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(71) Applicant: **Brother Kogyo Kabushiki Kaisha**
Nagoya-shi, Aichi-ken 467-8561 (JP)

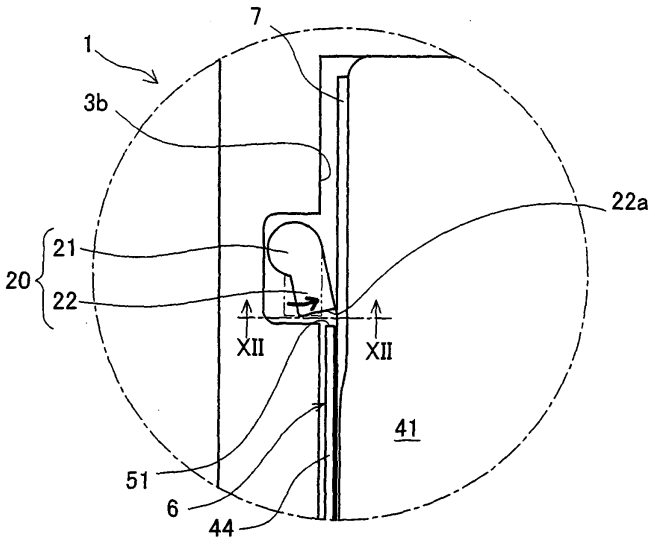
(72) Inventors:
- **Nakamura, Yasunori**
  c/o Intell. Prop. Dept.
  Nagoya-shi
  Aichi-ken 467-8562 (JP)
- **Hoshino, Terumasa**
  c/o Intellectual Prop. Dept.
  Nagoya-shi
  Aichi-ken 467-8562 (JP)
- **Matsumoto, Haruki**
  c/o Intell. Prop. Dept.
  Nagoya-shi
  Aichi-ken 467-8562 (JP)
- **Suito, Yoshikatsu**
  c/o Intell. Prop. Dept.
  Nagoya-shi
  Aichi-ken 467-8562 (JP)

(74) Representative: **Hofer, Dorothea et al**
Prüfer & Partner GbR
Patentanwälte
Sohnckestrasse 12
81479 München (DE)

(54) Printer with paper package

(57) An edge (51) of a first side board (44) on a downstream side in a sheet feed direction brought into contact with an end face of a regulating member (20) when the first side board (44) is forced to move to the downstream side in the sheet feed direction. Thus, a base board connecting with the first side board (44) is prevented from moving to the downstream side in the sheet feed direction. As a result, the package member which can be prevented from getting jammed in the sheet feed path during the sheet feed operation of a printer (1) when the package member is stored in the printer (1) regardless of the presence or absence of sheets (7) therein can be provided.

FIG.16



EP 1 795 468 A2

Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority from JP 2005-351817, filed December 6, 2005, the contents of which are hereby incorporated by reference.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The present invention relates to a package member which can be loaded in a printer to protect the exterior of stacked sheets to be used as a printing medium of the printer.

2. Description of Related Art

[0003] Conventionally, there has been known a package member which stores sheets as a printing medium to be set in a printer, the entire package member being loaded in the printer. (For instance, see Japanese Patent Application Laid-open No. 2004-210433). According to the 433 publication, the stacked sheets are stored in a package member having a simple structure, composed of a top board, a base board and a side board. The top board is almost same as the sheets in size and shape. The base board is almost same as the top board in size and shape, except being shorter in a sheet feed direction. The side board covers one side face of the stacked sheets, the side face being provided on the upstream side in the sheet feed direction. The base board having the size and shape almost same as the top board is slightly shorter than the top board, so that the sheets are partially exposed on the base board side. A pickup roller enters into the package member through the exposed area, thereby feeding the sheets stored in the package member one by one from the sheet at the bottom of the stacked sheets.

[0004] A sheet storage unit of the printer in which the package member is set is almost same as the package member in shape and size. When the package member is loaded in the sheet storage unit, the edges of the top board on both upstream/downstream sides in the sheet feed direction are brought into contact with the side walls of the sheet storage unit on both upstream/downstream sides respectively. Accordingly, the package member can be correctly positioned in the sheet feed direction in the sheet storage unit of the printer.

[0005] However, in the '433 publication, when the printer operates the feeding motion while the package member storing no sheets is set in the printer, the pickup roller sometimes conveys the top board itself instead of the sheets. As a result, the package member gets jammed in the sheet feeding path. This causes a burden on the user of removing the jammed package drawn into the sheet feeding path by force. Also, counter torque is applied to a platen drive unit more than necessary when the user tries to remove the package member which has been drawn into the sheet feeding path, which affects the endurance.

SUMMARY OF THE INVENTION

[0006] The present invention has been made in view of the above circumstances and has an object to overcome the above problems and to provide a package member which can be prevented from getting jammed in a sheet feed path during a sheet feed operation of a printer when the package member is stored in the printer regardless of the presence or absence of the sheets therein.

[0007] To achieve the above object, there is provided a package member which can store stacked sheets to be used as a printing medium in a printer having a sheet storage unit and a regulating member to be loaded in the sheet storage unit of the printer: a base board that covers a bottom of the stacked sheets; a top board that covers a top of the stacked sheets; and a first side board that connects with at least one of the base board and the top board to cover one of side faces of the stacked sheets, the side face being provided along a sheet feed direction, and comprises an edge on a downstream side in the sheet feed direction; wherein the package member is positioned in the sheet feed direction by contact of the edge of the first side board with the regulating member provided in the printer during a feeding operation of the sheets.

[0008] The package member having a structure described above comprises the first side board covering one of side faces of the stacked sheets, the side face connecting at least one of the top board and the base board and being provided along the sheet feed direction. The package member is arranged to be positioned in the sheet feed direction by the contact of the edge of the first side board on the down stream side in the sheet feed direction with the regulating member provided in the printer during the sheet feed operation. Accordingly, the package member can be prevented from being displaced while the printer perform the sheet feeding and the force pressing against the package member in the sheet feed direction is exerted on the package member itself. Therefore, it is possible to provide a package member which can be prevented from getting jammed in a sheet feed path during a sheet feed operation of a printer when the package member is stored in the printer regardless of the presence or absence of the sheets therein.

[0009] Further developments of the present invention are given in the dependent claims.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

Fig. 1 is a perspective external view of a printer in accordance with an embodiment of the present in-

vention;
Fig. 2 is a sectional side view of the printer of Fig. 1;
Fig. 3 is a perspective view of the printer of Fig. 1, showing a state in which a lid is opened and partially broken to be seen through;
Fig. 4 is a sectional side view of the printer of Fig. 1, showing a state in which a package member has been stored in a sheet storage unit of the printer;
Fig. 5 is an enlarged view of the printer of Fig. 1, showing the details of a sheet separation unit and a print mechanism unit of the printer;
Fig. 6 is a perspective view of the package member which can be loaded in the printer of Fig. 1;
Fig. 7 is a developed view of the package member of Fig. 6 seen from the outer side;
Fig. 8 is a schematic top view of a periphery of an upper hole of the package member storing no sheets;
Fig. 9 is a schematic top view of the periphery of the upper hole of the package member storing no sheets;
Fig. 10 is a developed view of the package member of Fig. 6 seen from the back side;
Fig. 11 is a perspective view showing the package member of Fig. 6 being assembled;
Fig. 12 is a perspective view showing the package member of Fig. 6 being assembled;
Fig. 13 is a perspective view showing the package member of Fig. 6 turned upside down;
Fig. 14 is a sectional side view showing the package member (from which a belt-shaped member has been removed) being loaded into the printer;
Fig. 15 is a perspective view showing a state in which the package member of Fig. 14 is set in the printer;
Fig. 16 is a partial enlarged view showing a state in which a regulating member of the printer is pushing edges of the sheets;
Fig. 17 is a cross-sectional view taken along a line XII-XII shown in Fig. 16;
Fig. 18 is a sectional side view showing a state in which a sheet is fed out of the package member stored in the printer;
Fig. 19 is a developed view showing a modification to a shape of side board of the package member seen from the outer side;
Fig. 20 is a developed view showing another modification to the shape of the side board of the package member seen from the outer side;
Fig. 21 is a perspective view showing a modification of the package member in which a side board of the package member is arranged to cover a side face of the stacked sheets extending in the sheet feed direction; and
Fig. 22 is a developed view of the package member of Fig.

21 seen from the back side.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0011] A detailed description of a preferred embodiment of a package member embodying the present invention will now be given referring to the accompanying drawings.

[Composition of Printer]

[0012] Firstly, a schematic structure of a printer 1, which is a thermal printer, will be explained with reference to Figs. 1 to 5.

[0013] Figs. 1 and 2 are a perspective external view and a perspective side view of a printer. Fig. 3 is a perspective view of the printer in which a lid is opened and partially broken to be seen through. Fig. 4 is a sectional side view of the printer in which sheets have been set in a sheet storage unit. Fig. 5 is an enlarged sectional view showing the details of a paper separation unit and a print mechanism unit.

[0014] As shown in Fig. 1, the printer 1 is designed to be compact in size, with a rectangular shape in a plan view (capable of accommodating sheets of approximately A6 to A7 size) and a thickness of approximately 2 cm or less.

[0015] A body case 2 of the printer 1 is composed of a frame 3, a lower cover 4 covering an under face of the frame 3, and an upper cover 5 covering a part of a top face of the frame 3.

[0016] In a part of the top face of the frame 3 that is not covered with the upper cover 5, a sheet storage unit 6 is formed as shown in Fig. 2. In the sheet storage unit 6, a package member 8 which accommodates a lot of heat-sensitive cut sheets 7 of A6 or A7 size can be loaded and stored as shown in Fig. 4.

[0017] The top of the sheet storage unit 6 is covered with a lid 10 which is pivotally movable in a direction indicated by an arrow of a heavy line in Fig. 2. Incidentally, a state in which the lid 10 has been opened is shown in Fig. 3. The body case 2 has a locking mechanism (not shown), so that the lid 10 can be closed and locked as shown in Fig. 4, in a state that the package member 8 is loaded in the sheet storage unit 6 as described above.

[0018] A window 11 made of a transparent resin is formed in the lid 10 as shown in Fig. 1, thereby allowing the user to see whether the package member 8 is loaded in the sheet storage unit 6 or not even when the lid 10 is closed. Further, the user can visually check information which is displayed on the package member 8 to indicate a type of the package member, and the presence or absence of the sheets 7.

[0019] At one end of the sheet storage unit 6, a pickup roller (sheet feed roller) 13, a separation block 14 and the like forming a sheet separation unit 12 are placed. Beneath the upper cover 5, a thermal head 16, a platen roller 17 and a paper guide 18 forming a print mechanism unit 15 (described in detail later) are placed.

[0020] As shown in Fig. 3, the sheet storage unit 6 is formed as a rectangular concave part capable of storing the package member 8. The sheet storage unit 6 is formed of inner side walls surrounding the sheet storage unit 6 and a bottom face 3d at the bottom of the sheet storage unit 6. The inner side walls of the sheet storage unit 6 include an inner wall 3a situated on the upstream side in the direction in which the sheet 7 is fed by the pickup roller 13 (sheet feed direction X), inner walls 3b and 3c extending in the direction in which the sheet 7 is fed, and an inner wall 14a situated on the downstream side and forming a part of the separation block 14.

[0021] The inner wall 3b which is one of the inner walls extending in the sheet feed direction X, is provided with a concave part 19. A regulating member 20 is placed inside the concave part 19. The regulating member 20 includes a base 21 which is rotatable around a vertical axis (not shown) and an arm 22 provided integrally with the base 21. The arm 22 is shaped like a rectangular solid, and an end face 22a (see Fig. 16) on the opposite side to the base 21 of the arm 22 is a rectangular shape.

[0022] The base 21 is equipped with a spring (not shown) which applies biasing force to the arm 22 in a direction letting the arm 22 protrude from the inner wall 3b (direction indicated by an arrow of a heavy line in Fig. 3). Therefore, when the package member 8 is loaded in the sheet storage unit 6, the arm 22 makes contact with side edges of the sheets 7 in the package member 8 and thereby presses the sheets 7 against the other inner wall 3c of the sheet storage unit 6, by which the edges of the sheets 7 are evened up and skewing of the sheets 7 is avoided during sheet feeding.

[0023] As shown in Fig. 3, a reflective sensor (sensor unit) 23 is provided to a part of the bottom face 3d beside the inner wall 3c and in the vicinity of a corner of the sheet storage unit 6. The reflective sensor 23 includes four sensors 23a-23d arranged in the sheet feed direction X. Each sensor 23a-23d emits light and detects the amount of reflected light, by which an identification mark (identification part) 64 of the package member 8 (explained later) is read.

[0024] Next, the sheet separation unit 12 will be explained below.

[0025] As shown in Fig. 5, the pickup roller 13, the separation block 14 and the print mechanism unit 15 are provided in the vicinity of the inner wall 14a of the sheet storage unit 6. On the inner surface of the lid 10, a pressure plate 24 is supported turnably.

[0026] A bias spring 25 is placed between the pressure plate 24 and the lid 10, which constantly exerts biasing force on the pressure plate 24 so as to turn the pressure plate 24 downward.

[0027] The package member 8 stores the sheets 7 which have been stacked up with their print surfaces (surfaces to be printed on) facing downward. The sheets 7 are set in the sheet storage unit 6, with the lower surface of the lowermost one of the stacked sheets 7 exposing itself partially from the package member 8. When the lid 10 is closed and locked, the pressure plate 24 biased downward by the aforementioned bias spring 25 presses down a front end part of the sheets 7 (in regard to the sheet feed direction X) via a top board 41 which will be explained later. Consequently, the exposed part of the lowermost sheet 7 is brought into contact with the pickup roller 13 and is pressed by the pickup roller 13 with proper force. Noted that on the bottom face of the package member 8, an open entrance 43A through which the lower surface of the lowermost one of the sheets 7 can be exposed and the pickup roller 13 can enter therein is provided.

[0028] The package member 8 previously has the open entrance 43A, so there is no need for complicated structures such as an opening/closing mechanism provided in the printer 1 to open and close a lid provided in the package member 8, and arranged to open the lid when the package member 8 is loaded in the printer 1. (For instance, in a video cassette, a lid provided to protect a tape read part of the video cassette is arranged to be opened or closed by an opening/closing mechanism of a videocassette recorder when the video cassette is inserted therein or ejected therefrom).

[0029] The separation block 14 is provided in proximity to the pickup roller 13. The separation block 14 has a separation guide surface 14b which is tilted with respect to the sheet feed direction X of the pickup roller 13.

[0030] The lowermost sheet 7 contacting the pickup roller 13 is given feeding force by the revolving pickup roller 13. With the separation function of the separation guide surface 14b of the separation block 14, only one sheet 7 at the bottom of the stacked sheets 7 is separated and sent out.

[0031] The print mechanism unit 15 will be explained below.

[0032] The platen roller 17 is rotatably provided next to the separation block 14, and the paper guide 18 is placed close to the exterior surface of the platen roller 17.

