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(54) Reel for transporting elongate flexible articles

(57) A reel for transporting elongate flexible articles has a pair of discs (1) whose central portions are connected one to another by a hub (11). The reel further has an axial bore (12) formed through and coaxially with of the hub, and at least one narrow gap (4) adapted to hold an identification card (3). The narrow gap or gaps

(4) are formed on an outer side surface of at least one disc (1) and in parallel with the side surface, so that the card (3) can easily be held in its entirety in the gap (4), or held in place at sides and/or corners of the card by the gaps (4).

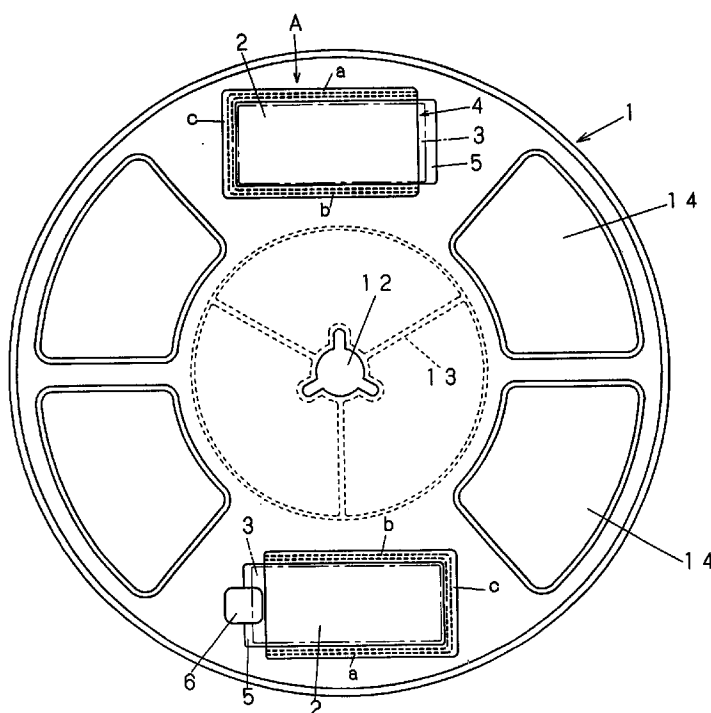


Fig. 1

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Description

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a reel for winding up an elongate flexible article to form a transportable package thereof, wherein the reel comprises a pair of parallel discs connected one to another by a hub or boss, and an axial bore formed centrally of the discs and the hub. A shaft will be inserted in the axial bore so as to support the reel at a station where the elongate flexible article is unwound for use.

2. Prior Art

Labels or the like have been attached to the outer side surfaces of the reels by means of an adhesive, in order to indicate the necessary information hand-written or printed and including the name and/or length of packaged article and the name of manufacturer.

Those reels have generally been reused, or alternatively recycled (after crushed). In such a case, the attached labels have had to be removed manually and using a proper solvent or a detergent together with or without water.

It has however taken a long time and has cost much labor to remove the labels or the like, so that the reuse or recycle of used reels has considerably been uneconomic, as compared with use of new reels or with disposal of used reels. Thus, the waste of resources due to such a disposal, as well as the pollution of water or environment due to the solvent or detergent, have been problems to be resolved.

SUMMARY OF THE INVENTION

An object of the present invention made in view of those problems is to provide a reel of a novel type that, contrary to the prior art practice, any users need no longer to directly paste or stick the labels to the reel adapted to take up an elongate flexible article and forming a transportable package thereof. In other words, the invention intends to make it possible for the users to quickly attach to the reels or detach therefrom the labels or the like in a simpler and easier manner.

From a general aspect, the reel provided herein to transport elongate flexible articles does comprise a pair of discs 1 whose central portions are connected one to another by a hub 11, an axial bore 12 formed through and axially of the hub, and at least one narrow gap 4 adapted to hold an identification card 3, wherein the narrow gap or gaps 4 are formed on an outer side surface of at least one disc 1 and in parallel therewith so that the card 3 is held in its entirety in the gap 4, or held in place at sides and/or corners of the card by the gaps 4. In a first preferred mode of the present invention, two opposite sides 'a' and 'b' or three sides 'a', 'b' and 'c' of

a substantially rectangular and transparent film 2 are fixed to the outer surface at a region thereof where the card is to be held, so that the gap 4 is defined between a back surface of the film and the outer surface of the disc.

In a second preferred mode, the substantially rectangular and transparent film 2 is fixedly adjoined to a backing sheet 82 at the two sides 'a' and 'b' or three sides 'a', 'b' and 'c', and a back surface of the backing sheet 82 is fixed to the outer surface of the disc, so that the gap 4 is defined between a back surface of the film and an outer surface of the backing sheet.

In a third preferred mode, a material of the disc protrudes outwardly from the outer surface thereof, at opposite two sides 'a' and 'b', at four corners 'e', 'f', 'g' and 'h', or at one of the sides and two of the corners, so as to form lugs 32, the sides and corners defining a substantially rectangular area where the card is to be held, wherein each lug 32 has an opening facing a center of the area, and the gap 4 for holding the card 3 is defined between a back surface of the lug 32 and the outer surface of the disc 1.

In a fourth preferred mode, a substantially rectangular shallow recess 5 is formed to receive the card 3 in the outer surface of the disc, and a material of thereof protrudes towards a center of the recess 5, at opposite two sides 'a' and 'b', at four corners 'e', 'f', 'g' and 'h', or at one of the sides and two of the corners, so as to form lugs 32, 42, 52 and/or 62, wherein each lug has an opening facing a center of the recess 5, and the gap 4 for holding the card 3 is defined between a back surface of each lug and the outer surface of the disc 1.

In fifth and sixth preferred modes, each opening respectively provided in the third and fourth modes is formed by cutting a portion of the protruding material.

In use of the reel provided in accordance with the first or second mode as summarized above, the identification card 3 (generally called 'label', including a paper sheet or film) may be inserted into the gap 4 which is defined between the transparent film 2 and the disc 1 or backing sheet 82, through one unclosed side of the rectangle. After the reels have become empty, the cards 3 may be removed out of the gaps in order that each reel may be used again.

