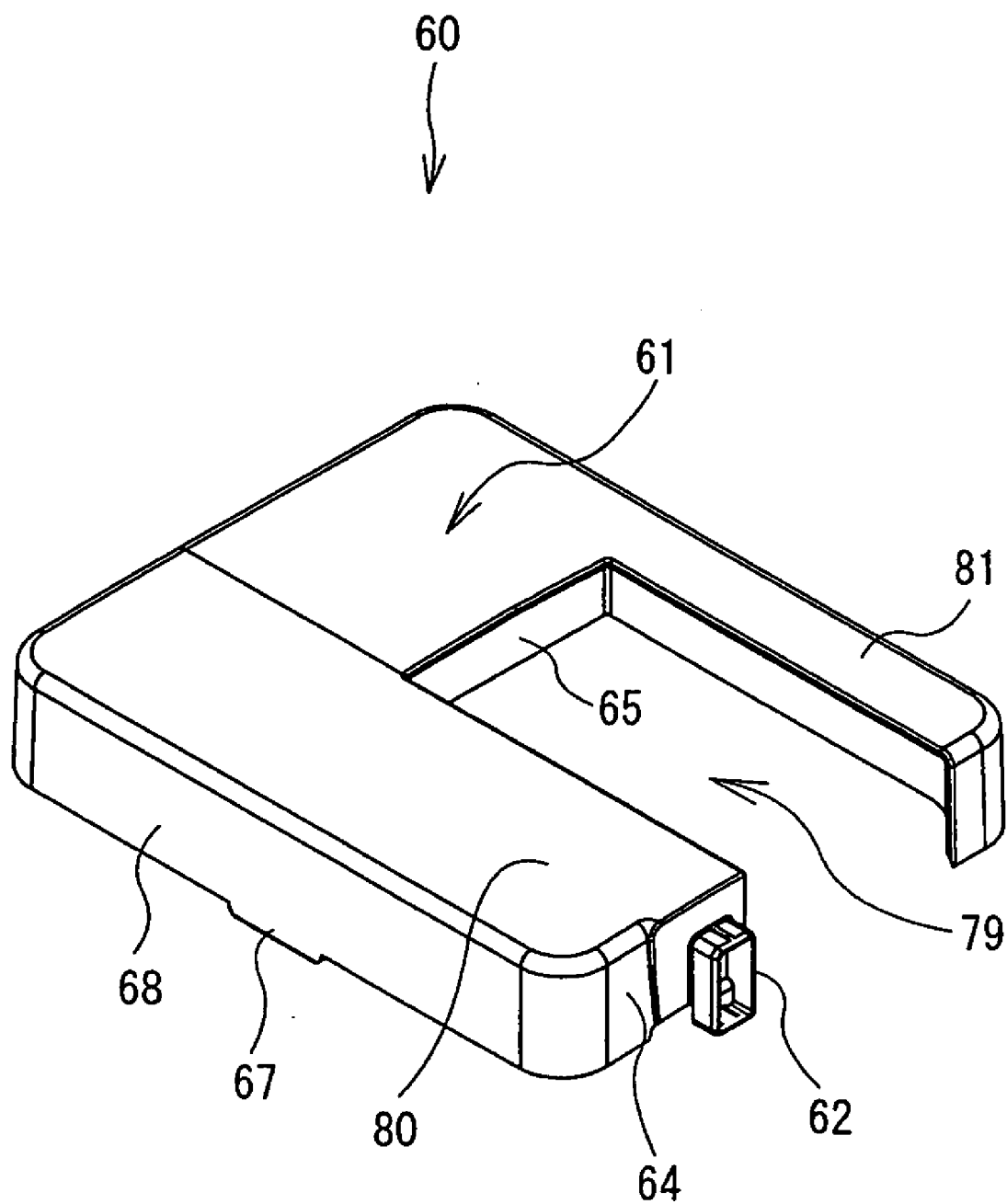


FIG. 10

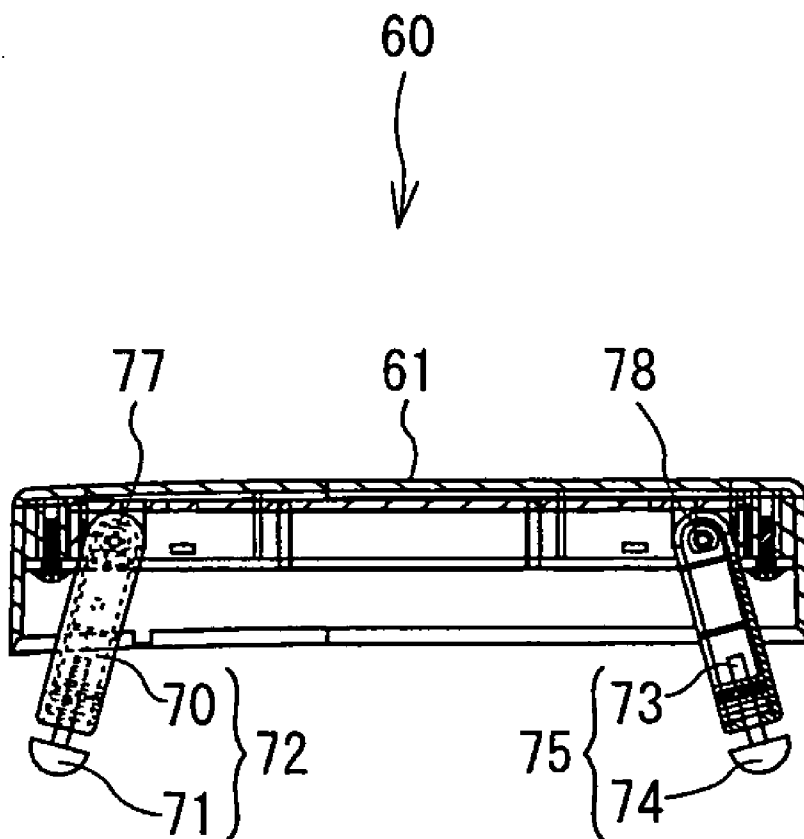


FIG. 11

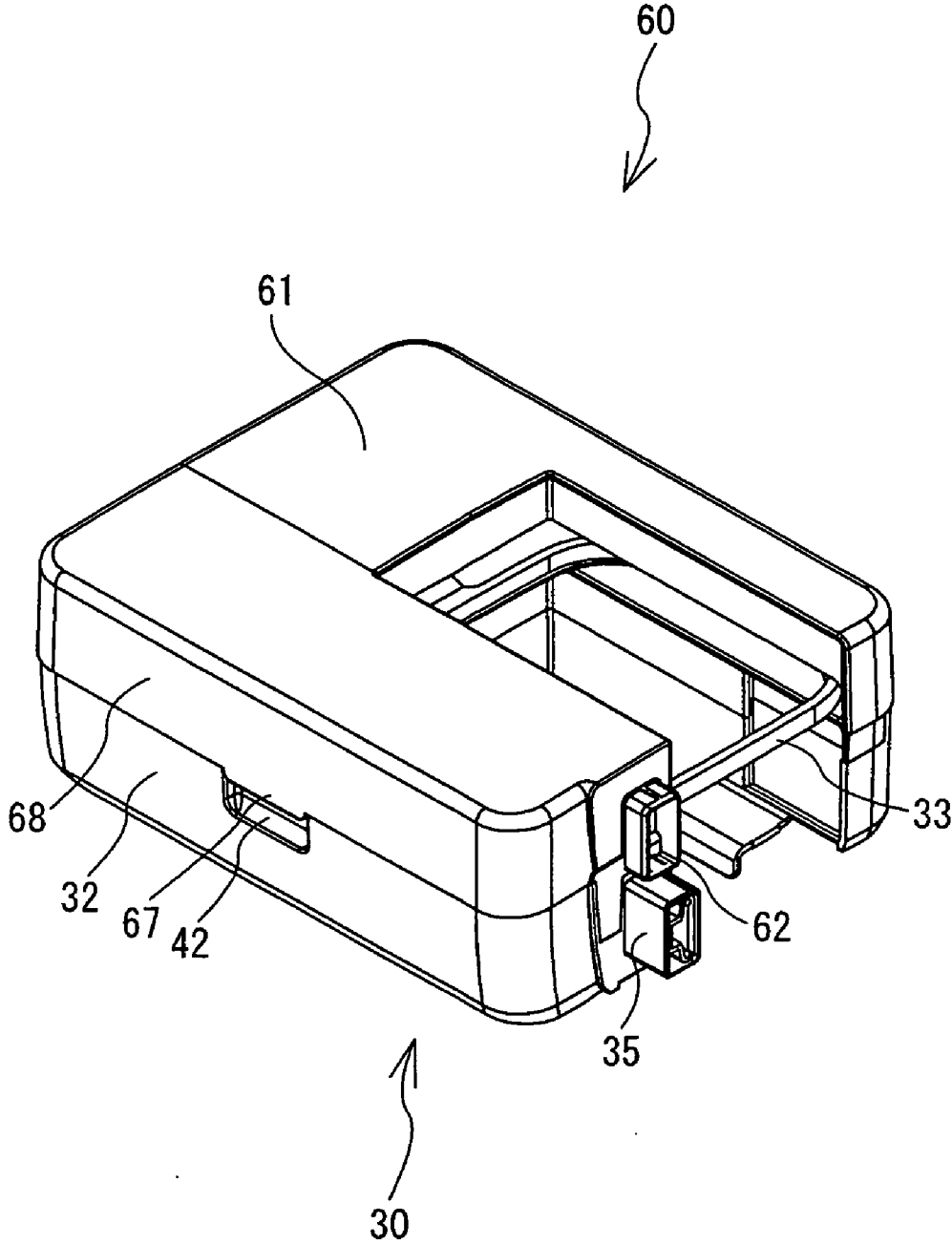


FIG. 12

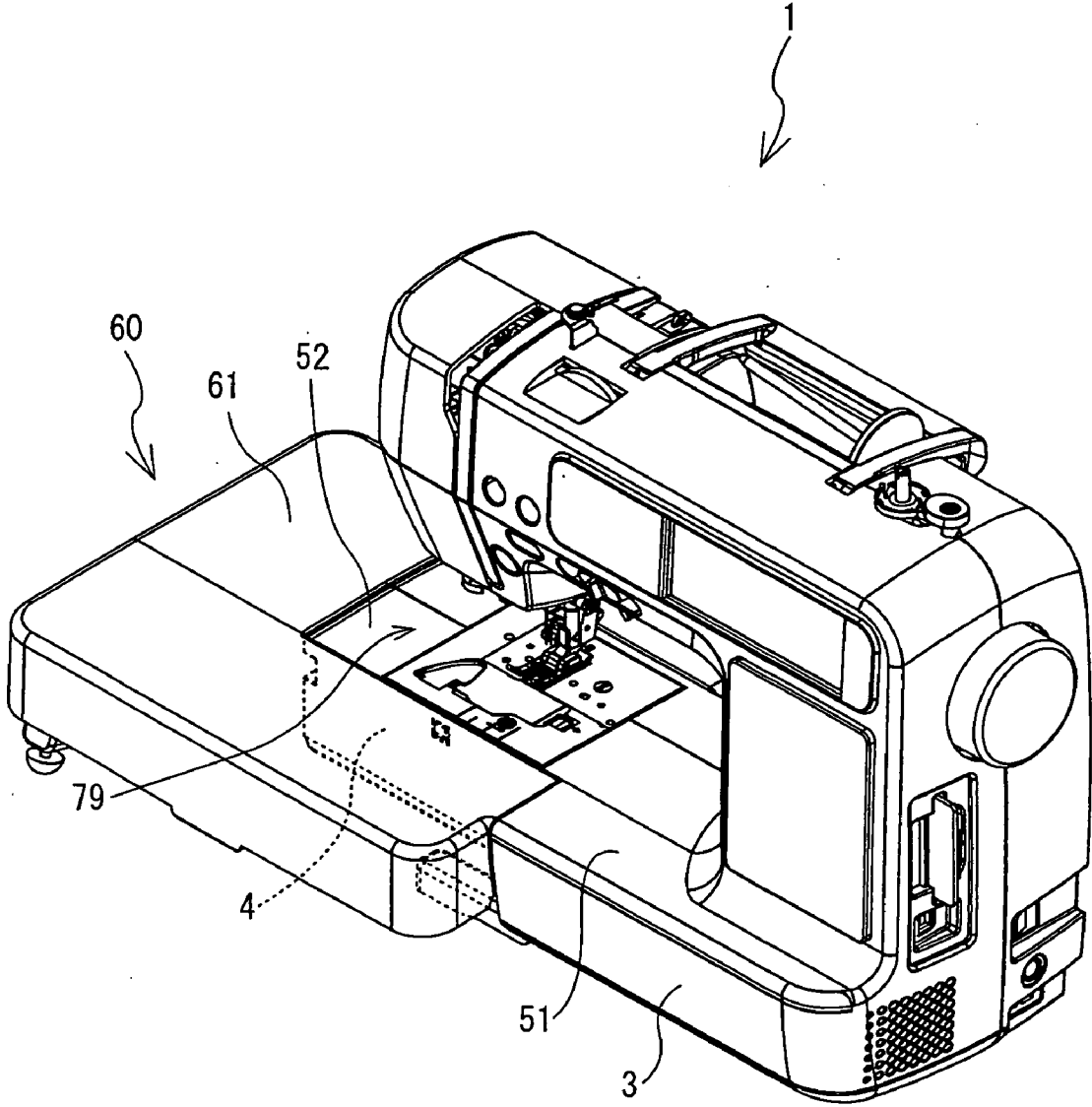


FIG. 13

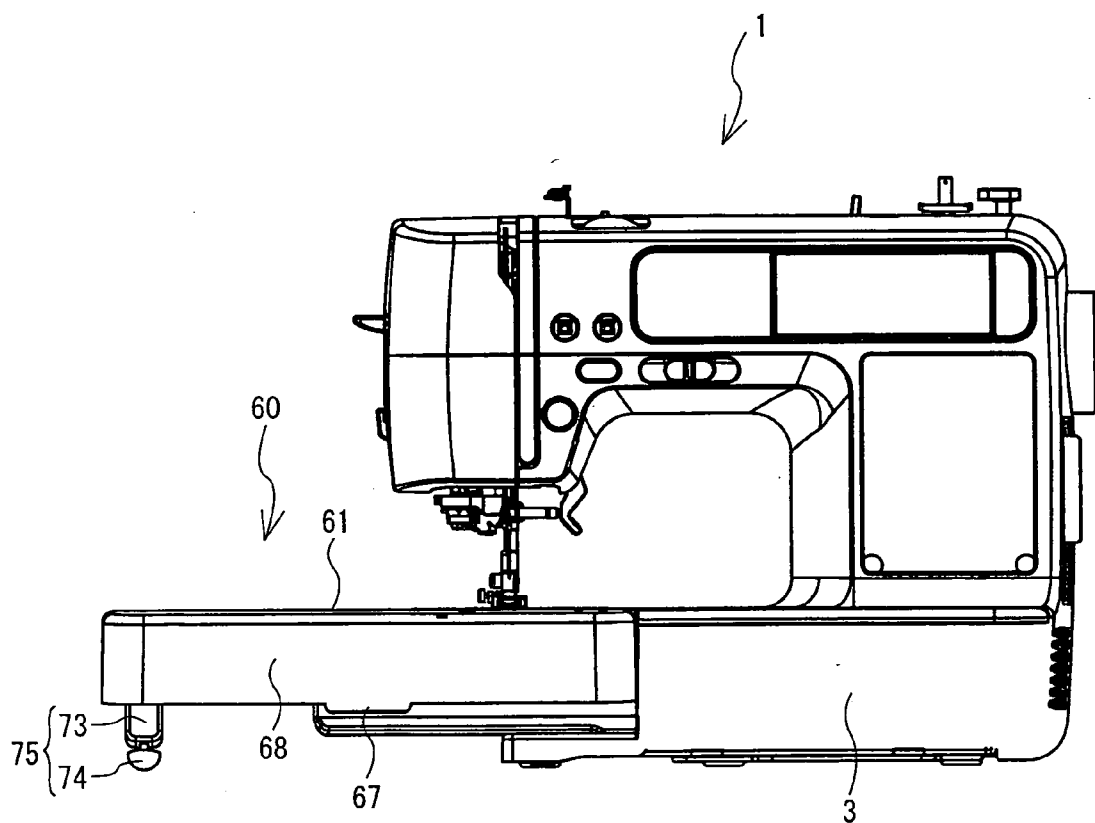
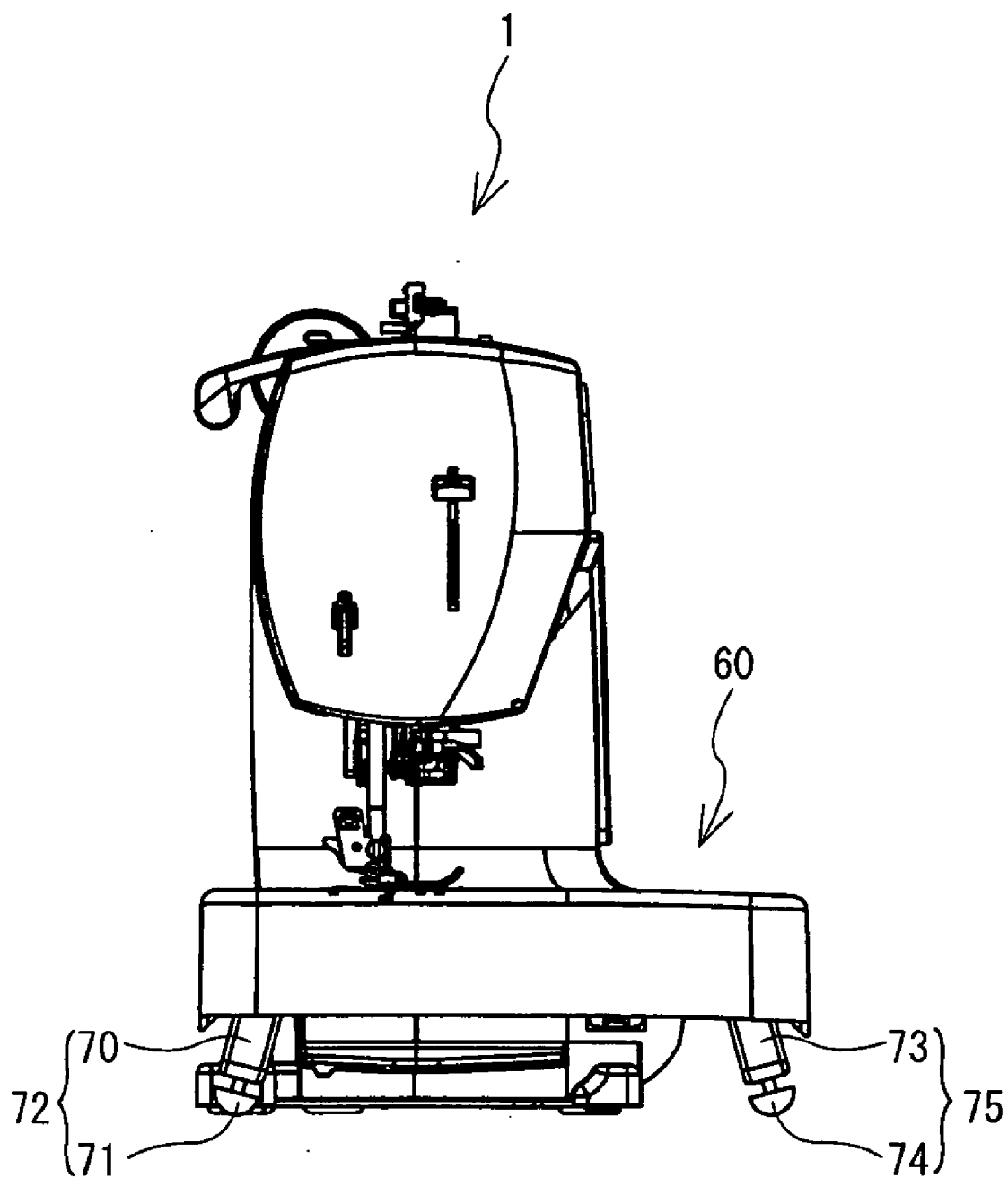


FIG. 14



EMBROIDERY UNIT COVER, SIDE TABLE FOR SEWING MACHINE, AND SEWING MACHINE

CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims priority to Japanese Patent Application No. 2007-180339, filed Jul. 9, 2007, the disclosure of which is hereby incorporated by reference in its entirety.

BACKGROUND

[0002] The present disclosure relates to an embroidery unit cover that forms a side table attachable to and detachable from a sewing machine, a side table that forms a cover to be disposed over and that covers an embroidery unit, and a sewing machine to which an embroidery unit cover and a side table can be attached to and detached from.

[0003] Japanese Patent Application Laid-Open Publication No. Hei 11-207075 discloses a dedicated cover for an embroidery unit that can be attached to a free arm portion of a sewing machine that is to be used for sewing an embroidery. The dedicated cover is used to prevent dust, etc., from entering the moving portions of the sewing machine when the sewing machine is housed or stored. Further, the dedicated cover has a planer portion and side walls that are formed on the peripheral border of the planer portion and so that the cover can be disposed to cover the embroidery unit from the above.

[0004] Another Japanese Patent Application Laid-Open Publication No. 2006-149949, discloses a side table that can be attached to a free arm portion of a sewing machine that is to be used. The side table is equipped with a substantially U-shaped support leg and an engagement portion which can be engaged with the body of the sewing machine, thereby making it possible to secure a large work cloth support surface when combined with a bed portion and the free arm portion.