[0033] As shown in Fig. 5, the paper guide 18 is provided with a sliding surface 18a as a concavely curved surface along the exterior surface of the platen roller 17. Between the paper guide 18 and the body case 2, a pressure coil spring 26 is placed so as to press the sliding surface 18a against the exterior surface of the platen roller 17.

[0034] The sheet 7 separated by the aforementioned sheet separation unit 12 is fed by the pickup roller 13 as indicated by the two-dot chain line in Fig. 5 and thereby passes under the base of the separation block 14. Thereafter, the sheet 7 is guided by a guide plate 27 and fed by the platen roller 17 to change its direction along the platen roller 17.

[0035] Specifically, the sheet 7 is guided by the guide plate 27 and fed beneath the platen roller 17 to a gap between the platen roller 17 and the paper guide 18. The sheet 7, sliding between the exterior surface of the platen roller 17 and the sliding surface 18a of the paper guide 18, is conveyed upward by the driving force of the revolv-

ing platen roller 17 changing its feed direction by 180 degrees. By the above operation, the sheet 7 reaches the top of the platen roller 17 with its print surface facing upward.

[0036] The thermal head 16, placed nearby the top of the platen roller 17, includes a heating element unit 16a. The thermal head 16 is turnably supported by a rotation axis 16b, by which the heating element unit 16a can contact and separate from the top of the platen roller 17.

[0037] Incidentally, the thermal head 16 is designed to be turnable as above in order to make a "paper jam clearance operation" possible when the sheet 7 gets jammed between the platen roller 17 and the paper guide 18.

[0038] To the thermal head 16, an end of a spring 28 of a twisting coil spring type is attached. The spring 28 constantly biases the thermal head 16 in a direction letting the heating element unit 16a provided in the thermal head 16 make contact with the top of the platen roller 17.

[0039] The sheet 7 is conveyed by the platen roller 17 with its print surface facing upward and the print surface makes contact with the heating element unit 16a of the thermal head 16, by which the printing is carried out at the contacting part.

[0040] The thermal head 16, formed as a line head, is capable of printing an arbitrary character string or image on the conveyed heat-sensitive sheet 7 in a direction orthogonal to the feed direction X of the sheet 7. The printable width of the thermal head 16 is set approximately equal to the width of the sheet 7.

[0041] In this embodiment, heat-coloring sheets are employed as the sheets 7. The heat-coloring sheet includes a coloring layer (coloring when heated by the thermal head 16) formed on its one side as an image receiving layer.

[0042] On the separation block 14, a sheet ejection guide surface 14c, tilted from the sheet feed direction X of the platen roller 17 toward the top of the printer 1, is formed.

[0043] The sheet 7 after being printed on by the heating element unit 16a of the thermal head 16 is guided by the sheet ejection guide surface 14c and thereby ejected upward to a top of the lid 10 through a gap between the lid 10 and the upper cover 5 of the body case 2, as indicated by two-dot chain lines in Fig. 1.

[Composition of Sheet Package]

[0044] Next, the package member 8 which is set in the printer 1 in this embodiment will be explained below.

[0045] Fig. 6 is a perspective view of the package member 8. Fig. 7 is a developed view of the package member 8 of the outer side.

[0046] As shown in Fig. 6, the package member 8 includes the sheets 7 as cut sheets, the package member 8 storing the sheets 7 which have been stacked up, and a long belt-shaped member 40 bundling the package member 8 up.

[0047] As the sheets 7, small-sized sheets of approximately A6-A7 size are used, for example. The package member 8 stores approximately 50 sheets therein.

[0048] The belt-shaped member 40 is wound around the package member 8 in a direction orthogonal to the sheet feed direction X to bundle the package member 8 up. As the belt-shaped member 40, a member having a width [1/5]-[1/2] of the length of the sheet 7 in the sheet feed direction X is used.

[0049] The package member 8 includes a top board 41 having substantially the same (rectangular) shape as the sheet 7, a second side board 42 connecting with the top board 41, a base board 43 connecting with the second side board 42, and a first side board 44 connecting with the base board 43. Specifically, out of two edges 45 and 46 of the top board 41 orthogonal to the sheet feed direction (direction indicated by an arrow K), the edge 45 on the upstream side connects with the second side board 42. An edge 47 of the second side board 42, opposite to the edge 45 connecting with the top board 41, connects with the base board 43.

[0050] The base board 43 is shaped like a substantially rectangular shape. Described emphatically, the base board 43 is composed of two large and small rectangles, formed like a T-shape, in which the small rectangle is placed above the large rectangle. The small rectangle is situated on the downstream side in the sheet feed direction (direction indicated by an arrow J), and has a length substantially 1/4 of the entire length of the base board 43 in the sheet feed direction. The large rectangle is situated on the upstream side in the sheet feed direction (direction indicated by the arrow J), and has a length substantially 3/4 of the entire length of the base board 43 in the sheet feed direction. The small rectangle has a slightly shorter length in the direction orthogonal to the sheet feed direction than the large rectangle. Hereinafter, the small rectangular part of the base board 43 on the downstream side in the sheet feed direction (direction indicated by the arrow J) is referred to as a base board narrow part 48, and the large rectangular part of the base board 43 on the upstream side in the sheet feed direction (direction indicated by the arrow J) is referred to as a base board wide part 49.

[0051] Out of edges of the base board wide part 49 along the sheet feed direction, an edge 50 on the left side in the sheet feed direction of the package member 8 (right side in Fig. 7) connects with the first side board 44. Out of edges of the first side board 44 orthogonal to the sheet feed direction to the first side board 44 (direction indicated by the arrow J), an edge 51 on the downstream side contacts with the regulating member 20 during sheet feeding, which will be described later. The package member 8 is composed of the top board 41, the second side board 42, the base board 43 and the first side board 44, which are formed in one unit.

[0052] Fig. 10 is a developed view of the package member 8 of the back side, in which the package member 8 before being folded is shown. The package member 8 shown in Fig. 6 is obtained by folding a flat cardboard

material shown in Fig. 10 so that the first side board 44 becomes upright, and then the top board 41, the second side board 42 and the base board 43 become a shape like "U".

[0053] The package member 8 is designed to have a dimension D1 in its width direction substantially equal to the width of the sheet 7. The details will be explained later.

[0054] The package member 8 is provided with creases. The creases 60 are formed at the boundaries between the top board 41 and the second side board 42, between the second side board 42 and the base board 43, and between the base board 43 and the first side board 44.

[0055] The top board 41 of the package member 8 of this embodiment is configured so that its dimension D2 in the sheet feed direction X will be substantially equal to the distance D3 (see Fig. 4) between the inner walls 3a and 14a of the sheet storage unit 6. With this configuration, when the package member 8 is loaded in the sheet storage unit 6, the edges 45 and 46 of the top board 41 on the upstream/downstream sides in the sheet feed direction X make contact with the inner walls 3a and 14a respectively as shown in Fig. 4. By the contact of the edges 45 and 46 with the inner walls 3a and 14a, the package member 8 is positioned correctly in the sheet feed direction X. The details will be explained later.

[0056] Meanwhile, the base board 43 of the package member 8 is provided with the open entrance 43A to be shorter than the top board 41 in the sheet feed direction X so as to allow the entrance of the pickup roller 13 into the package. With the open entrance 43A, the base board 43 is designed to be shorter than the top board 41 by a minimum length that is necessary for the entrance of the pickup roller 13 into the package, since setting the dimension of the base board 43 unnecessarily short can impair the function of the package member 8 for protecting the sheets 7.

[0057] The base board 43 has the identification mark 64 at a corner of its under surface (opposite to the sheets 7) on the upstream side in the sheet feed direction X as shown in Figs. 6 and 7. The identification mark 64 is formed by a well-known method such as printing so that the identification mark 64 will be situated in a reading area of the reflective sensor 23 when the package member 8 is set in the sheet storage unit 6.

[0058] The identification mark 64 is composed of four rectangular indicator bits 64a-64d. In this embodiment, among the four indicator bits, 1-3 bits are colored black and the remaining bits are not colored (left in the color (white) of the foundation of the package member 8). Concretely, the indicator bits 64a, 64c and 64d are colored black, while the remaining bit 64b is left white.

[0059] The above black/white pattern has been preset depending on the type of the sheet 7 stored in the package member 8. As shown in Fig. 7, on a top face of the top board 41 of the package member 8, a cassette type indicator 65 indicating the type of the package member 8 is placed. In the cassette type indicator 65, characters or the like are printed, by which the user can check the type of the package 8. In this embodiment, the characters "C-11L" are printed. The position of the cassette type indicator 65 is within a region facing to the window 11 provided in the lid 10 of the printer 1 when the package member 8 is set in the printer 1 as mentioned above. The user can visually check the cassette type mark 65 through the window 11. On the top board 41 of the package member 8, an upper hole 66 is also provided within the region facing to the window 11.

[0060] The circular upper hole 66 is about 6 mm in diameter. Hence, the user can see the upper hole 66 on the package member 8 through the window 11 provided in the lid of the printer 1 when the package member 8 is set in the printer 1. Also, a lower hole 67 is provided in a position opposite to the upper hole 66 on the base board 43 facing to the top board 41 having the upper hole 66.

[0061] The circular lower hole 67 has a diameter substantially equal to the upper hole 66. When the user checks the package member 8 through the upper hole 66, the user can see the sheets 7 when the package member 8 accommodates the sheets 7, and see the upper hole 67 when the package 8 does not accommodate the sheets 7. When the package member 8 set in the printer 1 does not accommodate the sheets 7, the user can visually check the base bottom face 3d of the sheet storage unit 6 of the printer 1 through the lower hole 67. In this embodiment, the sheets 7 are plain white, and the bottom face 3d of the sheet storage unit 6 is plain black. Therefore, the user can easily know the presence or absence of the sheets by looking the color inside the package member 8 through the window 11 and the upper hole 66.

[0062] In the embodiment, the user can make distinguish between the sheets 7 and the bottom face 3d of the sheet storage unit 6 by the color. However, when the sheets 7 and the bottom face 3d of the sheet storage unit 6 have the same color, a predetermined mark can be put on the bottom face 3d of the sheet storage unit 6 at the position facing to the lower hole 67, or the bottom face 3d can be coated by patterns, or lines or a meshed pattern can be designed on the sheets 7. The lower hole 67 can be omitted, when the user can easily check the presence or absence of the sheets 7 by the different colors of the sheets 7 and the back side of the package member 8. Also in this case, the predetermined mark can be put on the base board 43 at the position facing to the upper hole 66 provided on the top board 41 which is the backside of the package member 8, or a pattern can be provided all over the back side of the base board 43, or ruled lines or a mesh patter can be printed on the sheets 7.

[0063] Incidentally, substantially 6-mm diameter of the upper hole 66 is almost equal to a narrower width of the window 11. The upper hole 66 and the lower hole 67 can be larger than the window 11. However, the sheets 7 are partially exposed through the hole, so that the exposed part of the sheets 7 become discolored or deteriorated. The balance of the sizes of the upper/lower holes 66, 67 is preferably considered.

[0064] Furthermore, the upper hole 66 and the lower hole 67 can be different in size. Figs. 8 and 9 are schematic views around the upper hole 66 of the package member 8 in a state where the sheets 7 are not stored in the package member 8 (empty). In Fig. 8, the upper/lower holes 66, 67 are same in size, and in Fig.9, the lower hole 67 is larger than the upper hole 66 a little. In either case, both of the top board 41 and the base board 43 are slightly shifted in horizontal direction. Thus, the area where the upper/lower holes 66, 67 are overlapped, or equivalently, the area of the bottom face 3d of the sheet storage unit 6 which can be seen through the upper/lower holes 66, 67 when the package member 8 storing no sheets 7 is set in the printer 1, is larger in the case of Fig. 9 than in Fig. 8. Specifically, when the presence or absence of the sheets 7 can be checked by the difference of the color between the sheets 7 and the bottom face 3d, the arrangement shown in Fig. 9 is more favorable.

[0065] In addition to a circle, the upper/lower holes 66, 67 can be shaped like an ellipse, a hexagon, a rectangle, and the like. The upper/lower holes 66, 67 can be different in shape from each other.

[0066] The explanation returns to Fig. 7 again. As shown in Fig. 7, various information such as the identification mark 64 and the cassette type indicator 65 is printed on the package member 8. The printed information is varnished after printed so as not to fade off by friction. Specifically, it is important to varnish the identification mark 64, since the printer 1 may fail to work properly if the mechanism (the reflective sensor 23) for reading the identification mark 64 cannot read the identification mark 64 correctly. Printing including the information which can be visually checked by the user is made all over front face of the package member 8. Therefore, when the packages 8 are manufactured in a factory, the whole front face of the package member 8 is varnished, without setting only the printed parts set to be varnished. The package member 8 of the embodiment is manufactured in that way, but the front faces of the second side board 42 and the base board narrow part 48 of the base board 43 are unvarnished.

[0067] The front face of the second side board 42 is unvarnished because it becomes impossible to print a lot number for controlling the manufactured package member 8 on the second side board 42 if the front face on the second side board 42 is varnished.

[0068] The reason why the front face of the base board narrow part 48 of the base board 43 are unvarnished will be explained later, but briefly explained as follows: when the package member of the aforementioned prior art is set in the printer without the sheets and the sheet feeding starts, the pickup roller sometimes rotates at idle over the front face of the base board narrow part of the base board. In that case, the varnish which covers the base board narrow part has adhered to the pickup roller. Even after the package member which runs out of the sheets and does not store the sheets any more (empty) is replaced by the new package member, and when printing is started, the performance of the sheet separation get worse, and the separation of the sheets cannot be normally operated due to the varnish adhered to the pickup roller. Additionally, the sheet feeding cannot be normally performed, so that printing quality becomes declined. Therefore, in the package member 8 of the embodiment, the base board narrow part 48 of the base board 43 is arranged in advance not to be varnished.

[Assembly of Sheet Package]

[0069] A process for assembling the package member 8 will be described below with reference to Figs. 10 to 13.

[0070] Starting from the package member 8 in the state of Fig. 10, the first side board 44 is vertically folded at a crease 63 to be orthogonal to the base board 43 as shown in Fig. 11. The second side board 42 is vertically folded at a crease 62 to be orthogonal to the base board 43. Since the top board 41 is vertically folded relative to the second side board 42, the top board 41 and the base board 43 face each other and the package member 8 is formed into a shape like "U".

[0071] Subsequently, the sheets 7 which have been stacked up are sandwiched and stored between the base board 43 and the top board 41 of the package member 8.

[0072] When the sheets 7 are stored in the package member 8, the direction of each sheet 7 has been preset so that the print surface (a surface to be printed on) of each sheet 7 will face toward the base board 43. The direction is preset as above in order to let the print surface of each sheet 7 face the thermal head 16 when the package member 8 is loaded in the printer 1 and the sheet 7 is fed to the print mechanism unit 15.

[0073] Finally, the belt-shaped member 40 is wound around the package member 8 (sandwiching and storing the sheets 7) in a direction orthogonal to the sheet feed direction X to bundle the package member 8 up. Noted that Fig. 13 is a perspective view showing the package member 8 of Fig. 6 turned upside down.