Thus, such an easy removal of the cards 3 and the subsequent reuse of the reels are effective to suppress the running cost. Bodies of some reels may be damaged in the course of repeated uses thereof, disabling any reuse. If the transparent film and the backing sheet are made of the same material as the reel body, then the film and the sheet need not be detached from each damaged reel prior to a 'recycle' process including the crushing of used reels. If contrarily the stiff and tenacious film and backing sheet are made of a material different from that from which the reel bodies are made, then each film and each backing sheet will be forced off the reel body. In this case, the films and backing sheets and the reel bodies may be gathered separately and supplied to different recycle routes. However, any sol-

vent and/or detergent need not be used to peel said film and sheet from the reel body. Any expensive sewage treatment to avoid water pollution or any other environmental pollution is no longer necessary, and the ratio of reused or recycled reels to all the used reels will be raised.

In use of the reels provided in the third to sixth modes, two opposite side edges, four corners, or one side edge and two corners of each identification card 3 will be placed in the gaps 4 which are defined each between the lug 32, 42, 52, 62 or 120 and the disc 1 (or between a non-recessed region 22 around recess 5 and the bottom thereof, as will be detailed later). The used reels can be offered for ready reuse or recycle thereof, without carrying out any pretreatment of the reels from which the cards 3 have been removed.

The third and fourth modes are generally adapted for injection molding of the reels from a plastics, whilst the reels may preferably be produced by the so-called blow molding, vacuum molding or the pressing of a raw plastics sheet in the fifth and sixth modes.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a front elevation of a reel provided as Example-1 or -2 in a first embodiment;

Fig. 2 is a central and vertical cross section of the reel shown in Fig. 1;

Fig. 3 is a plan view of a characteristic portion of the reel provided as Example-1;

Fig. 4 is a front elevation of a reel provided as Example-3 or -4 in the first embodiment;

Fig. 5 is an enlarged cross section taken along the line V - V in Fig. 4;

Fig. 6 is a plan view of a characteristic portion of the reel provided as Example-3;

Fig. 7 is an enlarged cross section taken along the line VII - VII in Fig. 4;

Fig. 8 is a front elevation of a reel provided as Example-5 or -6 in the first embodiment;

Fig. 9 is a front elevation of a reel provided as Example-7 or -8 in the first embodiment;

Fig. 10 is a front elevation of a reel provided as Example-9 or -10 in a second embodiment;

Fig. 11 is an enlarged cross section taken along the line IX - IX in Fig. 10;

Fig. 12 is a plan view of a characteristic portion of the reel provided as Example-9;

Fig. 13 is a front elevation of a reel provided as Example-11 or -12 in the second embodiment;

Fig. 14 is a front elevation of a reel provided as Example-13 or -14 in a third embodiment;

Fig. 15 is a rear elevation corresponding to Fig. 13;

Fig. 16 is a central and vertical cross section of the reel shown in Fig. 14;

Fig. 17 is a front elevation of a reel provided as Example-15 or -16 in the third embodiment;

Fig. 18 is a front elevation of a reel provided as Example-17 or -18 in the third embodiment;

Fig. 19 is a front elevation of a reel provided as Example-19 or -20 in the third embodiment;

Fig. 20 is a front elevation of a reel provided as Example-21 or -22 in a fourth embodiment;

Fig. 21 is an enlarged cross section taken along the line VIII - VIII in Fig. 20;

Fig. 22 is a front elevation of a reel provided as Example-23 or -24 in the fourth embodiment;

Fig. 23 is a front elevation of a reel provided as Example-25 or -26 in the fourth embodiment;

Fig. 24 is a front elevation of a reel provided as Example-27 or -28 in the third embodiment;

Fig. 25 is an enlarged cross section taken along the line II - II in Fig. 24;

Fig. 26 is an enlarged cross section taken along the line III - III in Fig. 24;

Fig. 27 is a front elevation of an unfinished reel in Example-29 or -30 of a fifth embodiment;

Fig. 28 is an enlarged cross section taken along the line V - V in Fig. 27;

Fig. 29 is a front elevation of the reel finished in Example-29 or -30;

Fig. 30 is a vertical cross section of the reel finished in Example-29 or -30;

Fig. 31 is a front elevation of an unfinished reel in Example-31 or -32 of a sixth embodiment;

Fig. 32 is a central and vertical cross section of the unfinished reel shown in Fig. 31;

Fig. 33 is a front elevation of the reel finished in Example-31 or -32;

Fig. 34 is a vertical cross section of the finished reel in Example-31 or -32;

Fig. 35 is a front elevation of a reel provided as Example-33 or -34 of the sixth embodiment; and

Fig. 36 is a central and vertical cross section of the reel shown in Fig. 35.

THE PREFERRED EMBODIMENTS

Now, some preferable embodiments will be described, making reference to the accompanying drawings.

The term 'reel for transportation of elongate flexible articles' used herein denotes a reel other than those which are used to wind up a fishing yarn, a textile yarn or the like. A body of the reel provided by the present invention may comprise a pair of parallel discs 1 formed to be of the same or similar shape and subsequently connected one to another by a hub 11. Alternatively, the discs 1 and the hub 11 may be formed integrally with each other. A transparent film 2 is of a transparency such that the letters, symbols and/or figures hand-written or printed on an identification card 3 can be seen through the film covering the card.

In all the figures of the drawings, each disc 1 as one part of the reel body is illustrated to have two card holding areas 'A' of different types and located opposite to each other. However, each reel may have only one card

holding area 'A', or three or more areas 'A' of the same type.

Figs. 1 - 3 show a reel provided as Example-1 and -2, in which Fig. 1 is a front elevation of a disc 1 as the part of the reel body molded of a plastics, and Fig. 2 is a cross section of said disc. Fig. 3 is a plan view of a film 2 employed in Example-1 and -2.

The disc 1 has a central axial bore 12 for receiving a shaft not shown. Ribs 13 extend radially from the bore at regular angular intervals so as to be integral with and support a hub 11. Four windows 14 forms two groups each consisting of two of them and arranged symmetrically with respect to the vertical center line in Fig. 1. The thickness of disc 1 is usually 1 - 2 mm for economy of materials, though variable depending on certain conditions.