[0005] The above-described dedicated cover for the embroidery unit is removed from the body of the embroidery unit when the embroidery unit is attached to the sewing machine that is to be used. In this configuration, because the removed dedicated cover itself is of no use, a problem arises because a space for the cover may block the work space that is intended for the sewing machine during sewing. Further, the above-described side table is also removed from the body of the sewing machine when the table is not used or when the sewing machine is housed. In this configuration, a problem also arises because a space for the removed side table may block the work space for the sewing machine during sewing.

SUMMARY

[0006] Various exemplary examples of the general principles herein provide an embroidery unit cover that forms a side table that is attachable to and detachable from a free arm portion of a sewing machine, a side table that forms a cover for covering an embroidery unit, and a sewing machine to which an embroidery unit cover and a side table can be attached to and detached from.

[0007] Exemplary examples provide an embroidery unit cover that covers an embroidery unit to be attached to a sewing machine for sewing an embroidery. The embroidery unit cover includes a planar portion that forms a substantially horizontal surface combined with a bed portion of the sewing

machine and a free arm portion provided to the bed portion, a peripheral wall portion that runs continuously along a peripheral border of the planar portion and that extends vertically downward from the planar portion, and a first engagement portion that is disposed on the peripheral wall portion and that is structured to be attached to and detached from a second engagement portion disposed on at least one of the bed portion and the free arm portion. When the first engagement portion and the second engagement portion are engaged with each other, the embroidery unit cover forms a side table with the free arm portion.

[0008] Exemplary examples provide a side table that is to be attached to a sewing machine. The side table includes a planar portion that forms a substantially horizontal surface combined with a bed portion of the sewing machine and a free arm portion provided to the bed portion, a peripheral wall portion that runs continuously along a peripheral border of the planar portion and that extends vertically downward from the planar portion, a first engagement portion that is disposed on the peripheral wall portion and that is structured to be attached to and detached from a second engagement portion disposed on at least one of the bed portion and the free arm portion, and a first locking portion that locks with an embroidery unit to be attached to the sewing machine for sewing embroidery. The side table forms a cover that can be placed over the embroidery unit.

[0009] Exemplary examples provide a sewing machine to which an embroidery unit cover can be attached to and detached from. The sewing machine includes a bed portion, a free arm portion, and a second engagement portion that is provided on at least one of the bed portion and the free arm portion. The embroidery unit cover includes a planar portion that forms a substantially horizontal surface combined with a bed portion of the sewing machine and the free arm portion provided to the bed portion, a peripheral wall portion that runs continuously along a peripheral border of the planar portion and that extends vertically downward from the planar portion, and a first engagement portion that is disposed on the peripheral wall portion and that is structured to be attached to and detached from a second engagement portion disposed on at least one of the bed portion and the free arm portion. When the first engagement portion and the second engagement portion are engaged with each other, the embroidery unit cover forms a side table with the free arm portion.

[0010] Exemplary examples provide a sewing machine to which a side table can be attached to and detached from. The sewing machine includes a bed portion, a free arm portion, and a second engagement portion that is provided on at least one of the bed portion and the free arm portion. The side table includes a planar portion that forms a substantially horizontal surface combined with the bed portion of the sewing machine and the free arm portion provided to the bed portion, a peripheral wall portion that runs continuously along a peripheral border of the planar portion and that extends vertically downward from the planar portion, a first engagement portion that is disposed on the peripheral wall portion and that is structured to be attached to and detached from a second engagement portion disposed on at least one of the bed portion and the free arm portion, and a first locking portion that locks with an embroidery unit to be attached to the sewing machine for sewing embroidery. The side table forms a cover that can be placed over the embroidery unit.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] Exemplary examples of the disclosure will be described below in detail with reference to the accompanying drawings in which:

[0012] FIG. 1 is a perspective view of a sewing machine as viewed from the diagonally forward right;

[0013] FIG. 2 is a left side view of a sewing machine;

[0014] FIG. 3 is a perspective view of an embroidery unit as viewed from the diagonally forward right;

[0015] FIG. 4 is a right side view of an embroidery unit;

[0016] FIG. 5 is a perspective view of a sewing machine to which the embroidery unit is attached as viewed from the diagonally forward right;

[0017] FIG. 6 is a plan view of an embroidery unit cover;

[0018] FIG. 7 is a right side view of an embroidery unit cover;

[0019] FIG. 8 is a perspective view of an embroidery unit cover as viewed from the diagonally forward right;

[0020] FIG. 9 is a bottom view of the embroidery unit cover;

[0021] FIG. 10 is an arrow-directional cross-sectional view taken along line X-X of FIG. 6 in a configuration where support legs axially supported on the embroidery unit cover are kept in a substantially vertical posture;

[0022] FIG. 11 is a perspective view of an embroidery unit covered by an embroidery unit cover as viewed from the diagonally forward right;

[0023] FIG. 12 is a perspective view of a sewing machine to which an embroidery unit cover is attached as viewed from the diagonally forward right;

[0024] FIG. 13 is a plan view of a sewing machine to which an embroidery unit cover is attached; and

[0025] FIG. 14 is a left side view of a sewing machine to which an embroidery unit cover is attached.

DETAILED DESCRIPTION

[0026] The following will describe an example of the present disclosure with reference to FIGS. 1-14. The referential drawings are used to describe technological features that may be employed. Therefore, the described configurations, etc., of apparatuses are not intended to be restrictive, but merely illustrative.

[0027] First, an outlined configuration of the body of a sewing machine 1 will be described below with reference to FIGS. 1 and 2. In the following description, with reference to FIG. 2, the right side of the paper is referred to as "front side of the sewing machine 1" and the left side thereof is referred to as "rear side of the sewing machine 1", the upper side thereof is referred to as "upper side of the sewing machine 1" and the lower side thereof is referred to as "lower side of the sewing machine 1", and the side of the paper toward the viewer is referred to as "left side of the sewing machine 1" and the side thereof away from the viewer is referred to as "right side of the sewing machine 1".

[0028] As shown in FIG. 1, the sewing machine 1 has a right-to-left directionally long bed body portion 2, a pillar 5 that is erected upward from the right end of the bed body portion 2, and an arm portion 6 that extends leftward from the upper end of the pillar 5 and faces the bed body portion 2. The left end portion of the arm portion 6 is referred to as a head portion 7.

[0029] The bed body portion 2 is comprised of a bed portion 3 that extends from the bottom of the pillar 5, and a free arm-portion 4 that is extended a configuration such that one end thereof is supported at a substantially center position of the left end of the bed portion 3. The back-to-forth directional width of the free arm portion 4 is about $\frac{2}{3}$ of the width of the bed portion 3. Further, the upper surface of the bed portion 3

is positioned substantially at the same height as the height of the free arm portion 4, so that the upper surfaces of the bed portion 3 and the free arm portion 4 are combined to form a substantially horizontal surface.

[0030] Provided on the front surface of the arm portion 6 is a liquid crystal display (LCD) 16 that includes a touch panel. The LCD 16 displays the keys, etc., for inputting sewing pattern and sewing conditions. A user's touch at a position corresponding to any one of those input keys will be detected by the touch panel. Thus, such a configuration enables the user to select a sewing pattern and the sewing conditions. The free arm portion 4 houses a feed dog back-to-forth movement mechanism (not shown) and a feed dog up-and-down movement mechanism (not shown) that drive a feed dog (not shown), a feed adjustment pulse motor (not shown) that adjusts a feed amount of a work cloth by the feed dog, a shuttle (not shown) that contains a bobbin thread, etc. At the lower end of the head portion 7, a sewing needle 8 and a presser foot 9 are provided.