[0074] As above, the package member 8 is assembled in a relatively easy process.

[0075] In this embodiment, the above process for assembling (manufacturing) the package member 8 is carried out by a manufacturer. The user of the printer 1 purchases the package member 8 sold in the state of Fig. 6 and uses the package member 8 by loading it into the printer 1.

[Loading Sheet Package in Printer]

[0076] First, the belt-shaped member 40 wound around the package member 8 is removed.

[0077] Subsequently, the package member 8 is loaded into the sheet storage unit 6 of the printer 1 with the base board 43 facing downward as shown in Fig. 14.

[0078] Consequently, the exposed part of the lowermost one of the sheets 7 stacked up and stored in the package member 8 makes contact with the top of the

pickup roller 13. Therefore, by driving and revolving the pickup roller 13, the sheet 7 can be sent out and conveyed.

[0079] Incidentally, the lid 10 of the printer 1 is designed to be opened and closed on the downstream side in the sheet feed direction X. When the package member 8 is loaded into the printer 1 having such composition, the package member 8 is generally tilted as shown in Fig. 14 with the front end (on the upstream side in the sheet feed direction X) positioned lower than the rear end.

[0080] In the package member 8 of this embodiment, the second side board 42 of the package member 8 is placed on the upstream side in the sheet feed direction, and thus the state of storage of the sheets 7 can be maintained by the second side board 42. Therefore, the sheets 7 stored in the package member 8 are prevented from slipping down from the package member 8 and being scattered about (out of carelessness of the user) when the package member 8 is loaded into the sheet storage unit 6. Further, the tilting of the package member 8 lets the edges of the sheets 7 make contact with the second side board 42, by which the edges of the sheets 7 stacked up are evened up at a prescribed position, preventing trouble like a paper jam from occurring.

[0081] Fig. 15 shows a state in which the package member 8 has been completely stored in the sheet storage unit 6. In this state, the regulating member 20 stored in the sheet storage unit 6 rotates in the direction of the arrow shown in Fig. 15 and the arm 22 pushes the side edges of the sheets 7.

[0082] Fig. 16 is an enlarged view showing a state in which the arm 22 of the regulating member 20 is making contact with the sheets 7 and pushing the sheets 7. Fig. 17 is a cross-sectional view taken along the line XII-XII shown in Fig. 16.

[0083] The dimension D1 of the package member 8 in its width direction (see Fig. 10) is designed to be substantially equal to the width of the sheet 7. Also, the width of the top board 41 on the downstream side in the sheet feed direction X is arranged to be slightly narrower than the dimension D1. Therefore, the regulating member 20, which pushes the side edges of the sheets 7 on the downstream side of the top board 41 in the sheet feed direction X, can make contact with the side edges of the sheets 7 without being obstructed by part of the package member 8 covering the exterior of the sheets 7, by which the sheets 7 can be aligned along the inner wall 3c on the other side of the sheet storage unit 6.

[0084] As shown in Fig. 16, the edge 51 of the first side board 44 on the downstream side in the sheet feed direction X is brought into contact with the end face 22a of the regulating member 20 when the first side board 44 is moved to the downstream side in the sheet feed direction X. Thus, the movement of the base board 43 connecting with the first side board 44 to the downstream side in the sheet feed direction X can be restricted. It is noted that the package member 8 can be composed so that the edge 51 of the first side board 44 is already in contact with the end face 22a of the regulating member 20 when the package member 8 is loaded in the printer 1.

[0085] A state in which the lid 10 has been closed after the loading of the package member 8 into the sheet storage unit 6 is shown in Figs. 4 and 5. In this state, the top board 41 of the package member 8 is situated between the pressure plate 24 for pressing the sheets 7 against the pickup roller 13 and the sheets 7.

[0086] The sheets 7 are set in the printer 1 while being stored in the package member 8. When all the sheets 7 in the package member 8 are used up, the user pulls out the empty package member 8 from the sheet storage unit 6, and disposes it.

[0087] After that, the sheets 7 are loaded in the printer necessarily in the state being stored in the package member 8, which is advantageous in that the sheet separation function of the pickup roller 13 and the separation block 14 does not deteriorate even when the printer 1 has printed on a great number of sheets.

[0088] Here, let us consider a case where the stacked sheets 7 make direct contact with the pressure plate 24 not via the top board 41. In this case, the pressure plate 24 wears off in the continuous use of the printer 1 and the friction between the pressure plate 24 and the stacked sheets 7 decreases, by which the separation function is lost and the multi feeding (feeding two or more sheets 7 at once) is caused frequently. In the configuration of this embodiment, the stacked sheets 7 make direct contact with the top board 41, which is replaced together with the package member 8 each time when a prescribed number of sheets 7 are used up. Therefore, the friction between the top board 41 and the stacked sheets 7 do not drop even in the continuous use of the printer 1 over the years, by which an excellent separation function is maintained consistently and sheet feed trouble (multi feeding, etc.) is prevented from occurring.

[Method for Positioning Package Member in Printer]

[0089] Next, a method for correctly positioning the package member 8 in the printer 1 (in order to let the reflective sensor 23 of the printer 1 read the identification mark 64 of the package member 8) will be explained below.

[0090] In regard to the width direction of the package member 8, the dimension D1 (see Fig. 10) of the package member 8 in the width direction is set substantially equal to the width of the sheet 7 as mentioned above. Therefore, the sheets 7 are pushed by the regulating member 20 (provided to the inner wall 3b of the printer 1) against the inner wall 3c on the other side, while the package member 8 is also pushed by the regulating member 20 and positioned in the sheet storage unit 6.

[0091] Meanwhile, in the lengthwise direction of the package member 8 (i.e. in the sheet feed direction X), the dimension D2 (see Fig. 10) of the top board 41 of the package member 8 in the sheet feed direction X is set substantially equal to the distance D3 (see Fig. 4) be-

tween the inner walls 3a and 14a of the sheet storage unit 6. Therefore, the edges 45 and 46 of the top board 41 on the upstream/downstream sides in the sheet feed direction X make contact with the inner walls 3a and 14a of the sheet storage unit 6 respectively, which is referred to as a solution A. The edge 51 of the first side board 44 on the downstream side in the sheet feed direction X is brought into contact with the end face 22a of the arm 22 of the regulating member 20 provided in the printer 1 in the sheet feed operation, by which the movement of the base board 43 connecting with the first side board 44 in the downstream side in the sheet feed direction X can be restricted, which is referred to as a solution B. By these solutions, the package member 8 can be positioned in the sheet storage unit 6.

[0092] By the positioning of the package member 8 in the width direction and in the sheet feed direction X, the four indicator bits 64a-64d of the identification mark 64 are situated in the reading areas of the four reflective sensors 23a-23d respectively, by which the reflective sensor 23 is allowed to read the black/white pattern of the indicator bits 64a-64d correctly and judge the type of the sheet 7.

[0093] By the way, the sheet feed operation by the pickup roller 13 generally involves the following problem. When the feeding force is applied to the lowermost sheet 7 making contact with the pickup roller 13, the package member 8 also receives force in the sheet feed direction X due to the friction between the lowermost sheet 7 and the base board 43.

[0094] In this embodiment, even in the sheet feed operation, the edge 46 of the top board 41 (on the downstream side in the sheet feed direction X) makes contact with the inner wall 14a of the sheet storage unit 6, by which the movement of the package member 8 can be restricted against the feeding force from the pickup roller 13. Therefore, even though the second side board 42 or the base board 43 connecting with the top board 41 might shift slightly in the sheet feed direction X as shown in Fig. 18, the identification mark 64 on the package member 8 can be situated within a readable range of the reflective sensor 64 of the printer 1.

[0095] In the package member described in the aforementioned prior art, only the solution A to secure the package member in the sheet feed direction X by positioning the top board is carried out, but the solution B of the invention to position the base board is unperformed. Under the condition as such, when the sheet feed operation is performed with the empty package member loaded in the printer, the top board is pressed by the pressure plate on which the bias spring exert the biasing force. Further, the pickup roller has brought into contact with the top board directly, since the package member 8 has no sheets.

[0096] They sometimes cause a feeding of the top board itself instead of the sheet by the friction of the pickup roller. In accordance with the movement of the top board, the base board may be also pulled to the pickup roller. Then, the top board overlapping with the base board is conveyed into a sheet feed path such as a space between the pickup roller and the separation block, or the space between the platen roller and the paper guide further, which may cause an idle rotation of the pickup roller over the base board narrow part of the base board.

[0097] As a result, the varnish which covers the front face of the base board is adhered to the pickup roller. Thus, the performance of the sheet separation may get worse, and counter torque is applied to a platen drive unit (not shown) more than necessary when the user tries to remove the package member which has been drawn into the sheet feeding path, which affects the endurance.

[0098] On the contrary, in the package member 8 of the embodiment, addition to the solution A to secure the package member 8 by positioning the top board 41, the solution B to position the base board 43 is also performed. Accordingly, even when the top board 41 is nearly fed by the pickup roller 13, the regulating member 20 prevents the base board 43 from being fed, by which the package member 8 can be avoided from getting jammed in the sheet feed path of the printer 1. In this case, preferably, the first side board 44 is arranged to be folded at a crease toward the base board 43. With this arrangement, the stiffness of the first side board 44 is improved, thereby restricting the movement of the package member 8 against the feeding force of the pickup roller 13 more effectively.

[0099] In order to let the identification mark 64 on the base board 43 be positioned at and read by the reflective sensor 23 by letting the package member 8 withstand the feeding force of the pickup roller 13, the difference between the dimension D2 of the top board 41 in the sheet feed direction X and the distance D3 between the inner walls 3a and 14a of the sheet storage unit 6 of the printer 1 has to be within a permissible range of 1.0 mm. Taking a printing error (occurring when the identification mark 64 is printed on the package member 8), etc. into consideration, the dimension difference 1.0 mm is the limit value allowing the reflective sensor 23 to read the identification mark 64.

[0100] The package member 8 of the embodiment has the first side board 44 which connects with the base board 43, and covers the one of side faces of the stacked sheets 7, the side face being provided along the sheet feed direction X. The package member 8 is configured so that the edge on the downstream side in the sheet feed direction X is in contact with the end face 22a of the regulating member 20 provided in the printer 1 during the feeding operation of the sheets 7, by which the package member 8 is positioned correctly in the sheet feed direction X. With this arrangement, the movement of the package member 8 can be restricted while the package member 8 receives the force in the sheet feed direction X in the sheet feed operation of the printer 1.

[0101] More specifically, the embodiment can provide the package member 8 in which nothing gets jammed in the sheet feed path of the printer 1 when the printer 1

performs the sheet feed operation when the package member 8 is loaded in the printer 1 regardless of the presence or absence of the sheets 7 therein.

[0102] The package member 8 of the embodiment is designed to have the base board 43 which is shorter than the top board 41 in the sheet feed direction X, and the open entrance 43A in the base board 43. Accordingly, the composition of the package member 8 from which the sheets 7 can be fed without an extra component of the package member 8 or an extra mechanism of the printer 1, can be easily achieved.

[0103] Furthermore, in the package member 8 of the embodiment, the top board 41 has the upper hole 66 in the position opposite to the window 11 provided in the lid 10 of the sheet storage unit 6 of the printer 1. The user can see the stacked sheets 7 through the window 11 and the upper hole 66. Accordingly, the user can check the presence or absence of the sheets 7 in the package member 8 which can be loaded in the sheet storage unit 6 of the printer 1. Also, to issue the invalid print command can be avoided.

[0104] In the package member 8 of the embodiment, the color of the stacked sheets 7 is different from the color of the bottom face 3d of the sheet storage unit 6 of the printer 1, and the lower hole 67 is provided on the base board 43, the position opposite to the upper hole 66 on the top board 41. Accordingly, the user can check the bottom face of the sheet storage unit 6 or the color of the stacked sheets 7 by seeing through the upper hole 66, thereby recognizing the presence or absence of the sheets 7.

[0105] In the package member 8 of the embodiment, the lower hole 67 is set to be larger than the upper hole 66. Accordingly, even when the package member 8 becomes warped, and the relative position of the top board 41 and the base board 43 is shifted in horizontal direction, the user can check the lower hole 67 through the upper hole 66. Therefore, the user can recognize the presence or absence of the sheets 7 more clearly.

[0106] In the embodiment, the front face of the base board narrow part 48, which corresponds to the region on the upstream side in the sheet feed direction X of the periphery of the position where the pickup roller 13 (sheet feed roller) enters into the package member 8 on the outer face of the base board 43 facing to the sheet storage unit 6, is arranged to be unvarnished to keep damage to a minimum in case where the sheets 7 get jammed in the printer 1. Accordingly, the deterioration of the performance of the sheets separation due to the varnish adhered to the pickup roller (sheet feed roller) 13 can be avoided.

[0107] The package member 8 of the embodiment has the second side board 42, which covers the one of the side faces of the stacked sheets 7, the side face being provided on the upstream side in the sheet feed direction X, along the direction orthogonal to the sheet feed direction X. Accordingly, the sheets 7 is neatly stored in the package member 8 before loaded in the sheet storage unit 6 of the printer 1, so that the package member 8 can be easily and securely loaded in the sheet storage unit 6 of the printer 1.

[0108] The package member 8 of the embodiment is composed of the top board 41, the second side board 42, the base board 43 and the first side board 44, which are formed in one unit. Accordingly, the strength of the package member 8 can be enhanced as compared with the case where the top board 41, the second side board 42, the base board 43 and the first side board 44 are individually formed and then connected one another.

[Modifications]

[0109] While the above description has been given of an embodiment of the present invention, the technical scope of the present invention is not to be restricted by the above particular illustrative embodiment. Various modifications, design changes, etc. can be made to the embodiment without departing from the scope of the present invention.

[0110] For instance, the belt-shaped member 40 used to bundle the package member 8 up can be removed if the assembled shape of the package member 8 can be maintained well, thereby reducing the manufacturing cost correspondingly.

[0111] The sheet 7 employed for the package member 8 may also be a heat-perforated sheet including a perforation layer (perforated by heat) as an image receiving layer stacked on a base layer. Not only heat-sensitive sheets but also other types of sheets (thermal transfer sheets, etc.) can be used as the sheets 7.

[0112] The package member 8 may also be formed by preparing the top board 41, the second side board 42, the first side board 44 and the base board 43 separately and thereafter connecting them together.

[0113] The base board 43 of the package member 8 may also be configured substantially in the same dimension in the sheet feed direction X as the top board 41 as long as the pickup roller 13 can enter the package and feed the sheets 7. For example, a hole into which the pickup roller 13 can be entered may be provided in the base board 43. In this case, the length of the hole in the direction orthogonal to the sheet feed direction X needs to be as long as or longer than that of the pickup roller 13 in its rotational shaft direction. However, the length of the hole in the sheet feed direction X can be as long as or shorter than that of the pickup roller 13 in the sheet feed direction X.