In Example-1 shown at the upper part of Fig. 1, a flat and shallow recess 5 of a thickness of 0.3 - 1 mm is formed in the outer side surface of the disc 1. The surface area of this recess 5 is such that an identification card (shown by the dot-and-dash in Fig. 1) fits therein. A rectangular transparent film 2 almost covers the recess 5, except for the right margin thereof as shown in Fig. 1. In detail, two opposite sides 'a' and 'b' and another side 'c' perpendicular thereto of the film 1 are affixed to the other margins of the recess, using a high-frequency welder or the like, so that the film 2 is flat and flush with the outer surface of the disc. A gap 4 for receiving the card 3 is defined between the back surface of the film 2 and the bottom of the recess 5.

The card 3 held in the gap 4 will be protected from slipping off sideways (to the right in Fig. 1), since its right margin will stop the right edge of said card moving to the right. When removing the card 3 from the used reel, the card's right end may be lifted a little by means of a pen or the like so as to be picked and pulled with user's fingers.

The lower part of Fig. 1 illustrates Example-2 shown right-side left. An aperture 6 is formed through the disc, at a middle region of the entrance to (viz. left-hand margin of) the recess 5. The user's fingers can pick the card's left end, through this aperture 6, so as to more easily pull the card out of the gap.

A U-shaped cutout 7 is formed through a middle region of one shorter side of the rectangular transparent film 2, in Example-3 shown at the upper part of Fig. 4 and in Figs. 6 - 7. The longer side 'a', 'b' and the other shorter side 'c' of the film are affixed to the outer surface of the disc 1, and a central area surrounded by those sides 'a' to 'c' is lifted a height of about 0.5 mm above said outer surface. The gap 4 for holding the card is defined between the film's central area and the disc.

In Example-4 shown at the lower part of Fig. 4 and in Fig. 7, band-shaped zones 10 to which the sides of the film 2 are to be affixed protrude 0.3 - 1 mm from the outer side surface of the disc. The film spanning those zones 10 is flush with said outer surface of the disc so as to provide the gap 4 between the film and the disc. An aperture 6 penetrating the disc and a U-shaped cut-

out 7 of one side of the film are similar to those in the described Examples.

In Example-5 illustrated at the upper part of Fig. 8, the film 2 covers the recess 5, except for its vertical shorter sides and portions adjacent thereto. Only the opposite horizontal sides of the film are affixed to the disc. In this case, the card 3 can be inserted in the gap 4 to the left or right.

Example-6 illustrated at the lower part of Fig. 8 is characterized by an extension 5a of the recess 5. This extension 5a corresponds to the U-shaped cutout 7 formed through the middle portion of the side 'c' of the transparent film 2. The user can push to the left the inner end of card 3, to smoothly remove it from the gap.

Example-7 illustrated at the upper part of Fig. 9 is characterized by straight ribs 9. One of those ribs protruding outwardly of the disc is disposed close to one vertical margin of the card holding area 'A'. The other rib 9 is located apart a little from the other vertical margin. The central area of the film 2 between the opposite upper and lower side 'a' and 'b' is lifted 0.5 mm above said outer surface, similarly to Example-3. The ribs protect the card from slipping off sideways, though only two sides 'a' and 'b' are rigidly stuck to the disc.

Example-8 shown at the lower part of Fig. 9 is a modification of Example-7. A right-hand vertical side 'c' of the transparent film 2 has a U-shaped cutout 7, and the other vertical side of said film faces the right edge of a small recess 8. This recess 8 substitutes for aperture 6 formed in the foregoing Examples. The cutout 7 may be utilized to push the right end of card 3, with the small recess 8 serving for an easier picking of said card.

Figs. 10 - 13 show a second embodiment of the present invention. A card holder employed in this embodiment comprises a backing sheet 82 made of a proper material. The two opposite sides 'a' and 'b' or three sides further including another side 'c' are affixed to the backing sheet 82. The card holder is thus a double-sheet member or a flat thin bag 20.

In Example-9 shown in the upper part of Fig. 10 and in Figs. 11 and 12, the transparent film 2 serving as the outer surface of the bag has at its one shorter side a U-shaped cutout 7. The longer sides 'a' and 'b' and the other shorter side 'c' are welded to the corresponding portions of the backing sheet 82, which is made of the same material as the film, so as to provide the card holding area 'A'. The back surfaces of four sides 'a' to 'd' of the backing sheet 82 are also welded to the disc surface (or simply pressed thereto if a pressure-sensitive adhesive is previously applied to said back surfaces). As seen in Fig. 11, the gap 4 for holding the card in this case is thus previously defined, or will appear in use, between the film 2 and the sheet 82.

Example-10 shown at the lower part of Fig. 10 is characterized by the U-shaped cutouts 7 and 7a that are respectively formed in the film 2 and sheet 82 and coincide one with another in their location. An aperture 6 penetrating the disc 1 corresponds to the cutouts 7

and 7a, and cooperates therewith when the card 3 is smoothly taken out of the bag.

The U-shaped cutout 7 involved in Example-11 shown at the upper part of Fig. 13 is not located at the entrance of the gap but at an innermost region of the film 2. The card can be pushed towards the entrance, for an easier removal.

The transparent film 2 in Example-12 shown at the lower part of Fig. 13 has no cutout 7, contrarily to that employed in Example-11. An outer edge of the card 3 inserted in the gap does neither close fully the cutout 7a of the backing sheet 82 nor cover the aperture 6 of the disc.

Figs. 14 - 19 show a third embodiment of the present invention.

In Example-13 shown at the upper part of Fig. 14, a card holding area 'A' of a rectangular shape is defined by two elongate lugs 32. Those lugs extend along the horizontal sides 'a' and 'b' to cover all the four corners 'e', 'f', 'g' and 'h' of the rectangle. A distance from the back surface of each lug 32 and the outer surface of the disc 1 is designed to be 0.3 - 1 mm. As seen in Fig. 15, two elongate cavities 2v are present through the disc, due to the molding process for forming the lugs 32. Thus, a gap is provided between the back surface of each elongate lug and the outer surface of the disc 1. Each gap 4 has an opening facing the center of said area 'A', so that the card attached to this area can be held at its side edges in the opposite gaps.

In detail, each of the upper and lower sides of the card 3 will engage with the gap 4 and be guided therealong until taking a normal position on said area 'A'. The thus inserted card 3 is protected over the full length of each of its opposite horizontal sides extending between the two proximal corners, not to slip off during use. One of the vertical sides of this card 3 may be lifted using a pen or the like and picked up with the user's fingers, after the reel is used.