[0031] As shown in FIG. 2, at the front side of the left side surface of the bed portion 3, a rectangular recessed engagement portion 20 is formed. The engagement portion 20 is disposed at a substantially center position in the up-and-down direction at the front side of the left side surface of the bed portion 3. The engagement portion 20 may be formed in the shape of a substantially rectangular frame as viewed from the side whose longitudinal direction is in the up-and-down direction. Further, in the engagement portion 20 (hereinafter referred to as "first female engagement portion 20"), a female electrical connector 24 is provided. The female electrical connector 24 is used by the sewing machine 1 to control the operations of an embroidery unit 30 (see FIG. 3 later) when the embroidery unit 30 is attached. When the female electrical connector 24 and an electrical connector 37 (see FIG. 3 later) that is provided to the embroidery unit 30 (see FIG. 3 later) are connected to each other, the sewing machine 1 can control the embroidery unit 30 (see FIG. 3 later) through electrical communications.

[0032] At the upper front side of the left side surface of the free arm portion 4, a substantially rectangular recessed portion (hereinafter referred to as "second female engagement portion 21) whose longitudinal direction is in the up-and-down direction is formed over the front side surface.

[0033] Next, an outlined configuration of the embroidery unit 30 will be described below with reference to FIGS. 3 and 4. The embroidery unit 30 is used to sew an embroidery in a configuration such that the embroidery unit 30 is attached to the bed body portion 2 (see FIG. 1) of the sewing machine 1. In the following description, with reference to FIG. 4, the left side of the paper is referred to as "front side of the embroidery unit 30" and the right side thereof is referred to as "rear side of the embroidery unit 30", the upper side thereof is referred to as "upper side of the embroidery unit 30" and the lower side thereof is referred to as "lower side of the embroidery unit 30", and the side of the paper toward the viewer is referred to as "right side of the embroidery unit 30" and the side thereof away from the viewer is referred to as "left side of the embroidery unit 30".

[0034] As shown in FIG. 3, the embroidery unit 30 has a laterally-placed substantial U-shape in plan view. The back-to-forth directional length of a body portion of the embroidery unit 30 is a little larger than the back-to-forth directional length of the bed body portion 2 (see FIG. 1) of the sewing machine 1 (see FIG. 1). Further, the right-to-left directional

length of the body portion of the embroidery unit 30 may be about 1.5 times the length of the free arm portion 4 (see FIG. 1). The shape of a sandwiched portion 46 at the center of the laterally-placed substantial U-shape in plan view may be almost the same shape of the free arm portion 4 (see FIG. 1) of the sewing machine 1 in plan view. The embroidery unit 30 may be used in a configuration such that the sandwiched portion 46 is fitted to the free arm portion 4 (see FIG. 1) of the sewing machine 1 (see FIG. 1).

[0035] The embroidery unit 30 has a box-shaped structure that includes an upper planar portion 31, a peripheral wall portion 32, and a bottom portion (not shown). The peripheral wall portion 32 runs along the peripheral borders of the upper planar portion 31 and the bottom portion (not shown) and extends perpendicular to the upper planar portion 31 and the bottom portion (not shown). The height of the peripheral wall portion 32 is almost the same as the vertical width of the bed body portion 2 (see FIG. 1) of the sewing machine 1 (see FIG. 1).

[0036] The embroidery unit 30 may be provided with a Y-carriage mechanism 34 that protrudes upward above the upper planar portion 31. The Y-carriage mechanism 34 incorporates a Y-directional transport mechanism that may be used to transport an embroidery frame 33 in the Y-direction, which is the back-to-forth direction of the bed body portion 2 (see FIG. 1) of the sewing machine 1. Further, an X-directional transport mechanism (not shown) may be incorporated below the upper planar portion 31. The X-directional transport mechanism may be used to transport the Y-carriage mechanism 34 in the X-direction (right-to-left direction of the bed body portion 2), which is orthogonal to the Y-direction. Further, in the front part of the upper planar portion 31, a slit 39 may be formed that extends in the right-to-left direction. The X-directional transport mechanism and the Y-carriage mechanism 34 are connected to each other in such a manner so as to sandwich the slit 39. If the X-directional transport mechanism and the Y-carriage mechanism 34 operate in this configuration, the embroidery frame 33 may operate. Such a configuration may enable the movement of the embroidery frame 33 to an arbitrary position in the X-Y plane.

[0037] Further, the embroidery unit 30 may include two arm portions 47 and 48 that protrude rightward. An engagement wall 35 protrudes from the right side peripheral wall 44 at the end of a front-side arm portion 47. The engagement wall 35 has such a shape that rectangular walls are placed together to form a substantially rectangular frame, as viewed in side plan, whose longitudinal direction is in the up-and-down direction. In a portion enclosed by the engagement wall 35 (hereinafter referred to as "first engagement portion 35"), an electrical connector 37 may be incorporated. The first engagement portion 35 faces the first female engagement portion 20 (see FIG. 1) that is formed as a recess in the bed portion 3 (see FIG. 1) when the embroidery unit 30 is attached to the sewing machine 1 (see FIG. 1). When the embroidery unit 30 is attached to the sewing machine 1 (see FIG. 1), the first engagement portion 35 and the first female engagement portion 20 (see FIG. 2) are engaged with each other so that the embroidery unit 30 may be held by the sewing machine 1 (see FIG. 1). Moreover, the electrical connector 37 that is incorporated in the portion enclosed by the engagement wall 35 serves to electrically connect to the female electrical connector 24 of the sewing machine 1 (see FIG. 1). When the first engagement portion 35 and the first female engagement portion 20 (see FIG. 1) are engaged with each other, the female

electrical connector 24 and the electrical connector 37 are electrically connected to each other.

[0038] Further, as shown in FIG. 4, a protruding portion 43 (hereinafter referred to as "second engagement portion 43") protrudes from a portion where a rear-side peripheral wall portion (not shown) of the front-side arm portion 47 (see FIG. 3) of the embroidery unit 30 comes in contact with a left-side peripheral wall 45 of the sandwiched portion 46 sandwiched between the arm portions 47 and 48. The second engagement portion 43 may be substantially T-shaped as viewed in side plan, having the rear-side peripheral wall portion (not shown) as its bottom. When the embroidery unit 30 is attached to the sewing machine 1, the second engagement portion 43 faces the second female engagement portion 21 (see FIG. 1) that is formed as a recess in the free arm portion 4 (see FIG. 1). When the embroidery unit 30 is attached to the sewing machine 1 (see FIG. 1), the second engagement portion 43 and the second female engagement portion 21 are engaged with each other so that the embroidery unit 30 may be held by the sewing machine 1 (see FIG. 1).

[0039] As shown in FIG. 3, in the peripheral wall portion 32 of the outer surfaces of the arm portion 47, at the middle in the right-to-left direction, a female locking portion 40 that has a substantially rectangular recessed shape, as viewed in side plan, and whose longitudinal direction is in the right-to-left direction, extends over the upper planar portion 31. Further, from a portion where the female locking portion 40 comes in contact with the upper planar portion 31, a locking portion 41 protrudes (hereinafter, a combination of the female locking portion 40 and the locking portion 41 is referred to as "female locking portion 42"). Locking portions 67 (see FIG. 5 later) are locked at the locking portion 41 when the embroidery unit cover 60 is placed over the embroidery unit 30 from above. Such a configuration enables the embroidery unit cover 60 (see FIG. 6 later) to be fixed to the embroidery unit 30.