[0114] The length of the hole in the sheet feed direction X can be shorter than that of the pickup roller 13 in the sheet feed direction X, since the pickup roller 13 just needs to press against the sheets 7 with its surface without necessarily having to enter into the package member 8 entirely through the hole. Of course, the length of hole in the sheet feed direction X can be longer than that of the pickup roller 13 in the sheet feed direction X. Noted that the hole corresponds to the open entrance.

[0115] The configuration of the identification mark 64 formed on the base board 43 of the package member 8 is not restricted to the black/white pattern of the rectangular indicator bits made by printing. The identification mark 64 may also be configured by forming holes at proper positions of the package member 8 to indicate information by a pattern of the presence/absence of holes, for example. The identification mark 64 may also indicate information other than the type of the sheet 7, that is, any information can be indicated exactly enough to be recognized by a sensor of the printer.

[0116] The printer 1 may also be configured to carry out printing with a means other than the thermal head 16. When the printer is allowed to be a little larger, other printing means like an ink jet printing head may be employed, for example.

[0117] The sensor 23 of the printer 1 is not restricted to the reflective sensor 23. Any appropriate sensor can be employed irrespective of whether it is of a contact type or non-contact type.

[0118] The first side board 44 can partially share the one side edge in the sheet feed direction X with the base board wide part 49 of the base board 43. In regard to the first side board 44, the position of the edge 51 on the downstream side in the sheet feed direction X needs to be same as this embodiment, but the position of the edge 51 on the upstream side in the sheet feed direction X can be shifted closer to the downstream side in the sheet feed direction X. For instance, as shown in Fig. 19, a first side board 70 having the one-thirds length in the sheet feed direction X of the first side board 44 (see Fig. 7) of the embodiment may be applicable. As shown in Fig. 20, a side board 71 having the one-eights to one-sevenths length in the sheet feed direction X of the first side board 44 (see Fig. 7) of the embodiment may also be applicable. Preferably, the edge 51 on the downstream side in the sheet feed direction X is shaped like a straight line orthogonal to the sheet feed direction X, but the whole shape of the first side board 44 can be rectangular or sector or other shapes. Depending on the position of the regulating member 20 of the printer 1, the position of the edge on the upstream side in the sheet feed direction X can be shifted as well as the edge 51 on the downstream side in the sheet feed direction X.

[0119] In the printer 1 of the embodiment, the regulating member 20 is placed inside the concave part 19 provided in the inner wall 3b on the left side in the sheet feed direction X. The regulating member 20 can be provided in a concave part provided in the inner wall 3c on the right side in the sheet feed direction X. In this case, the first side board 44 is provided on the right side in the sheet feed direction X of the package member 8. When the regulating member 20 is provided both in the concave part 19 provided in the inner wall 3b on the left side in the sheet feed direction X and the concave part provided in the inner wall 3c on the right side in the sheet feed direction X, the first side board 44 can be provided in either one or both of right and left sides in the sheet feed direction X of the package member 8.

[0120] The first side board 44 connects with the base board 43, but may connect with the top board 41. The first side board 44 may connect with both top board 41 and the base board 43. Out of edges of the base board 43, the edge connected with the first side board 44 can connect with another side board. In the first side board 44, there may be also provided a hole through which the regulating member 20 enter into the package member.

[0121] In the embodiment, the whole base board narrow part 48 of the base board 43 is unvarnished. The length of the base board narrow part 48 orthogonal to the sheet feed direction X is longer than that of the pickup roller 13 in its rotational shaft direction. Therefore, only a region where the pickup roller 13 passes when the pickup roller 13 is horizontally moved over the base board narrow part 48 of the base board 43 can be varnished. In this case, when the package member 8 is loaded in the printer 1, the varnished areas on either side of the unvarnished region in the sheet feeding direction X are provided on the front face of the base board narrow part 48 of the base board 43, since the shaft center of the pickup roller 13 and the center of the base board narrow part in the direction orthogonal to the sheet feed direction X are the same.

[0122] The configuration of the package member 8 can be such that a side board 72 covers the one side edges of the sheets 7 extending in the sheet feed direction X. The side board 72 in this configuration can be considered to be work as the second side board 42 and the first side board 44 together in the above embodiment. Fig. 22 is a developed view of the package member 8, seen from the back side thereof. The package member 8 in Fig. 21 can be assembled from the package member 8 shown in Fig. 22, by being folded in the shaded arrow direction.

[0123] The side board 72 is configured so as to cover the one side edges of the sheets 7 extending in the sheet feed direction X, thereby effectively minimizing the displacement of the top board 41 and the base board 43 during the sheet feeding. More specifically, the identification mark 64 can be correctly positioned above the reflective sensor 23 by the reduced amount of the displacement of the top board 41 and the base board 43.

[0124] The package member 8 of the embodiment is composed of the top board 41, the side board 72 and the base board 43 which are formed in one unit. Accordingly, the strength of the package member 8 can be enhanced as compared with the case where the top board 41, the side board 72 and the base board 43 are individually formed and then connected one another.

[0125] While the presently preferred embodiment has been shown and described, it is to be understood that this disclosure is for the purpose of illustration and that various changes and modifications may be made without departing from the scope of the invention as set forth in the appended claims.

Claims

1. A package member (8) which can store stacked sheets (7) to be used as a printing medium in a printer (1) having a sheet storage unit (6) and a regulating member (20) to be loaded in the sheet storage unit (6) of the printer (1):

   a base board (43) that covers a bottom of the stacked sheets (7);
   a top board (41) that covers a top of the stacked sheets (7); and
   a first side board (44) that connects with at least one of the base board (43) and the top board (41) to cover one of side faces of the stacked sheets (7), the side face being provided along a sheet feed direction (X), and comprises an edge (51) on a downstream side in the sheet feed direction (X);

   wherein the package member (8) is positioned in the sheet feed direction (X) by contact of the edge (51) of the first side board (44) with the regulating member (20) provided in the printer (1) during a sheet feeding operation.

2. The package member (8) according to claim 1,
   wherein the printer (1) comprises a sheet feed roller (13) to feed the sheets (7), and
   the base board (43) is formed with an open entrance (43A) through which the sheet feed roller (13) can enter into the package member (8).

3. The package member (8) according to claim 1 or 2
   wherein the printer (1) comprises a lid (10) to cover the sheet storage unit (6), and a window (11) provided in the lid (10), and
   the top board (41) comprises an upper hole (66) facing to the window (11) so that the stacked sheets (7) can be seen through the window (11) and the upper hole (66).

4. The package member (8) according to claim 3,
   wherein the stacked sheets (7) are different in either ones or both of colors and patterns, from a bottom face (3d) of the sheet storage unit (6) of the printer (1), and
   the package member (8) comprises a lower hole (67) on the base board (43) facing to the upper hole (66) on the top board (41).

5. The package member (8) according to claim 4,
   wherein the lower hole (67) is set to be larger than the upper hole (66).

6. The package member (8) according to one of claims 2 to 5
   wherein the printer (1) comprises a sensor unit (23), and
   the base board (43) has an identification part (64) to be read by the sensor unit (23) of the printer (1), the identification part (64) being a part in which a mark is printed and varnished, and
   the package member (8) has an unvarnished region on the base board (43) facing to the sheet storage unit (6), on an upstream side in the sheet feed direction (X) of a periphery of a position where the sheet feed roller (13) enters into the package member (8).

7. The package member (8) according to one of claims 1 to 6, comprising:

   a second side board (42) that covers one of side faces of the stacked sheets (7) on the upstream side in the sheet feed direction (X), the side face being provided along a direction orthogonal to the sheet feed direction (X).

8. The package member (8) according to one of claims 1 to 7,
   wherein the top board (41), the first side board (44) and the base board (43) are formed in a unit.

9. The package member (8) according to claim 7,
   wherein the top board (41), the first side board (44), the second side board (42) and the base board (43) are formed in a unit.