The reel provided in Example-14 shown at the lower part of Fig. 14 is manufactured using a split die, so that no voids 2v shown at the upper part of Fig. 15 are produced in this case. Dimples 16 somewhat elongate are formed in parallel with the horizontal lugs 32. The user may put his or her fingernail in the dimple 16 so as to easily pick the edge of the card which has to be removed from the used reel.

Example-15 shown at the upper part of Fig. 17 is different from Example 13 in that the right-hand ends of the lugs 32 are replaced with a vertical rib 18 spaced a little from the right-hand corners 'g' and 'h' located at the entrance of area 'A'. An aperture 6 somewhat elongate along the lugs is formed through the disc, between the left-hand corners 'e' and 'f' of said area. The rib 18 allows the card to be pushed to the left in between the lugs 32. The aperture 6 is useful for the user's finger to push the card back over the rib, when removing the card from the reel.

Example-16 shown at the lower part of Fig. 17 is characterized by the pent-roof-shaped lugs 32 not cov-

ering the corners 'e' - 'h', in contrast with those involved in Example-13. Vertical ribs 18 are disposed near and outside the respective ends of the lugs. The rib 18 over which the card moves toward and away from the card holding area is intercepted with an aperture 6, which is useful for the user's finger to pick the card's end out of said area.

In Example-17 shown at the upper part of Fig. 18, four right-angled triangular lugs 32 are formed corresponding to four corners 'e' - 'h' of an imaginary rectangular area as the card holding area. The hypotenuse of each triangular lug 32 face the center of said area. A finger hole 6 is formed through the disc at its portion located intermediate the upper corners 'e' and 'g'. In order to take off the card whose corners are clipped by the triangular lugs 32, the user may insert his or her finger in the hole so as to forcibly pick up the upper middle portion of said card.

In Example-18 illustrated at the lower part of Fig. 18, two right-angled triangular lugs 32 and one straight and elongate lug 32 like those in Example-13 are formed on the disc. The elongate lug corresponds to one side (viz. upper side in Fig. 18) of the imaginary rectangle, with the triangular lugs corresponding to the two corners 'e' and 'g'. In this case, the card 3 is held in place at its lower side (viz. upper side in Fig. 18) and at its upper corners, by the three lugs.

Example-19 illustrated at the upper part of Fig. 19 is a reel which has the card holding area 'A' defined between a left-hand vertical side 'a' and two corners 'g' and 'h', between which a right-hand vertical side extends. The former side is covered by an elongate lug 32 and the corners are covered by triangular lugs 32. An aperture 6 located intermediate the triangular lugs penetrates the disc.

In Example-20 shown at the lower part of Fig. 19, the triangular lugs 32 at the right-hand side 'b' is replaced by two elongate lugs separated by the aperture 6.

Figs. 20 to 26 show a fourth embodiment in which the area for holding the card 3 is recessed from the outer surface of the disc.

The reel provided in Example-21 shown at the upper part of Fig. 20 and Fig. 21 has a shallow recess 5 elongate sideways and having a depth corresponding to about two thirds of the thickness of disc. Upper lugs 42 extending along the upper side 'a' of the card holding area 'A' are separated by a middle aperture 6. A lower lug 42 extend over the full length of the lower side 'b'. The lugs are of a thickness equal to about one third of the thickness of disc. The gaps 4 are defined each between the back surface of the lug 42 and the bottom of the recess. The outer surfaces of those lugs 42 are flush with that of the disc, so that the card 3 held by the gaps 4 is protected from colliding with any foreign obstacle, so as not to slip off.

In Example-22 shown at the lower part of Fig. 20, a recess 5 about 0.3 - 1 mm deep has opposite margins along the upper and lower sides 'a' and 'b'. Pent-roof-

shaped lugs 32 extending in parallel with the outer surface of disc are formed to cover the margins, and an elongate aperture 6 extends along and between the pent-roof-shaped lugs.

Example-23 shown at the upper part of Fig. 22 also comprises the pent-roof-shaped lugs 32 similar to those in Example-22. However, the lugs in this Example do not cover the right-hand ends of the upper and lower side 'a' and 'b'. Apertures 6 each disposed between the lugs respectively extend across the right and left margins of the shallow recess 5. In Example-24 shown at the lower part of Fig 22, no corners are covered by the lugs 32 which are also pent-roof shaped in side elevation of the reel.

In Example-25 shown at the upper part of Fig 23, short lugs 32 cover four corners 'e' - 'h' of a recess 5, and an aperture 6 is located near the right-hand margin of this recess. The aperture 6 has edges located outside the recess 5 and reinforced with ribs 19, respectively. Example-26 shown at the lower part of Fig. 23 is a modification of Example-25, wherein two parallel lugs 32 fully cover the left- and right-hand margins of recess 5, and are located symmetrical with respect to the middle aperture 6. This aperture is also accompanied by the reinforcement ribs 19 similar to those in Example-25.

In Example-27 shown at the upper part of Fig 24 and in Fig. 25, a recess 5 is of a depth equal to about two thirds of the thickness of disc. Lugs 42 separated by a middle aperture 6 extend the full length of right side margin 'b' of the recess. Each lug 42 is of a thickness equal to one third of said disc thickness. Nail-shaped lugs 52 protruding from the left side margin 'a' towards the recess center are disposed up and down and symmetrically with each other. All the outer surfaces of those lugs 42 and 52 are flush with that of this disc. As seen in Fig. 25, the nail-shaped lugs 52 have ends bent to be of a reversed J-shape to grip the card 3, in such a manner as if they were paper clips.

Example-28, which is a modification of Example-27, is shown at the lower part of Fig. 24 and in Fig. 26 comprises nail-shaped lugs 62 also having ends of a reversed J-shape. The depth of the recess 5 is however one third of the disc thickness. Substantially triangular lugs 32 cover the corners 'g' and 'h' of the left side 'b' of said recess. The nail-shaped lugs 62 are disposed proximal the other corners of the right side 'a'. The back surfaces of those lugs 32 and 62 are flush with the outer surface of this disc. Apertures 6 formed through said disc are located adjacent to the respective triangular lugs 32.