[0040] Next, an outlined configuration of the sewing machine 1 in a configuration such that the embroidery unit 30 is attached will be described below with reference to FIG. 5.

[0041] As shown in FIG. 5, in a configuration such that the embroidery unit 30 is attached to the sewing machine 1 in order to sew an embroidery, the free arm portion 4 of the sewing machine 1 is fitted to the sandwiched portion 46 (see FIG. 3) having the laterally-placed and substantial U-shape of the embroidery unit 30. Then, the first engagement portion 35 (see FIG. 3) and the first female engagement portion 20 (see FIG. 1) are engaged with each other, while the second engagement portion 43 (see FIG. 3) and the second female engagement portion 21 (see FIG. 1) are engaged with each other. Then, the embroidery unit 30 may be held by the sewing machine 1 in a configuration such that an upper surface 51 of the bed portion 3 of the sewing machine 1, an upper surface 52 of the free arm portion 4, and the upper planar portion 31 of the embroidery unit 30 are combined to form a substantially horizontal surface. The embroidery unit 30 is stably supported on the floor surface because the vertical width of a side surface 53 of the bed portion 3 of the sewing machine 1 and the vertical width of the peripheral wall portion 32 of the embroidery unit 30 are almost the same width as each other.

[0042] In this configuration, the female electrical connector 24 (see FIG. 1) of the sewing machine 1 may be electrically connected to the electrical connector 37 (see FIG. 3) of the embroidery unit 30. Therefore, electrical communications are established between the sewing machine 1 and the embroidery-unit 30. In response to input information entered by the

user through the LCD 16, the sewing machine 1 controls the X-directional transport mechanism and the Y-carriage mechanism 34 of the embroidery unit 30, thereby operating the embroidery frame 33. Accordingly, an embroidery may be sewed by the sewing machine 1.

[0043] Next, an outlined configuration of the embroidery unit cover 60 will be described below with reference to FIGS. 6-10. The embroidery unit cover 60 can be placed over the embroidery unit 30 (see FIG. 3) and used as a cover to prevent dust, etc., from entering the embroidery unit 30 (see FIG. 3). The embroidery unit cover 60 can be attached to the sewing machine 1 (see FIG. 1) and used also as a side table when sewing a pattern on a large work cloth. In the following description, with reference to FIG. 6, the left side of the paper is referred to as "left side of the embroidery unit cover 60" and the right side thereof is referred to as "right side of the embroidery unit cover 60", the upper side thereof is referred to as "rear side of the embroidery unit cover 60" and the lower side thereof is referred to as "front side of the embroidery unit cover 60", and the side of the paper toward the viewer is referred to as "upper side of the embroidery unit cover 60" and the side thereof away from the viewer is referred to as "lower side of the embroidery unit cover 60".

[0044] As shown in FIG. 6, the embroidery unit cover 60 has a plate-shaped planar portion 61 having a substantially laterally-placed U-shape in plan view as its upper surface. The back-to-forth length of the embroidery unit cover 60 may be a little larger than the back-to-forth length of the bed body portion 2 (see FIG. 1) of the sewing machine 1 (see FIG. 1). The right-to-left length of the embroidery unit cover 60 may be about 1.5 times of the right-to-left length of the free arm portion 4 (see FIG. 1). The shape of the planar portion 61 may be almost the same as the shape of the upper planar portion 31 (see FIG. 3) of the embroidery unit 30 (see FIG. 3). Therefore, the embroidery unit cover 60 can be placed over the embroidery unit 30 (see FIG. 3) from the above. The shape of a sandwiched portion 79 sandwiched between two arm portions 80 and 81 that extend rightward may be almost the same as a planar shape of the free arm portion 4 (see FIG. 1). Therefore, it is possible to fit the sandwiched portion 79 to the free arm portion 4 (see FIG. 1).

[0045] Among peripheral wall portions 64, 65, 68, and 69 (see FIG. 7 later) extending along the peripheral border of the planar portion 61, a peripheral wall portion 64 at the end of the front side arm portion 80 may be provided with a third engagement portion 62 that protrudes rightward. Further, at the front side of a peripheral wall portion 65, on the left side surface of a sandwiched portion 79, and sandwiched between the arm portions 80 and 81 extending rightward, a fourth engagement portion 63 that protrudes rightward may be provided.

[0046] As shown in FIGS. 7 and 8, the embroidery unit cover 60 has peripheral wall portions 64, 65, 68, and 69 that run continually along the peripheral border of the planar portion 61 and that extend vertically downward from the planar portion 61. The peripheral wall portions 64, 65, 68, and 69 may be sufficiently higher than the Y-carriage mechanism 34 (see FIG. 3) that protrudes from the upper surface of the embroidery unit 30. The peripheral wall portions 64, 65, 68, 69 have a height of about $\frac{2}{3}$ of the bed portion 3 (see FIG. 1). Therefore, the peripheral wall portions 64, 65, 68, 69 may be high enough to cover the Y-carriage mechanism 34 (see FIG. 3) in a configuration such that the embroidery unit cover 60 is used as a cover over the embroidery unit 30 (see FIG. 3).

[0047] On the outer front-side peripheral wall portion 68 and the outer rear-side peripheral wall portion 69, downward protruding locking portions 67 and 66 are respectively provided. At each end of the locking portions 67 and 66, an inward protruding locking portion may be provided. The protruding locking portion may be configured so that it can be locked by the locking portion 41 (see FIG. 3) of the embroidery unit 30 (see FIG. 3).

[0048] As shown in FIG. 8, the third engagement portion 62 that protrudes from the peripheral wall portion 64 of the arm portion 80 and that extends rightward may have a structure such that rectangular walls are placed together to form a substantially rectangular frame shape in which the longitudinal direction is in the vertical direction. The third engagement portion 62 may have its lower portion sticking out from the lower end of the peripheral wall portion 64 by about $\frac{1}{4}$ of its longitudinal width. As shown in FIG. 7, the fourth engagement portion 63 that protrudes from the peripheral wall portion 65 of the sandwiched portion 79 sandwiched between the two arm portions 80 and 81 and that extends rightward may include walls that form a substantially E-shape as a whole, as viewed in side plan. Further, due to its shape, the third engagement portion 62 can be engaged with the first female engagement portion 20 (see FIG. 1) in the sewing machine 1 (see FIG. 1). In addition, due to its shape, the fourth engagement portion 63 can be engaged with the second female engagement portion 21 (see FIG. 2) in the sewing machine 1 (see FIG. 1).

[0049] Furthermore, as shown in FIG. 9, within a portion of space surrounded by the planar portion 61 and the peripheral wall portions 64, 65, etc., a dividing wall 76 which divides the space portion in the back-to-forth direction may be provided along an edge on the opposite side of the sandwiched portion 79 having the substantially laterally-placed U-shape in plan view. In one of the portions divided by the dividing wall 76, substantially rectangular solid-shaped support legs 72 and 75 may be axially and rotatably supported and housed. The support legs 72 and 75 may be erected and projected downward from the embroidery unit cover 60 when used, to support the embroidery unit cover 60 in a configuration such that the embroidery unit cover 60 is attached to the sewing machine 1 (see FIG. 1) so that the embroidery unit cover 60 may be used as a side table. The support legs 72 and 75 may have substantially rectangular solid-shaped support leg body portions 70 and 73, support leg tip portions 71 and 74, and support leg axial portions 77 and 78, respectively.