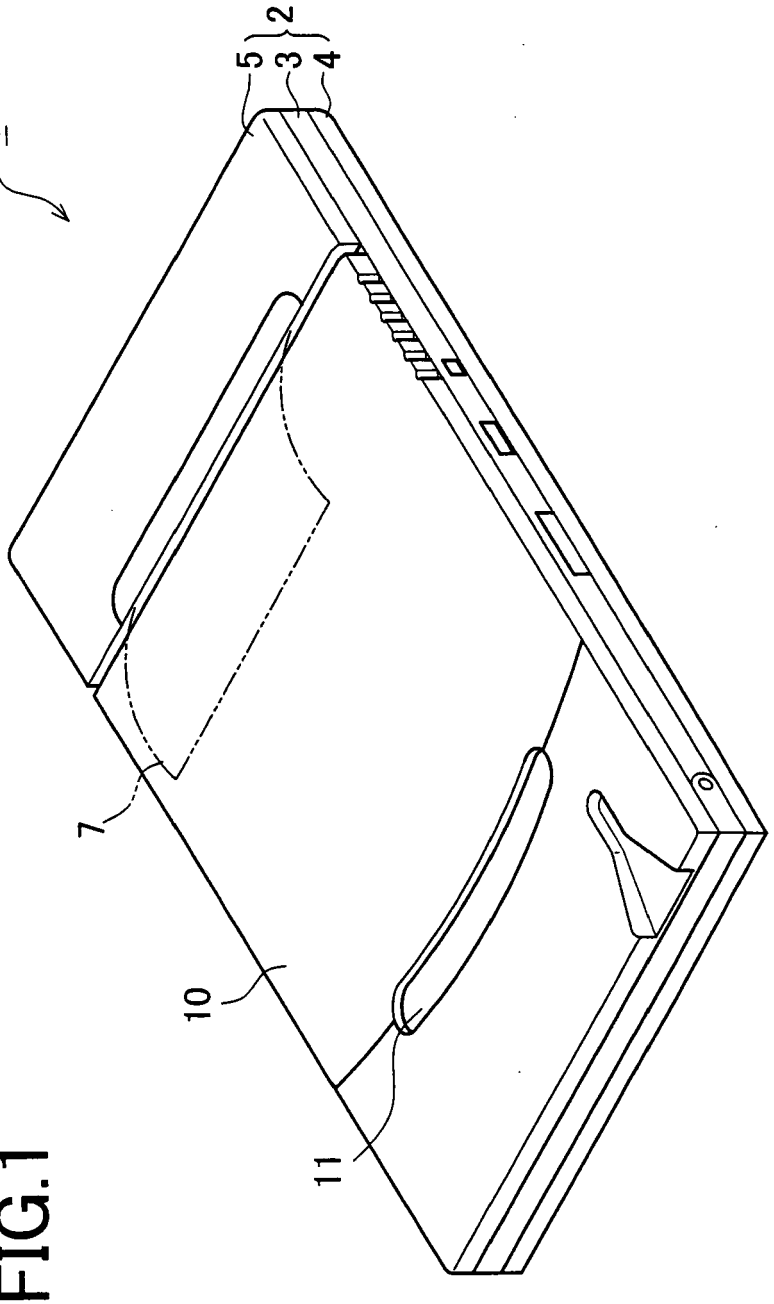


FIG.1

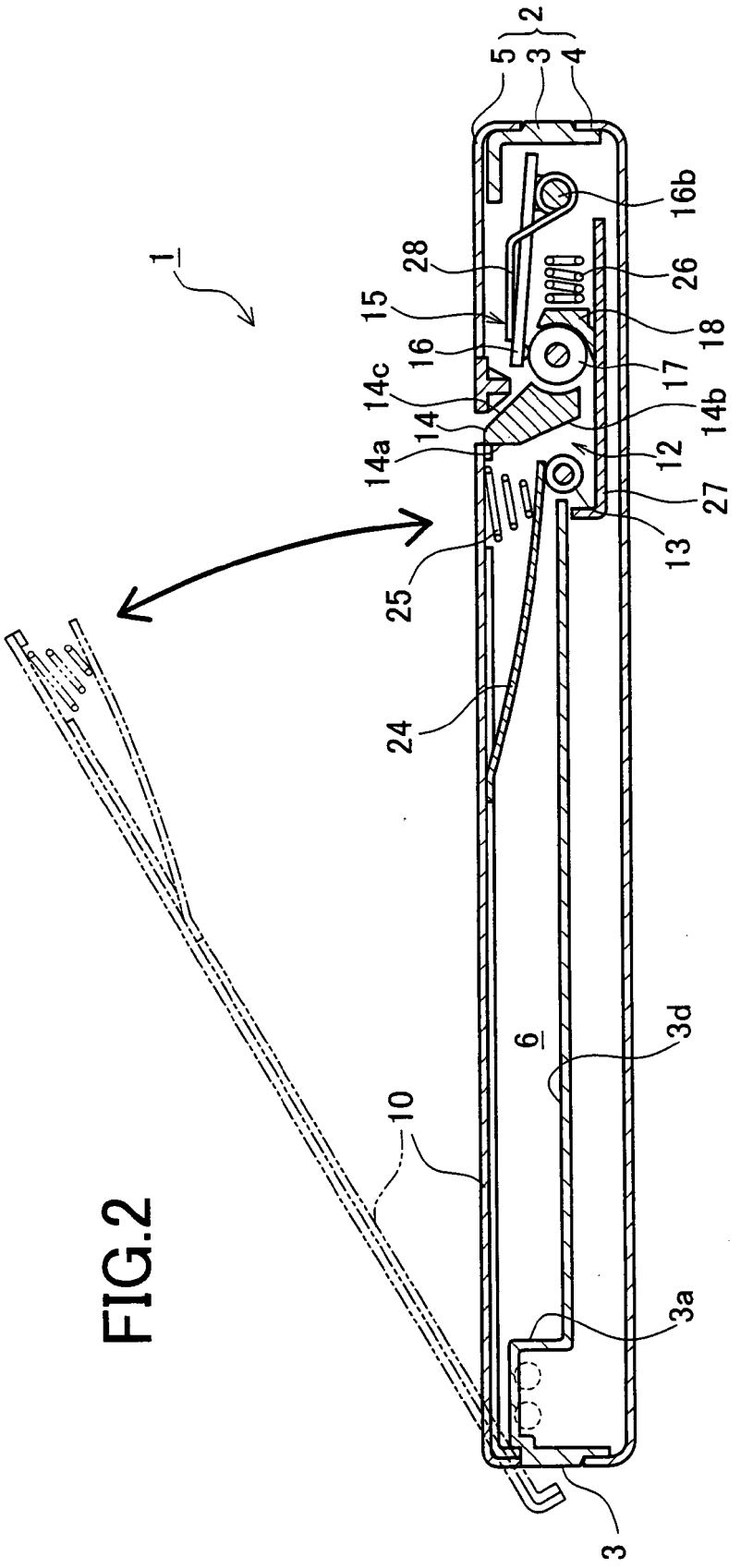


FIG.2

FIG.3

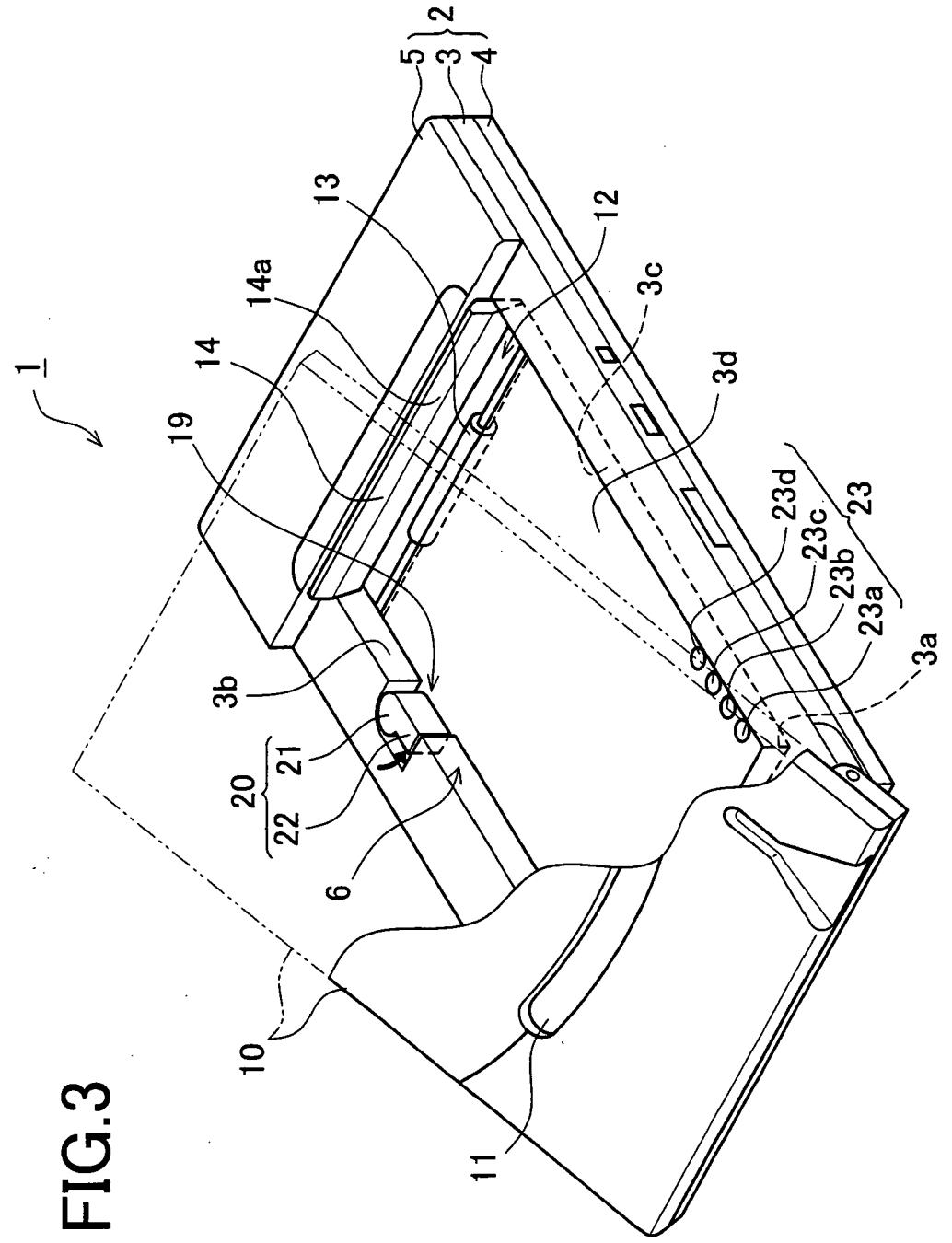


FIG.4

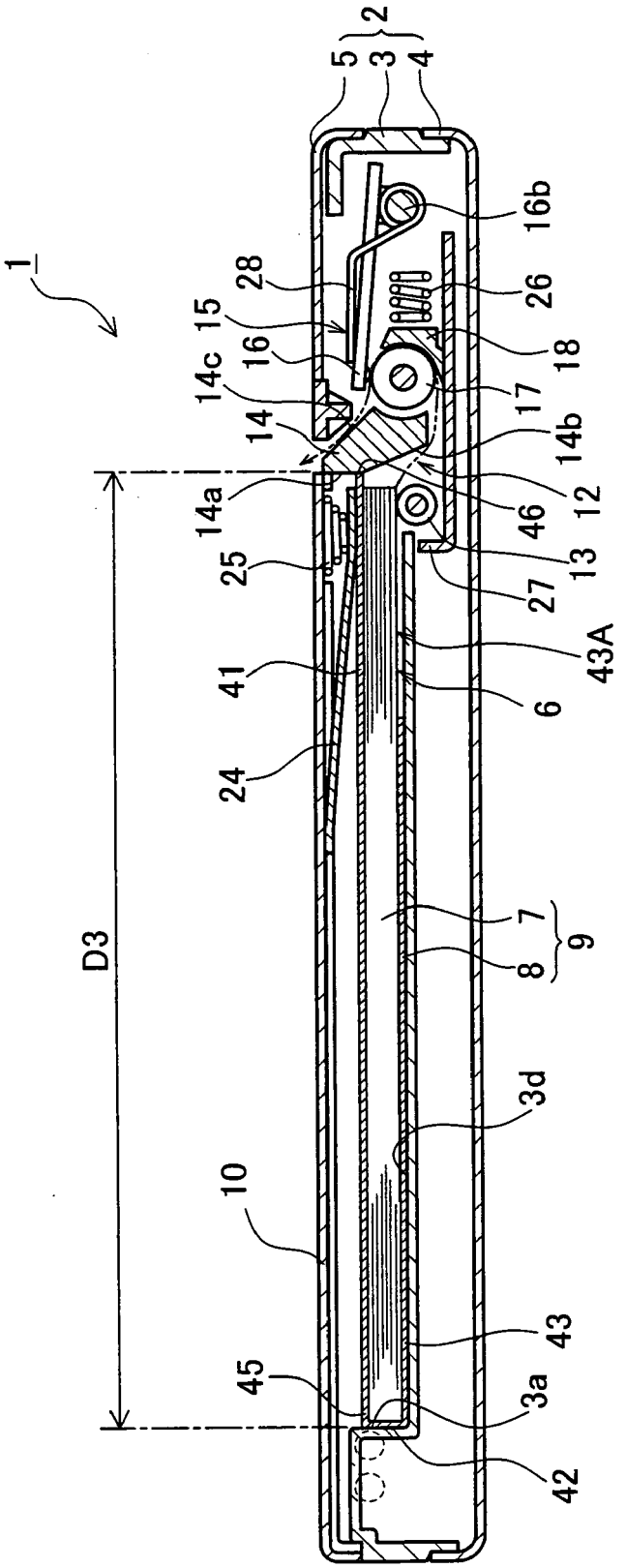
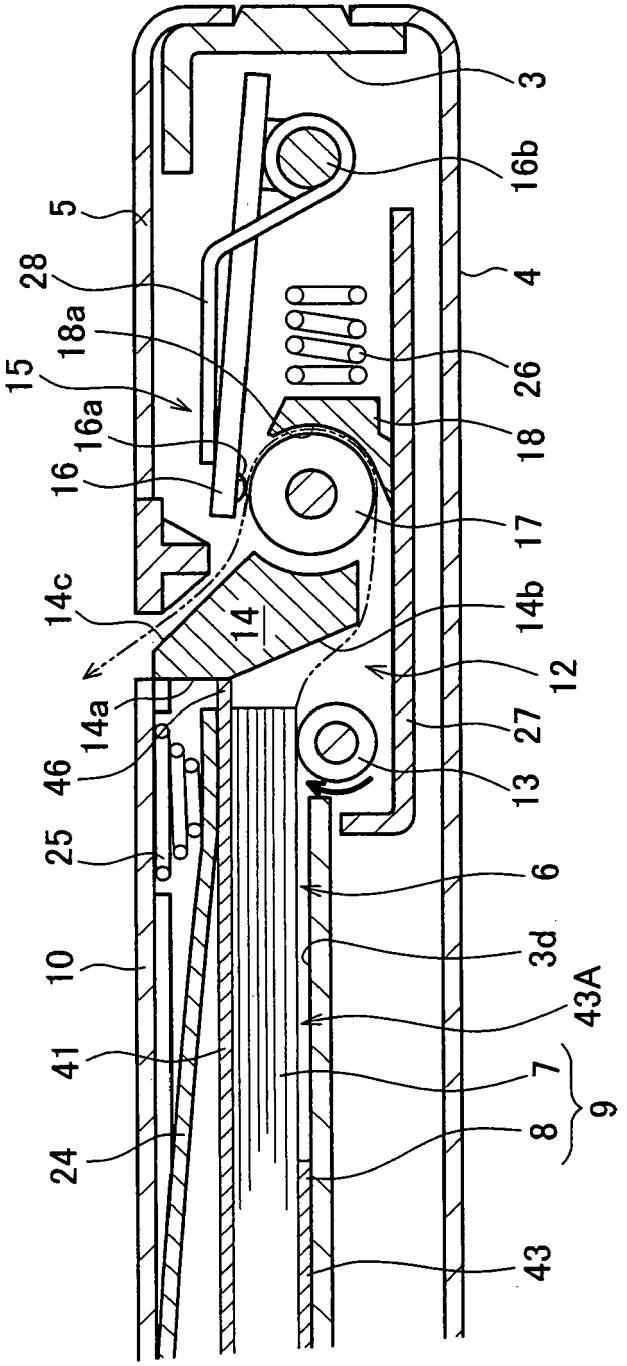

1
2
5
3
4
16b
28
26
15
16
18
14c
17
14
14b
14a
46
12
25
13
27
43A
41
6
24
7
9
8
D3
3d
10
43
45
3a
42

FIG.5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16b
5
4
28
18a
26
15
16a
18
16
17
14c
14
14b
12
14a
27
46
13
25
6
10
3d
43A
41
7
9
8
24
43