Figs. 27 - 30 show a fifth embodiment of the present invention, wherein bulges of a plastics sheet have outer surfaces which define the outer surface of disc 1. In Example-29 of this embodiment is shown at the upper part of Fig. 27, the plane plastics sheet 1- 2 mm thick has been heated and blow-molded (alternatively, vacuum-molded or pressed) to provide the disc 1. The bulges of this plastics sheet are: a round central portion

13a surrounding a core portion 12a (which will be opened later to serve as the axial bore for receiving the shaft not shown); a circular rib 13b surrounding the central portion 13a and having a back annular groove 11a integral with said rib; straight and radial ribs 13c extending outwardly from the circular rib 13b; annular and outer segments 13d disposed outside the card holding area 'A' so as to form as a whole the outer periphery of this disc; and four sectors 14a disposed side by side and between the circular rib 13b and the annular segments. Four triangular lugs 120 cover the four corners 'e' - 'h' of the rectangular area 'A', such that the back surface of each lug 120 is 0.3 - 1 mm high from the non-bulged regions of this plastics sheet. The hypotenuse 21 of each triangular lug 120 faces the center of said area 'A'.

Each hypotenuse 21 is cut off the sheet to provide an opening 21a, such that four gaps 4 are formed behind the triangular lugs 120. Four corners of the card 3 will be inserted in the respective gaps 4, as indicated by the dot-and-dash in Fig. 29. In addition, the bottom of the core portion 12a is cut off the sheet to provide the axial bore 12, and tops of the bulged sectors 14a are also removed to form the windows 14.

The discs 1 each prepared as described above will then be arranged into a back-to-back position, with a hub 11 being inserted into the annular grooves 11a formed behind the circular ribs 13b, to thereby provide a finished reel shown in Fig. 30.

The lower part of Fig. 27 shows Example-30, in which two lugs 120 facing one another and toward the center of the card holding area 'A' are formed on and along the left and right sides 'a' and 'b' of said 'A'. The back surface of each lug 120 is 0.3 - 1 mm high from the non-bulged sheet surface. Each lug 120 has a bulged wall 21 perpendicular to the disc surface and of a U-shape in front elevation. This wall 21 will be cut off the sheet to provide an opening 21a, such that a gap 4 facing the center of said area 'A' is formed between the back surface of said lug 120 and the non-bulged surface of this disc. Two vertical sides of the card 3 will be inserted in those gaps 4, with two horizontal sides of said card being interposed between and guarded by an elongate upper and lower ribs 18, in a manner also indicated by the dot-and-dash.

Figs. 31 - 36 show a sixth embodiment of the present invention, wherein necessary regions of a plastics sheet are recessed towards the back surface thereof. In Example-31 shown at the upper part of Fig. 31, the plastics sheet 1 - 2 mm thick has been blow-molded to form a raw disc. This disc comprises: a round central portion 13b surrounding a core portion 13a (which will be opened later to serve as the axial bore for receiving the shaft not shown); straight and radial ribs 13c extending outwardly from the central portion 13b; a substantially rectangular rib 13d surrounding the card holding area 'A'; and four sectors 14a disposed side by side and between the central portion 13b and the periphery of the raw disc. A shallow rectangular recess

5 is surrounded by the rectangular rib 13d. All of the portions, ribs and sectors, viz. 13b, 13c, 13d and 14a, are recessed towards the back surface of the raw disc as will be seen in Fig. 32. Four small triangular regions 22 remain unrecessed, in such a state that the four corners 'e' - 'h' of the recess 5 serving as the rectangular area 'A' are each 'chamfered'. The recess 5 is 0.3 - 1 mm deep from the unrecessed outer surface this plastics sheet.

Each triangular region 22 has a hypotenuse 21 which faces the center of said recess 5 and continues to a wall 23 perpendicular to the disc surface. Each hypotenuse wall 23 is cut off the sheet to provide an opening 21a as shown in Figs. 29 and 30 referred to above, such that four gaps 4 are formed behind the triangular regions 22. Four corners of the card 3 will be inserted in the respective gaps 4, similarly to those in the already described Examples. In addition, a round center of the core portion 13a is cut off 12 is severed from the sheet to provide the axial bore 12, and bottoms of the recessed sectors 14a are also removed to form the windows 14.

The discs 1 each prepared as described above will then be arranged into a back-to-back position, so that the round central portions 13b each surrounding the core portion 13a are fixed to each other to provide a single and integral hub 11 in a finished reel.

In Example-32 shown at the lower part of Fig. 31, a substantially rectangular recess 5 is recessed a depth greater than the thickness of the raw sheet. Middle regions 22 of the left- and right-hand sides 'a' and 'b' of this recess have each a U-shaped wall 23 perpendicular to the sheet and facing the center of car holding area 'A'. Those walls 23 are subsequently cut out of the sheet to provide openings 21a shown in Figs. 33 and 34, so that the opposite sides of the card 3 are held in gaps 4 each defined behind the unsevered middle regions 22.

Example-33 shown at the upper part of Fig. 35 and in Fig. 36 is a modification of Example-31, wherein the four triangular regions 22 remaining unrecessed in Example-31 are replaced by four small rectangular regions 22 respectively coinciding with the four corners 'e' - 'h' of the recess 5 serving as the rectangular area 'A'. The walls 23 each defining the small rectangular region 22 is also cut off to provide an opening 21a. The gaps 4 are thus formed each behind the remaining top of said small rectangular region 22, to engage with the corners of the card 3. A rectangular aperture 6 is opened through this disc, across the lower side of area 'A' and intermediate the lower corners 'f' and 'h'.

A shallow round recess 12a is formed inside and coaxially with the recessed core portion 13a in this case. The bottom of the recess 12a and the bottom of each recessed sector 14a are cut off at the same time as the severing of the walls 23, so as to provide the axial bore 12 and windows 14, respectively.

Example-34 shown at the lower part of Fig. 35 is a modification of Example-32, wherein the two middle regions 22 of the left- and right-hand sides 'a' and 'b' in the latter Example are herein replaced by four small rec-

tangular regions 22 spaced a little from the corresponding corners in the also substantially rectangular recess 5. The walls 23 each defining the small rectangular region 22 are also cut off to provide an opening 21a, as indicated by the dot-and-dash. The gaps 4 are thus formed each behind the remaining top of said small rectangular region 22, to engage with the corners of the card 3. Two rectangular apertures 6 are opened through this disc, respectively across the left and right sides of area 'A'.