[0050] The support leg axial portions 77 and 78 may be used to axially support the support legs 72 and 75 on the embroidery unit cover 60. The support leg axial portions 77 and 78 may be respectively provided at the ends of the support leg body portions 70 and 73. The support legs 72 and 75 may be axially supported by the embroidery unit 60 at the corners of the embroidery unit cover 60. The support legs 72 and 75 may be rotated about the support leg axial portions 77 and 78 as their respective base axes to be positioned in a substantially vertical posture and a horizontal posture parallel to the back-to-forth direction. If the embroidery unit cover 60 is used as an embroidery unit cover in a configuration such that the embroidery unit cover 60 is placed over the embroidery unit 30 (see FIG. 3), the support legs 72 and 75 may be kept in the horizontal posture so that they may not interfere with the embroidery unit 30 (see FIG. 3). On the other hand, if the embroidery unit cover 60 is attached to the sewing machine 1 (see FIG. 1) and used as a side table as shown in FIG. 10, the

support legs 72 and 75 may be kept in a substantially vertical posture to support the embroidery unit cover 60. The embroidery unit cover 60 may be provided with butting portions (not shown). Therefore, if the support legs 72 and 75 are rotated, the support legs 72 and 75 respectively abut against the butting portions and cannot be rotated any more from the substantially vertical posture. Such a configuration enables keeping the support legs 72 and 75 in the substantially vertical posture. Further, to prevent the support legs 72 and 75 from freely rotating, frictional resistance is caused when the support legs 72 and 75 would rotate.

[0051] The support leg tip portions 71 and 74 may be disposed on an end of the support legs 72 and 75 opposite to the support leg axial portions 77 and 78, respectively. The support leg tip portions 71 and 74 may each comprise a semispherical tip portion whose spherical surface faces toward the tip and a screw rod portion that protrudes in the opposite direction to the spherical surface. The screw rod portions may be screwed into respective screw holes in the support leg body portion 70 and the support leg body portion 73.

[0052] As shown in FIG. 10, if the embroidery unit cover 60 is attached to the sewing machine 1 and used as a side table, the support legs 72 and 75 may be respectively rotated around the support leg axial portions 77 and 78 as axes, and used in the substantially vertical posture. By adjusting the degree of screwing that the screw rod portions of the support leg tip portions 71 and 74 are screwed into the support leg body portions 70 and 73, it is possible to adjust the entire lengths of the support legs 72 and 75. Therefore, the same embroidery unit cover 60 can be used as a side table even if the sewing machine 1 is used on an uneven plane or the embroidery unit cover 60 is attached to another sewing machine.

[0053] Next, an outlined configuration of the embroidery unit cover 60 in a configuration such that the embroidery unit cover 60 is placed over the embroidery unit 30 will be described below with reference to FIG. 11.

[0054] As shown in FIG. 11, the embroidery unit cover 60 may be placed over the embroidery unit 30 and used as a cover to prevent dust, etc., from entering the embroidery unit 30. Further, in a configuration such that the embroidery unit cover 60 is placed over the embroidery unit 30, the locking portion 67 that protrudes from the peripheral wall portion 68 of the embroidery unit cover 60 is locked by the locking portion 41 (see FIG. 3) at the female locking portion 42 of the embroidery unit 30. With such a configuration, the embroidery unit cover 60 can be fixed to the upper side of the embroidery unit 30. In plan view, the embroidery unit 30 and the embroidery unit cover 60 may have almost the same shape, so that the embroidery unit cover 60 can be tightly fitted to the embroidery unit 30. Therefore, the space surrounded by the planar portion 61 and the peripheral wall portion 68 of the embroidery unit cover 60 may be used to cover the slit 39 (see FIG. 3) and the Y-carriage mechanism 34 (see FIG. 3) which may particularly need preventing the entry of dust, etc., in the embroidery unit 30.

[0055] In a configuration such that the embroidery unit cover 60 is placed over the embroidery unit 30, the third engagement portion 62 that protrudes from the embroidery unit cover 60 and the first engagement portion 35 that protrudes from the embroidery unit 30 may be disposed in parallel to each other in the up-and-down direction. Similarly, the fourth engagement portion 63 provided on the embroidery unit cover 60 and the second engagement portion 43 (see FIG. 3) provided on the embroidery unit 30 that may be engaged

with the second female engagement portion 21 (see FIG. 1) are disposed in parallel to each other in the up-and-down direction.

[0056] Next, an outlined configuration of the sewing machine 1 and the embroidery unit cover 60 that are engaged with each other will be described below with reference to FIGS. 12-14.

[0057] As shown in FIG. 12, when the embroidery unit cover 60 is attached to the sewing machine 1 and used as a side table, the sandwiched portion 79 which may have a substantially laterally-placed U-shape in plan view in the embroidery unit cover 60 is fitted to the free arm portion 4 of the sewing machine 1. Also, in this configuration, the first female engagement portion 20 (see FIG. 1) of the sewing machine 1 is engaged with the third engagement portion 62 (see FIG. 6) of the embroidery unit cover 60, while the second female engagement portion 21 (see FIG. 1) of the sewing machine 1 is engaged with the fourth engagement portion 63 (see FIG. 6) of the embroidery unit cover 60.

[0058] With such a configuration, the upper surface 51 of the bed portion 3 and the upper surface 52 of the free arm portion 4 of the sewing machine 1, and the planar portion 61 of the embroidery unit cover 60 are respectively held at positions at almost the same height to form a substantially horizontal surface. Therefore, the substantially horizontal surface can be used as a table surface. In this configuration, because the right-to-left directional width of the planar portion 61 of the embroidery unit cover 60 may be about 1.5 times of the right-to-left directional width of the free arm portion 4 of the sewing machine 1, a substantially horizontal larger surface portion can be used as a side table. The operation mode may be switched halfway through a sewing process by using a sewing machine, from utility stitch sewing that forms stitches while a work cloth is fed with the feed dog, to embroidery sewing that utilizes an embroidery unit. In such a configuration, conventionally, a space for the embroidery unit cover that is removed from the embroidery unit, would block the work space. In contrast, the embroidery unit cover 60 of the present disclosure can be used as a side table, so that the work space can be used effectively. Moreover, the user need not prepare a side table separately, thus improving the economic efficiency.

[0059] Further, as shown in FIGS. 13 and 14, the up-and-down width of the peripheral wall portion 68 on the embroidery unit cover 60 is about 2/3 of the up-and-down width of the bed portion 3 in the sewing machine 1. Therefore, when the embroidery unit cover 60 is attached to the sewing machine 1, a gap may be formed below the embroidery unit cover 60. In this configuration, the support legs 72 and 75 may be positioned in a substantially vertical posture, and the embroidery unit cover 60 may be attached to the sewing machine 1. In this configuration, the support legs 72 and 75 are held to support the embroidery unit cover 60 at the end side opposite to the sewing machine 1. Further, the support leg tip portions 71 and 74 at the tips of the respective support legs 72 and 75 may be adjusted as necessary. Therefore, it is possible to adjust the lengths of the support legs 72 and 75 so that the support legs 72 and 75 can adequately support the embroidery unit cover 60.

[0060] Thus, it is possible to support one end side of the embroidery unit cover 60 with the engagement portions 62 and 63, and support the other end side thereof with the support

legs **72** and **75**. Therefore, a formed side table surface can be held stably, thereby enabling sewing a large-sized work cloth easily.