FIG.6

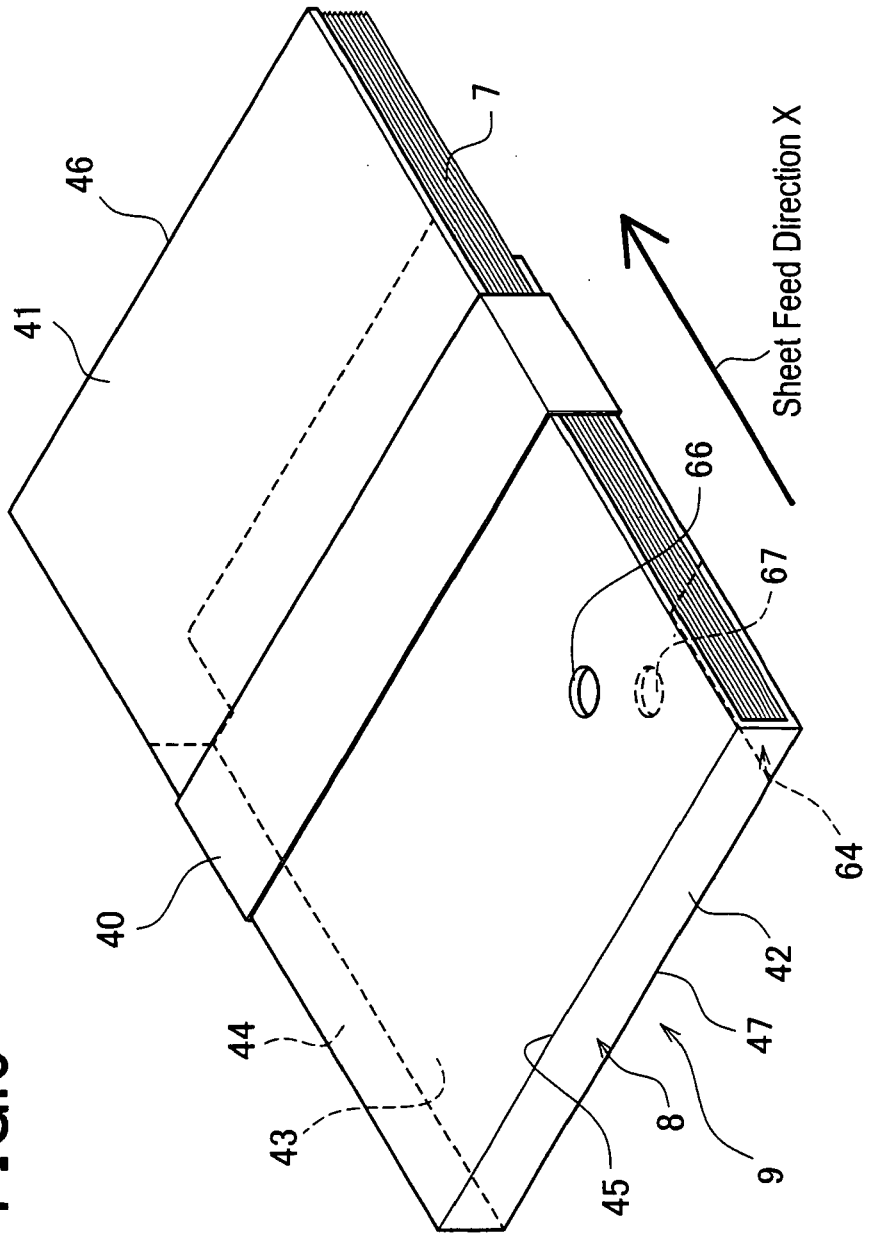


FIG.7

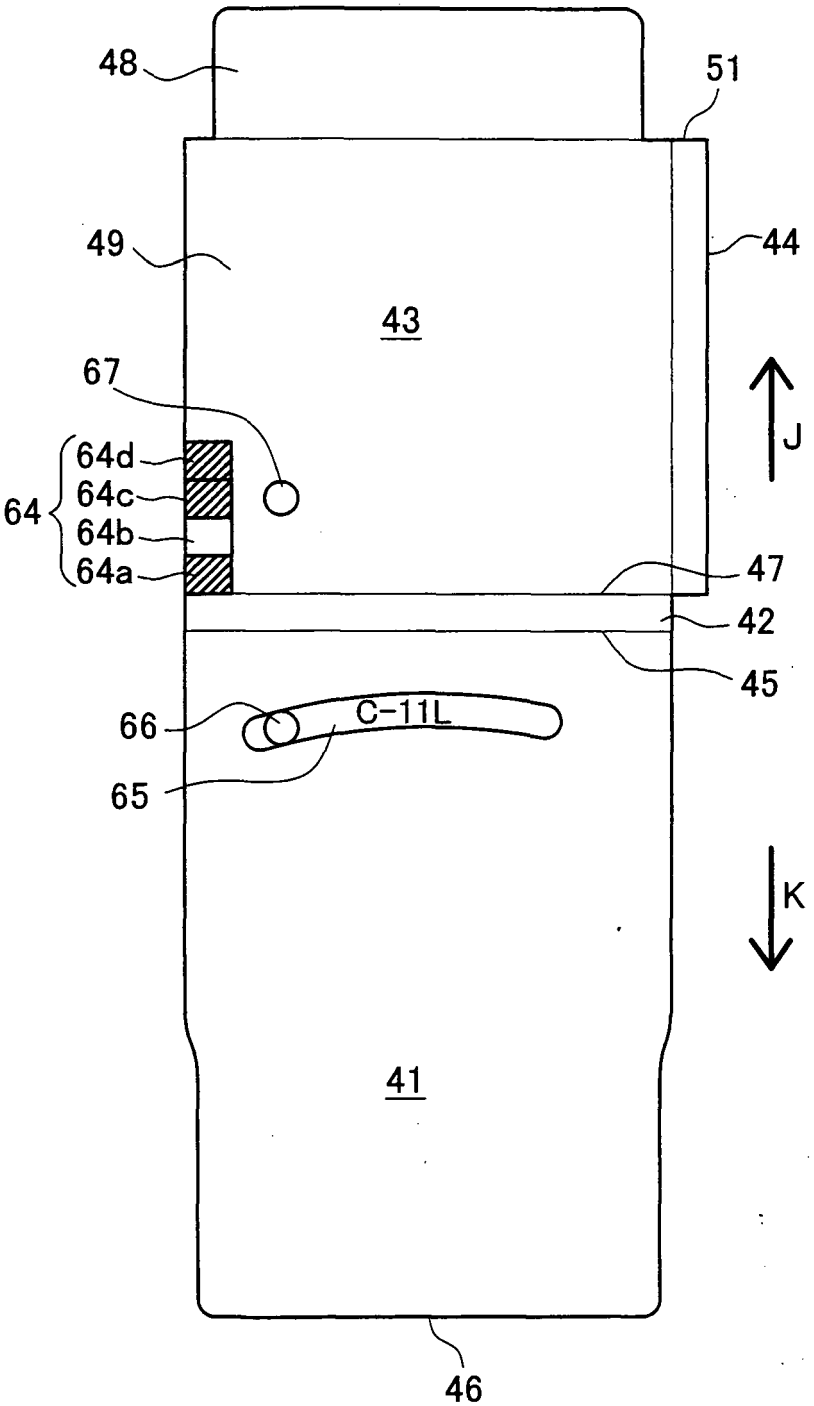


FIG.8

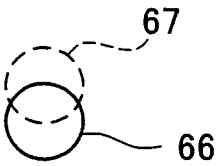


FIG.9

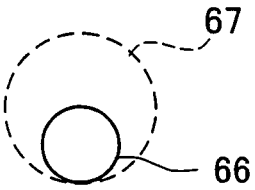


FIG.10

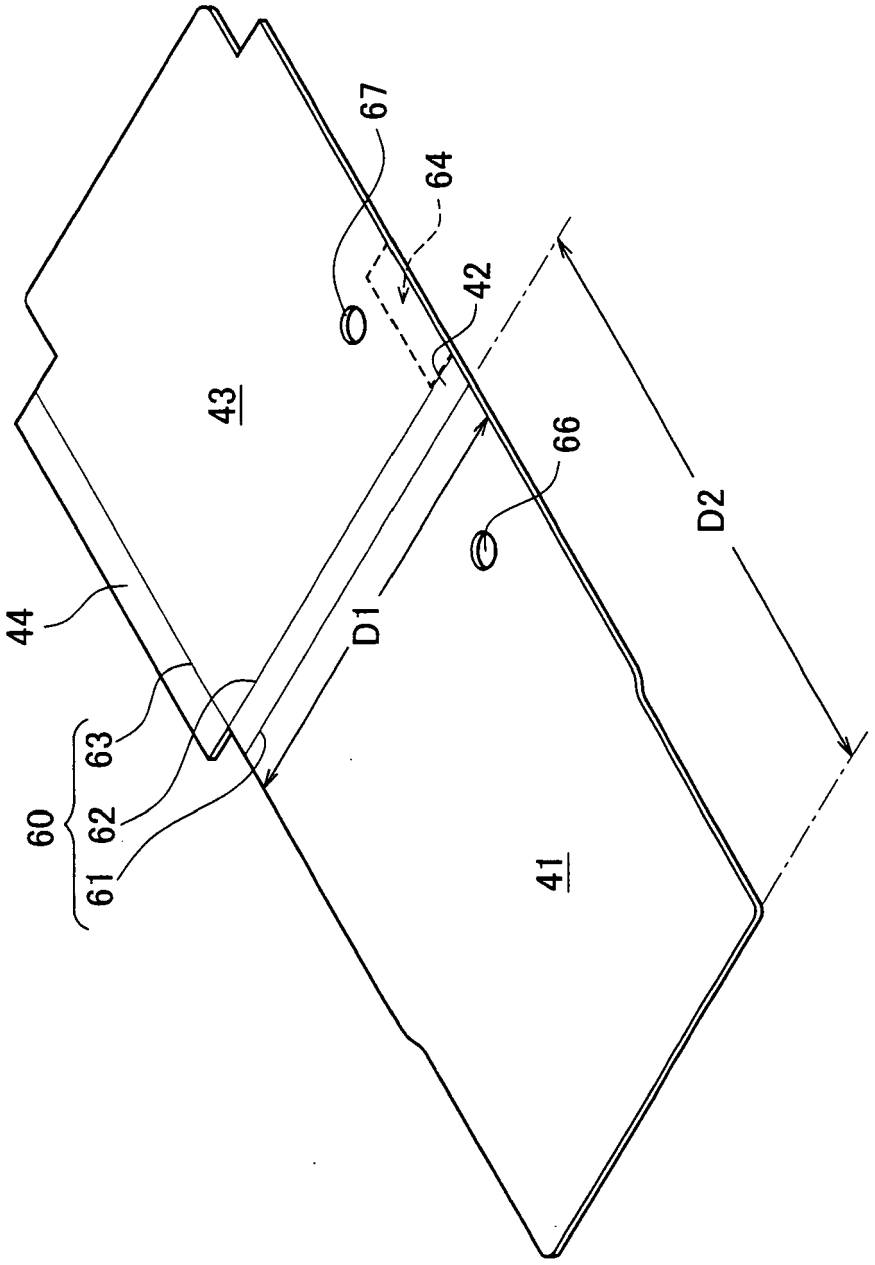


FIG.11

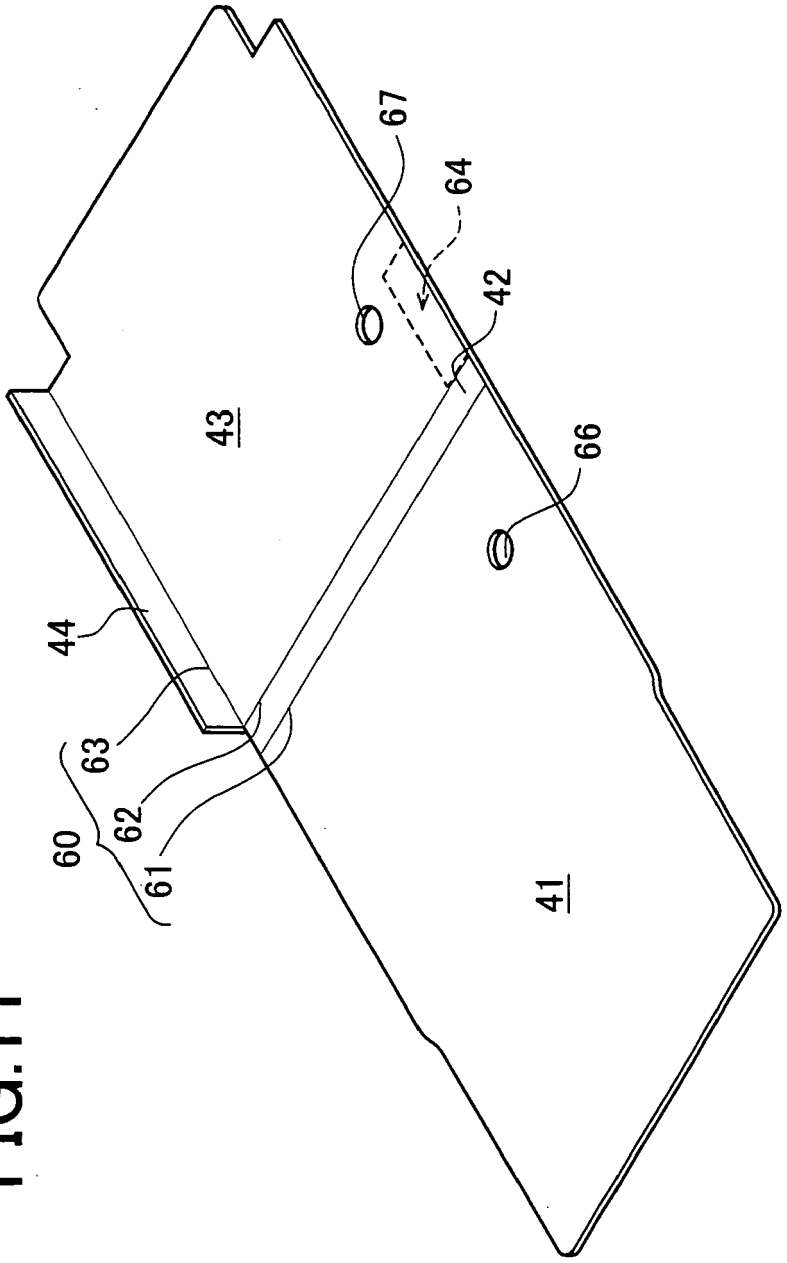


FIG.12

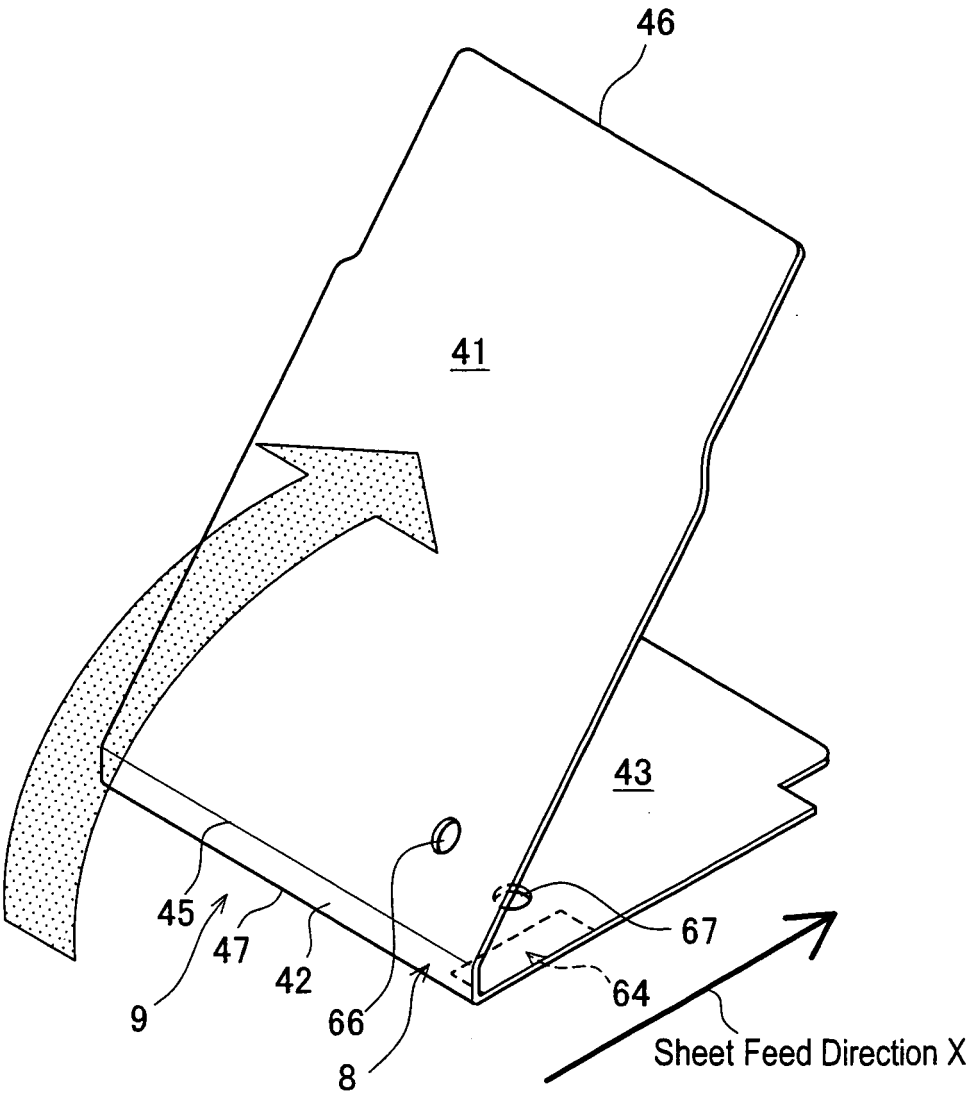


FIG.13

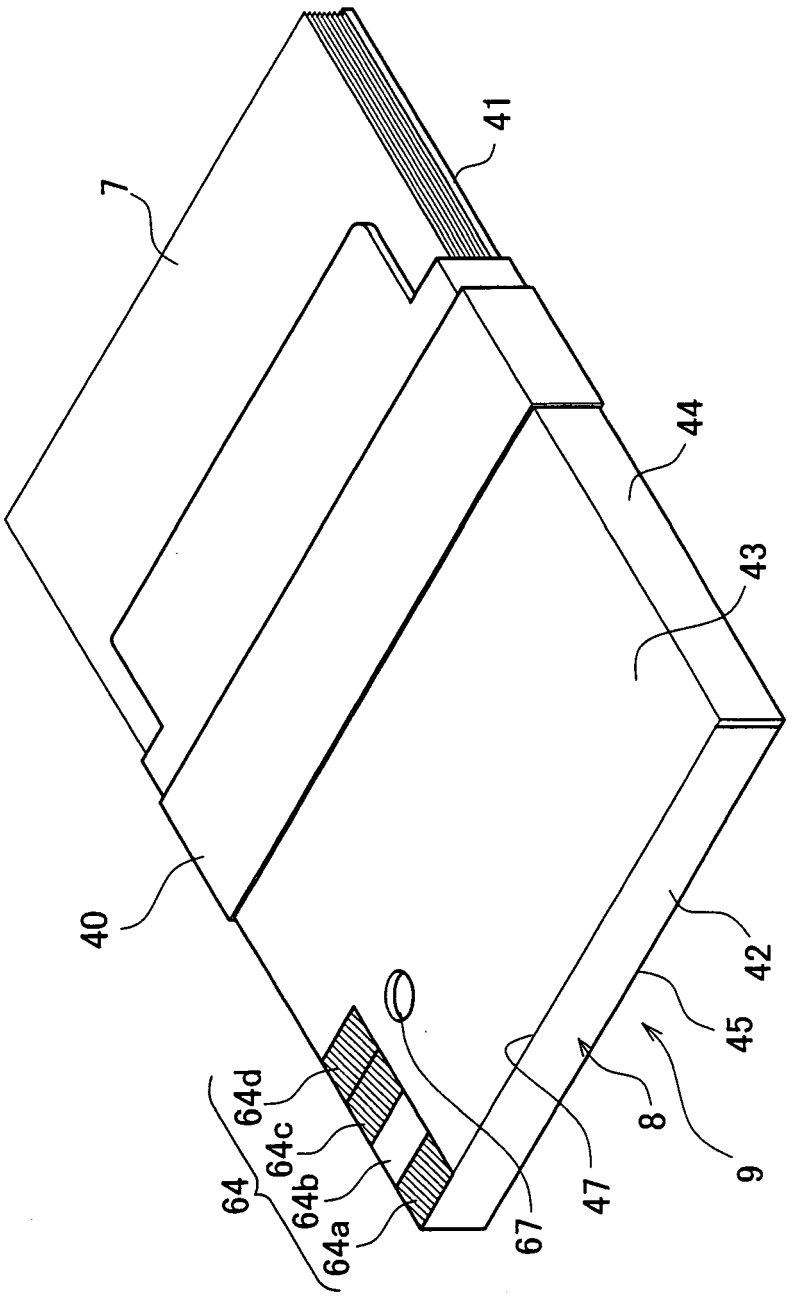
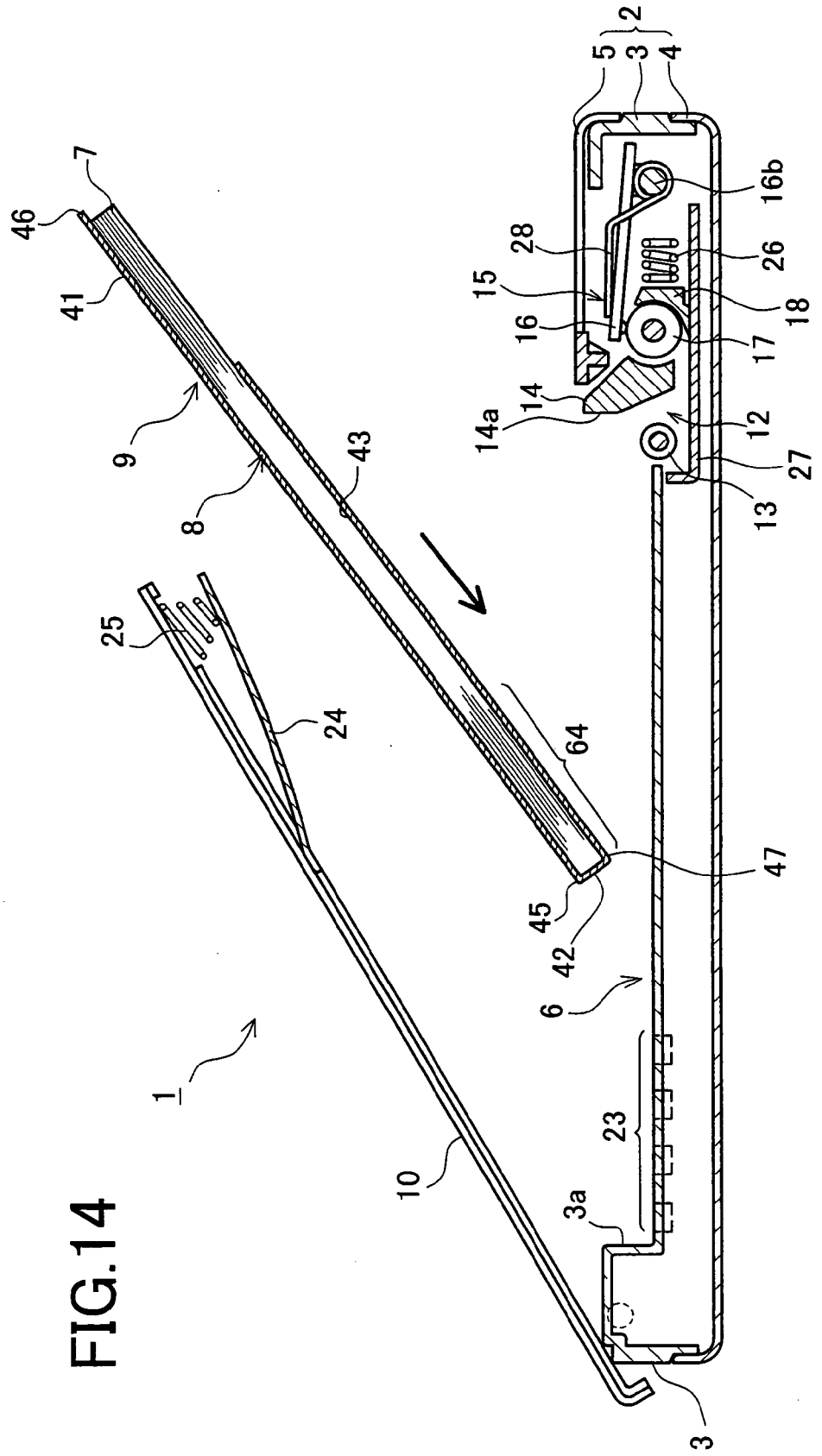


FIG.14


1