In summary, the identification card can easily be placed and stably held in and be readily removed out of the gap. This gap is defined between the transparent film and the disc surface, or between said film and the backing sheet secured to said disc surface, in accordance with the first and second embodiments. Therefore, it is now possible to reuse the reels many times until they are broken or damaged to disable the reuse. The damaged reels will be discharged to a recycle process, after the films and sheets are separated from the reel bodies made of different materials. In a case wherein the film, sheet and reel bodies are made of the same material, they need not be separated from each other before put in the recycle process. Such a reuse and/or recycle of the used reels realizes an economy of resources, lowers the running cost of reels and avoids environmental pollution.

The gaps formed integral with the disc as the part of reel body in the third to sixth embodiments are not only useful to removably hold the card but also diminishes the labor cost and drawbacks which might be incurred by the transparent films and backing sheets affixed to the reel bodies.

Claims

1. A reel for transporting elongate flexible articles, the reel comprising:
 - a pair of discs 1 whose central portions are connected one to another by a hub 11;
 - an axial bore 12 formed through and axially of the hub; and
 - at least one narrow gap 4 adapted to hold an identification card 3, wherein the narrow gap or gaps 4 are formed on an outer side surface of at least one disc 1 and in parallel therewith so that the card 3 is held in its entirety in the gap 4, or held in place at sides and/or corners of the card by the gaps 4.
2. A reel as defined in claim 1, wherein two opposite sides 'a' and 'b' or three sides 'a', 'b' and 'c' of a substantially rectangular and transparent film 2 are fixed to the outer surface at a region thereof where the card is to be held, so that the gap 4 is defined between a back surface of the film and the outer surface of the disc.

3. A reel as defined in claim 1, wherein a substantially rectangular and transparent film 2 is fixedly adjoined to a backing sheet 82 at the two sides 'a' and 'b' or three sides 'a', 'b' and 'c', and a back surface of the backing sheet 82 is fixed to the outer surface of the disc, so that the gap 4 is defined between a back surface of the film and an outer surface of the backing sheet. 5
4. A reel as defined in claim 1, wherein a material of the disc protrudes outwardly from the outer surface thereof, at opposite two sides 'a' and 'b', at four corners 'e', 'f', 'g' and 'h', or at one of the sides and two of the corners, so as to form lugs 32, the sides and corners defining a substantially rectangular area where the card is to be held, wherein each lug 32 has an opening facing a center of the area, and the gap 4 for holding the card 3 is defined between a back surface of the lug 32 and the outer surface of the disc 1. 10 15 20
5. A reel as defined in claim 1, wherein a substantially rectangular shallow recess 5 is formed to receive the card 3 in the outer surface of the disc, and a material of thereof protrudes towards a center of the recess 5, at opposite two sides 'a' and 'b', at four corners 'e', 'f', 'g' and 'h', or at one of the sides and two of the corners, so as to form lugs 32, 42, 52 and/or 62, wherein each lug has an opening facing a center of the recess 5, and the gap 4 for holding the card 3 is defined between a back surface of each lug and the outer surface of the disc 1. 25 30
6. A reel as defined in claim 4 or 5, wherein each opening is formed by cutting a portion of the protruding material. 35