[0061] Although the above example employs a planar portion having a substantially laterally-placed U-shape as the shape of the embroidery unit cover **60** in plan view, the present disclosure is not limited thereto. Any other shape may be employed as the shape of the embroidery unit cover **60** so long as the shape is the same as the shape of the embroidery unit **30** in plan view and such that the embroidery unit cover **60** can be placed over the embroidery unit **30** to cover the embroidery unit **30**. Further, although the shapes, numbers, and protruding positions of the engagement portions **62** and **63** that protrude from the peripheral wall portions **64** and **65** of the embroidery unit cover **60** are specified in the example, the present disclosure is not limited thereto. Any other shapes, numbers, and protruding positions may be employed as the engagement portions **62** and **63** so long as they can be engaged with the female engagement portions **20** and **21** of the sewing machine **1** and such that the embroidery unit cover **60** can be held through the engagement. Furthermore, although the shapes, axial supporting positions, and operating postures of the support legs **72** and **75** provided on the embroidery unit cover **60** are specified in the example, the present disclosure is not limited thereto. Any other shapes, axial supporting positions, and operating postures may be employed as the side table so long as they can be supported when the embroidery unit cover **60** is attached to the sewing machine **1** to be used as the side table.

[0062] Although the embroidery unit cover **60** forms a side table in the above example, the present disclosure is not limited thereto. Alternatively, a side table may form the embroidery unit cover **60**. Although the shape of the side table is substantially U-shape in plan view in the example, the present disclosure is not limited thereto. Any other shape may be employed as the side table so long as they can be attached to the sewing machine **1**. Although the shapes, numbers, and protruding positions of the engagement portions that protrude from the peripheral wall of the side table are specified in the example, the present disclosure is not limited thereto. Any other shapes, numbers, and protruding positions may be employed as the engagement portions can be engaged with the female engagement portions **20** and **21** of the sewing machine **1** such that the side table can be held through the engagement. Although the shapes, numbers, and protruding portions of the locking portions that protrude from the peripheral wall of the side table are specified in the example, the present disclosure is not limited thereto. Any other shapes, numbers, and protruding positions may be employed as far as the locking portions can be locked by the female locking portions. Although the shapes, axial supporting positions, and operating conditions of the support legs provided on the side table are specified in the example, the present disclosure is not limited thereto; Any other shapes, axial supporting positions, and operating postures may be employed as the side table so long as they can be supported in a configuration such that the side table is attached to the sewing machine.

[0063] As explained above, an embroidery unit cover of the present disclosure includes a planar portion that forms a substantially horizontal surface with a bed portion and a free arm portion of a sewing machine, a peripheral wall portion that runs continuously along a peripheral border of the planar portion and that extends vertically downward from the planar portion, and a first engagement portion that is provided to the

peripheral wall portion. Therefore, when the embroidery unit cover is attached to the sewing machine, the embroidery unit cover forms a side table having the planar portion as a table surface. Accordingly, a space for the embroidery unit cover to be placed may be unnecessary, thereby enabling effective utilization of a work space.

[0064] Further, a side table of the present disclosure includes a planar portion that forms a substantially horizontal surface with a bed portion and a free arm portion of a sewing machine, a peripheral wall portion that runs continuously along a peripheral border of the planar portion and that extends vertically downward from the planar portion, a first engagement portion that is provided to the peripheral wall portion, and a locking portion that locks with an embroidery unit. Therefore, when the side table is placed over the embroidery unit, the side table forms a cover that prevents dust etc. from entering the embroidery unit.

[0065] Still further, a sewing machine of the present disclosure includes an engagement portion that can be engaged with an embroidery unit cover or a side table, on at least one of a bed portion and a free arm portion. Therefore, the embroidery unit cover or the side table can be attached to the sewing machine.

[0066] While various features have been described in conjunction with the examples outlined above, various alternatives, modifications, combinations, variations, and/or improvements of those features and/or examples may be possible. Accordingly, the examples, as set forth above, are intended to be illustrative. Various changes may be made without departing from the broad spirit and scope of the underlying principles.

What is claimed is:

1. An embroidery unit cover that covers an embroidery unit to be attached to a sewing machine for sewing embroidery, the embroidery unit cover comprising:

a planar portion that forms a substantially horizontal surface combined with a bed portion of the sewing machine and a free arm portion provided to the bed portion;

a peripheral wall portion that runs continuously along a peripheral border of the planar portion and that extends vertically downward from the planar portion; and

a first engagement portion that is disposed on the peripheral wall portion and that is structured to be attached to and detached from a second engagement portion disposed on at least one of the bed portion and the free arm portion,

wherein the embroidery unit cover forms a side table with the free arm portion when the first engagement portion and the second engagement portion are engaged with each other.

2. The embroidery unit cover according to claim **1**, wherein:

the first engagement portion has a protruding shape that fits into the second engagement portion of the sewing machine; and

the planar portion is held at a height that is substantially the same as the bed portion and the free arm portion when the first engagement portion is fitted into the second engagement portion.

3. The embroidery unit cover according to claim **1**, further comprising:

a support leg that supports the embroidery unit cover in a configuration,

wherein:

the first engagement portion and the second engagement portion are engaged with each other, and

the support leg is positioned so that the support leg is able to be switched between a housing position such that the support leg is in a substantially horizontal posture and a use position such that the support leg is in a substantially vertical posture.

4. The embroidery unit cover according to claim 1, wherein the planar portion has substantially the same shape as an upper surface of the embroidery unit in plan view and can be placed over the entire upper surface of the embroidery unit.

5. A side table to be attached to a sewing machine, comprising:

a planar portion that forms a substantially horizontal surface combined with a bed portion of the sewing machine and a free arm portion provided to the bed portion;

a peripheral wall portion that runs continuously along a peripheral border of the planar portion and that extends vertically downward from the planar portion;

a first engagement portion that is disposed on the peripheral wall portion and that is structured to be attached to and detached from a second engagement portion disposed on at least one of the bed portion and the free arm portion; and

a first locking portion that locks with an embroidery unit that is attachable to the sewing machine for sewing an embroidery,

wherein the side table forms a cover that can be placed over the embroidery unit.

6. The side table according to claim 5, wherein the first locking portion protrudes from the peripheral wall portion and locks with a second locking portion disposed on a peripheral border of the embroidery unit.

7. The side table according to claim 5, wherein a portion surrounded by the planar portion and the peripheral wall portion covers an entire upper surface of the embroidery unit.

8. The side table according to claim 5, further comprising: a support leg that supports the side table in a configuration, wherein:

the first engagement portion and the second engagement portion are engaged with each other, and

the support leg is positioned so that the support leg is able to be switched between a housing position such that the support leg is in a substantially horizontal posture and a use position such that the support leg is in a substantially vertical posture.

9. A sewing machine with an embroidery unit cover that can be attached to and detached from the sewing machine, the sewing machine comprising:

a bed portion;

a free arm portion; and

a second engagement portion that is disposed on at least one of the bed portion and the free arm portion and that enables the engagement of the embroidery unit cover according to claim 1.

10. A sewing machine with a side table is structured to be attached to and detached from the sewing machine, the sewing machine comprising:

a bed portion;

a free arm portion; and

a second engagement portion that is disposed on at least one of the bed portion and the free arm portion and that enables the engagement of the side table according to claim 5.

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