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3a
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12
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14a
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16b
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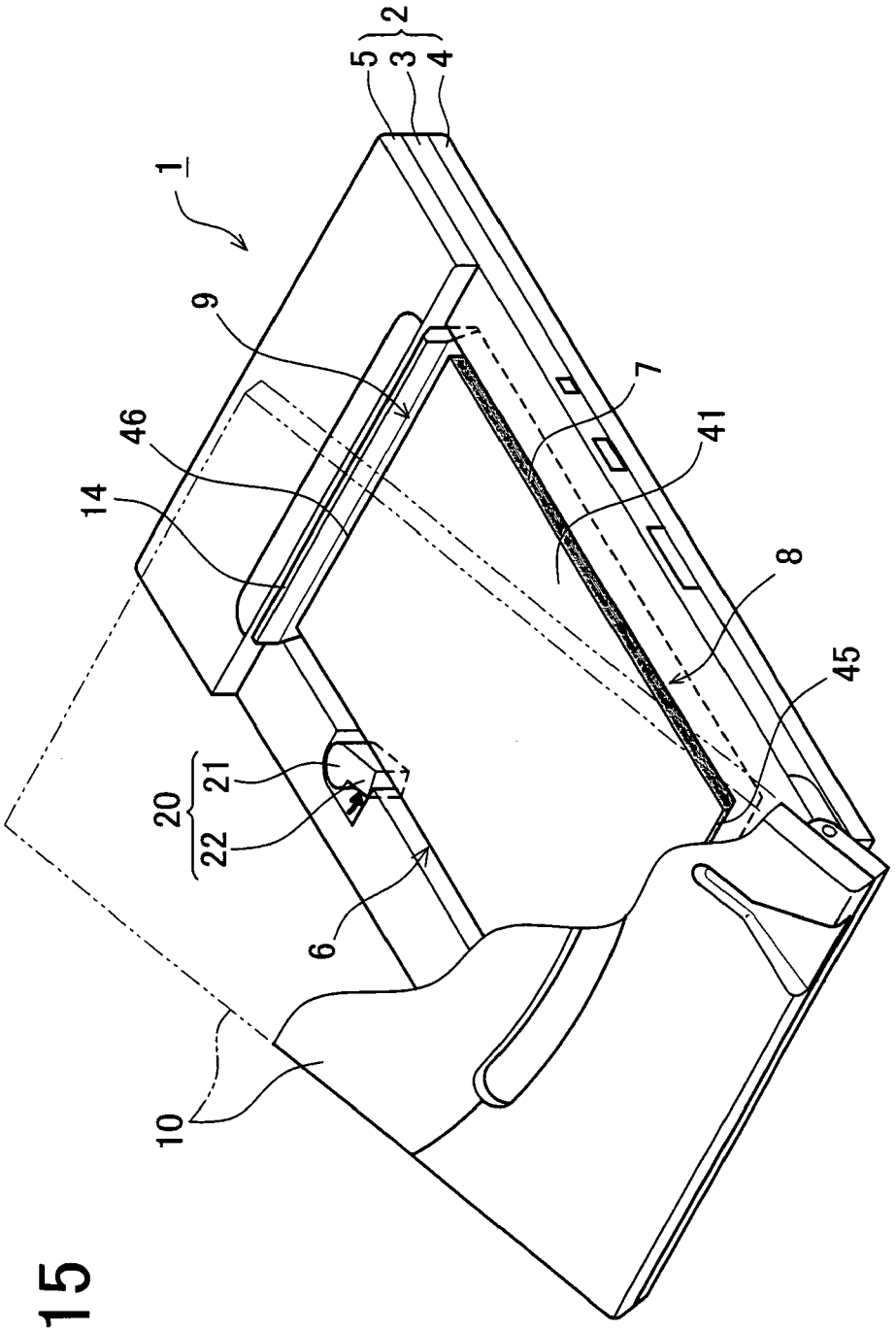


FIG.15

FIG.16

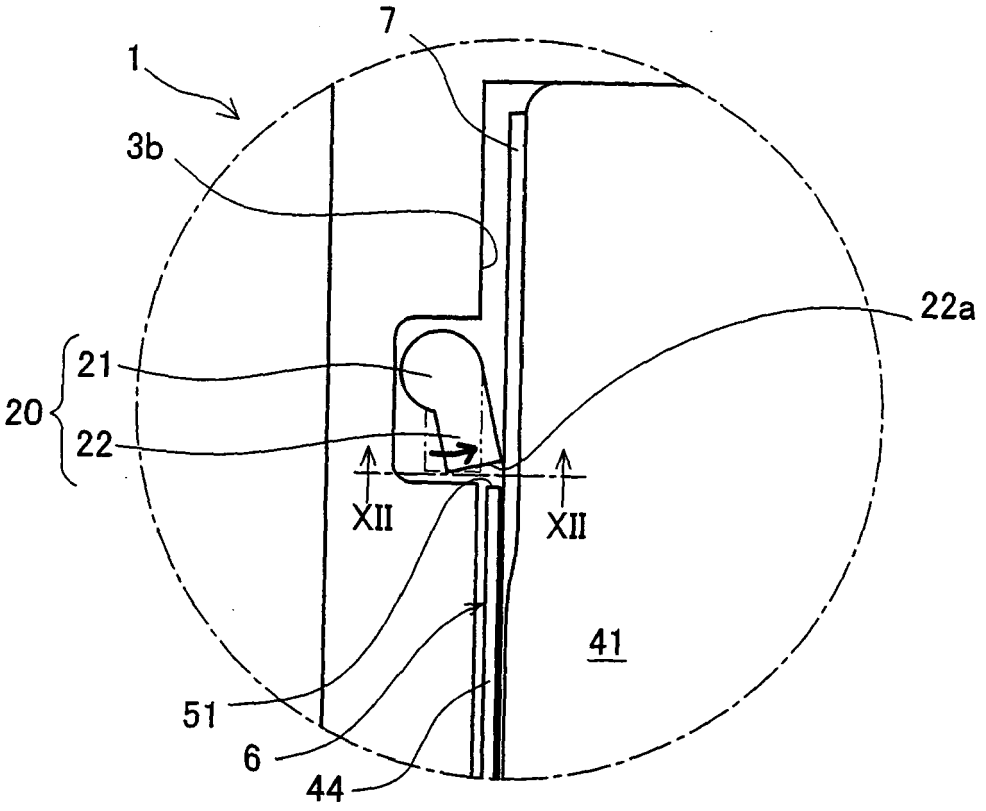


FIG.17

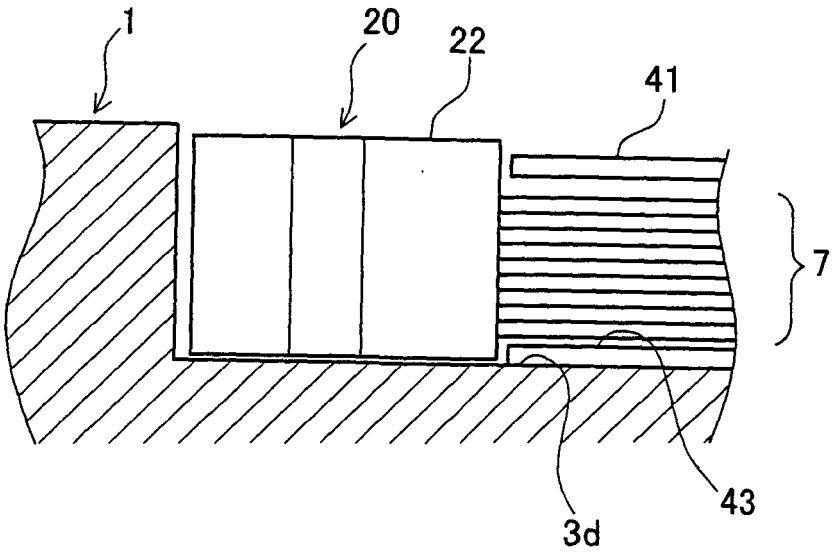
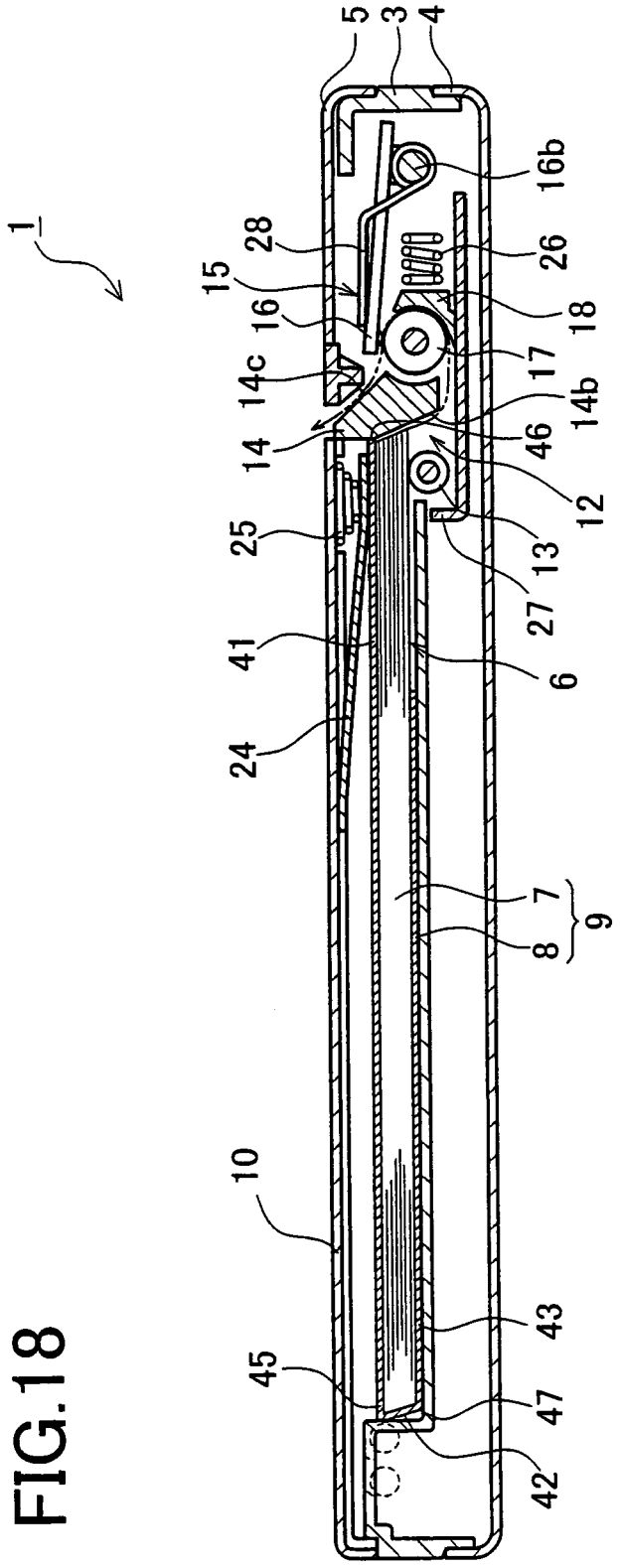