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Fig. 1

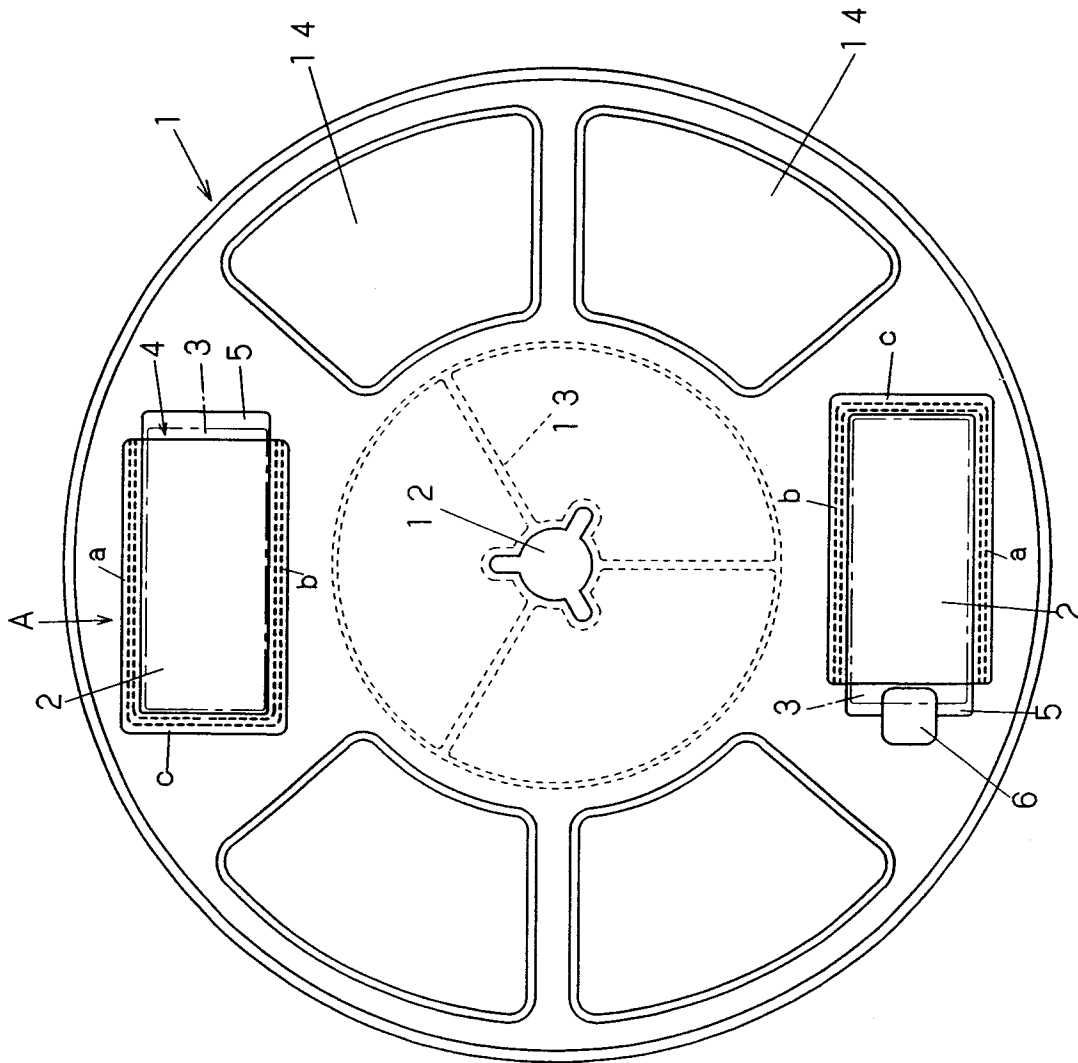


Fig. 2

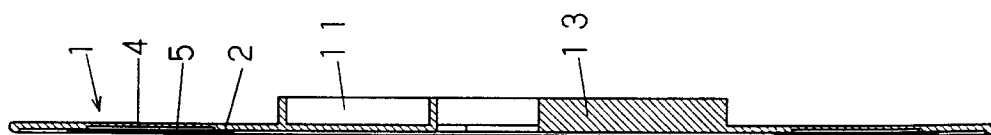


Fig. 3

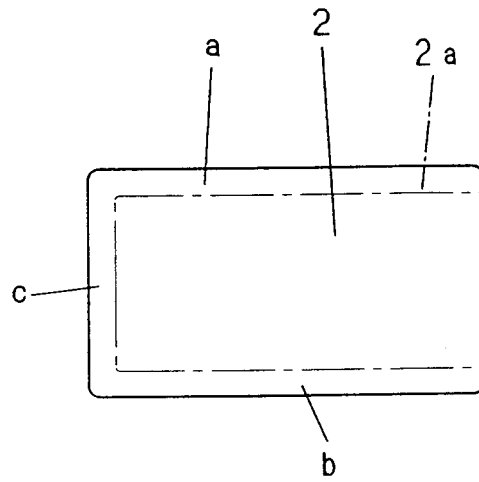


Fig. 6

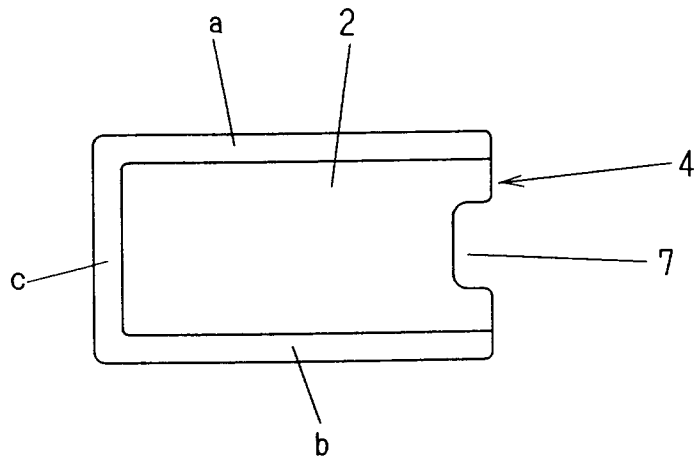
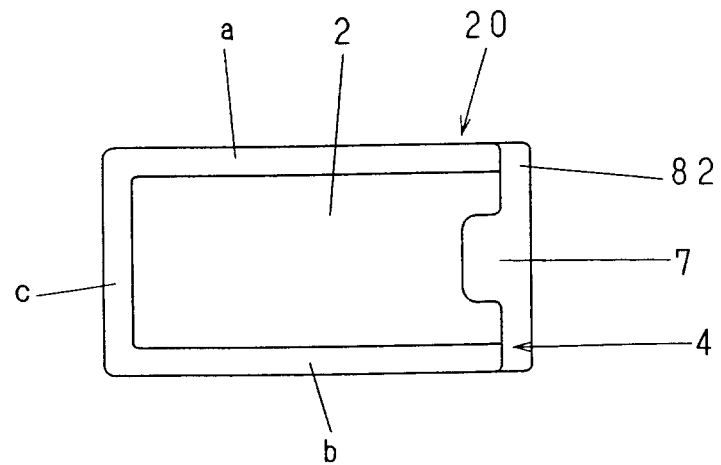
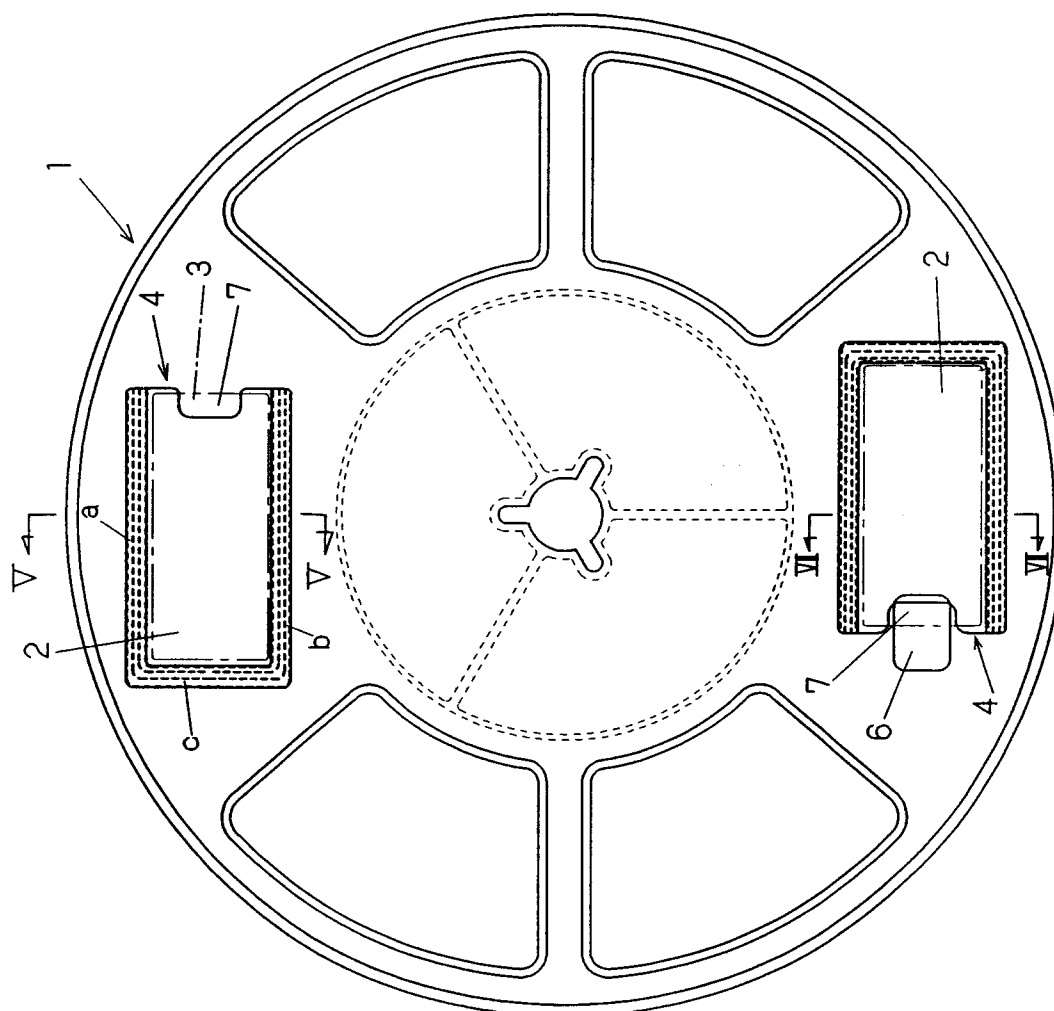