FIG.18


1
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16b
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16
18
14c
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14b
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FIG.19

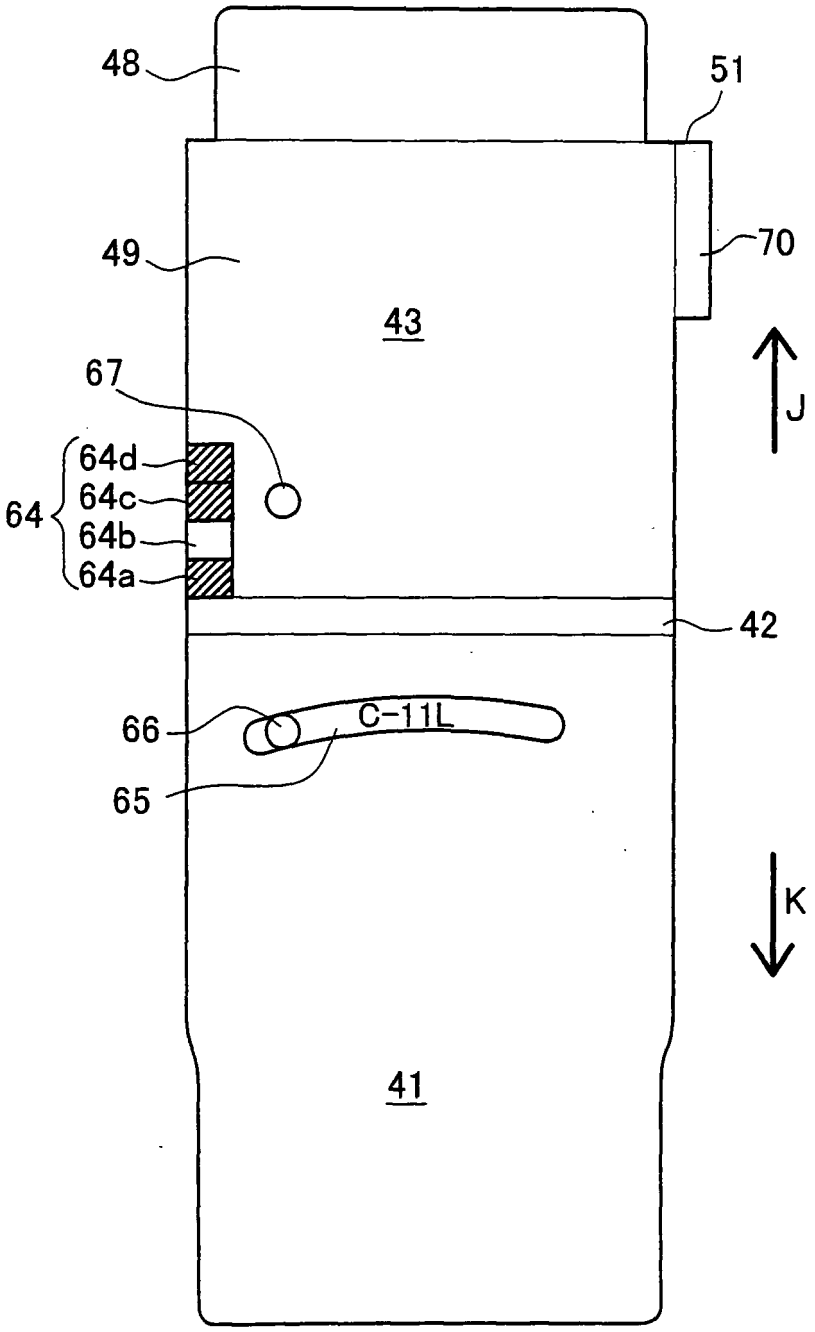


FIG.20

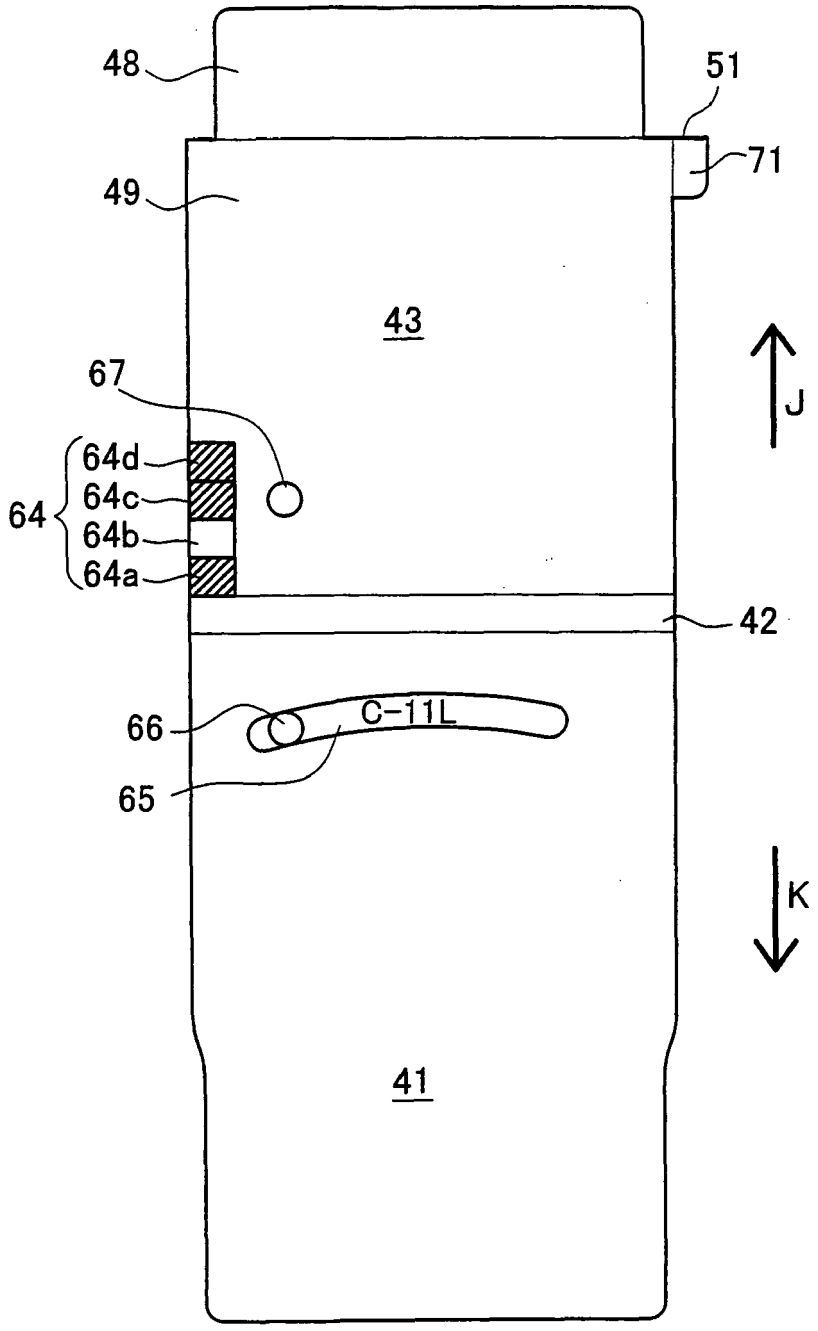


FIG.21

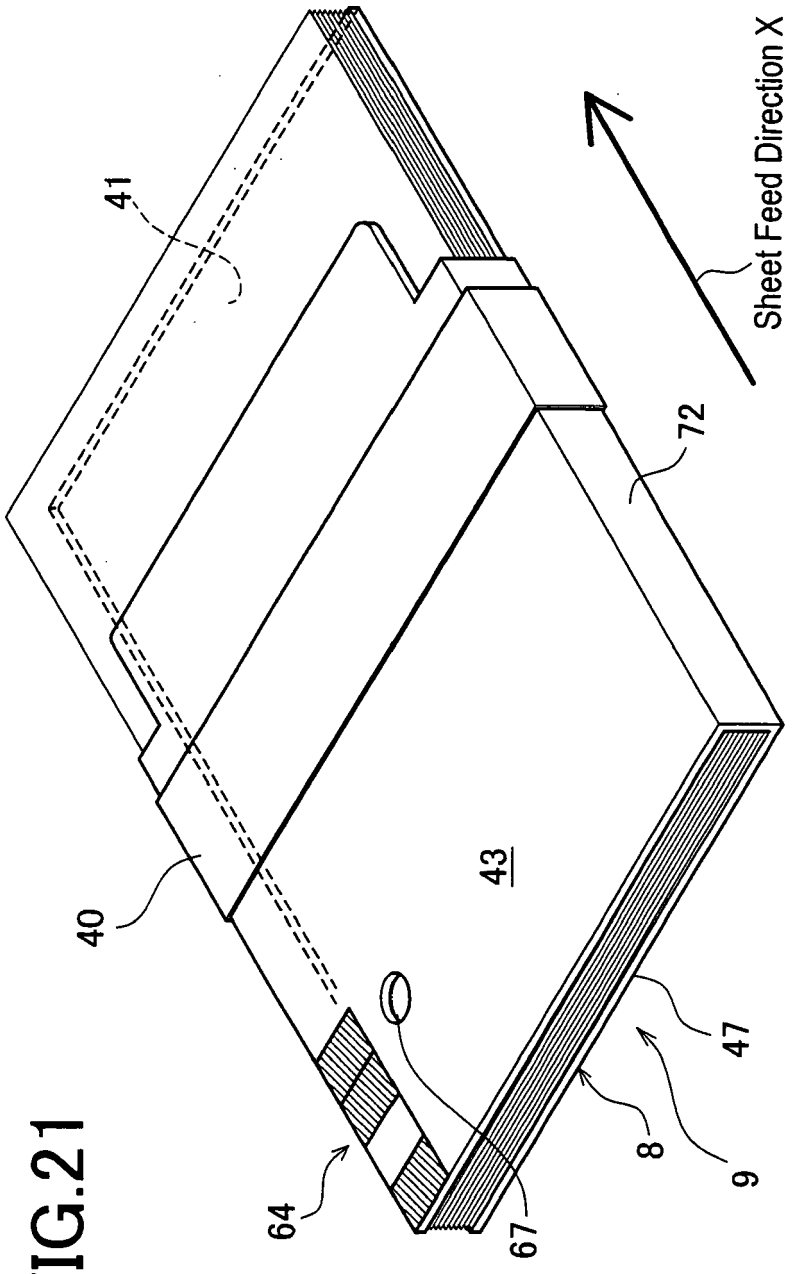
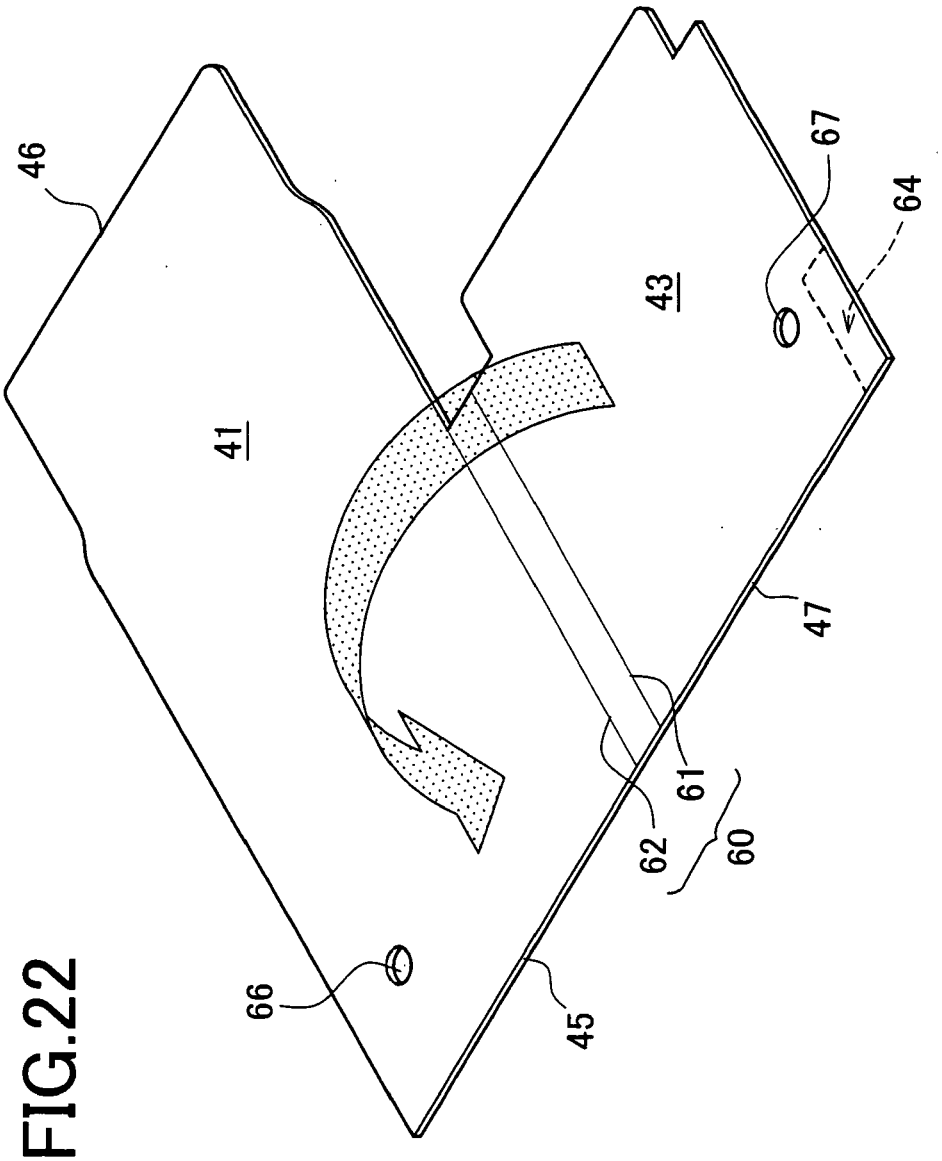


FIG.22



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Patent documents cited in the description

- JP 2005351817 A **[0001]**
- JP 2004210433 A **[0003]**