Fig. 12



F i g . 4



F i g . 5

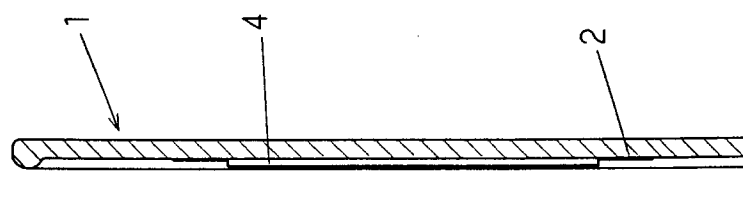
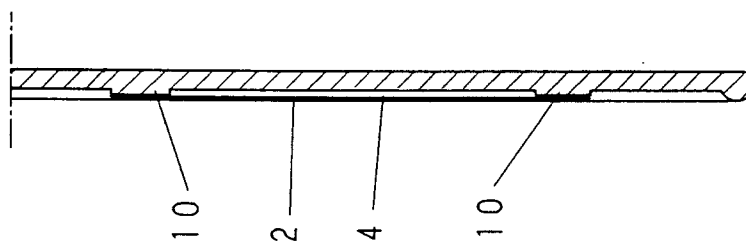


Fig. 7



F i g . 8

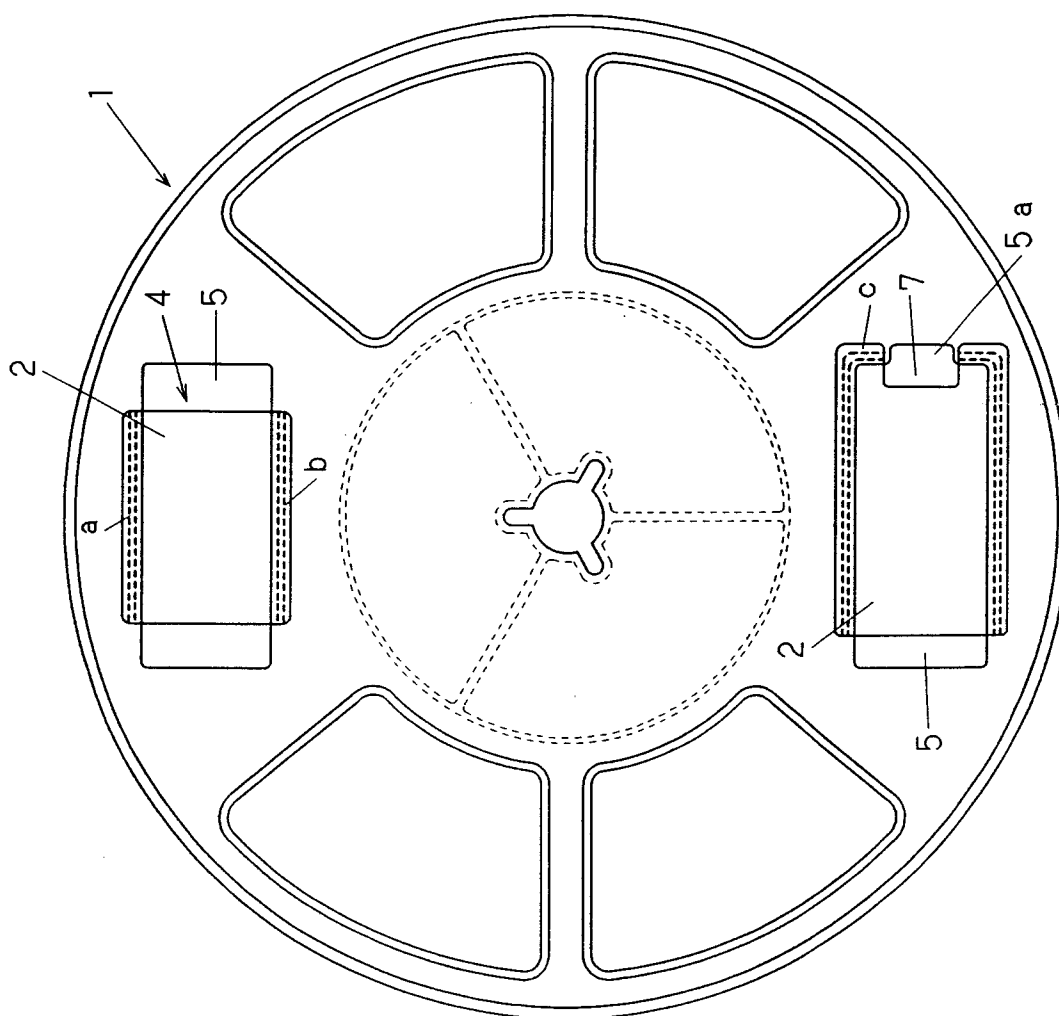


Fig. 9

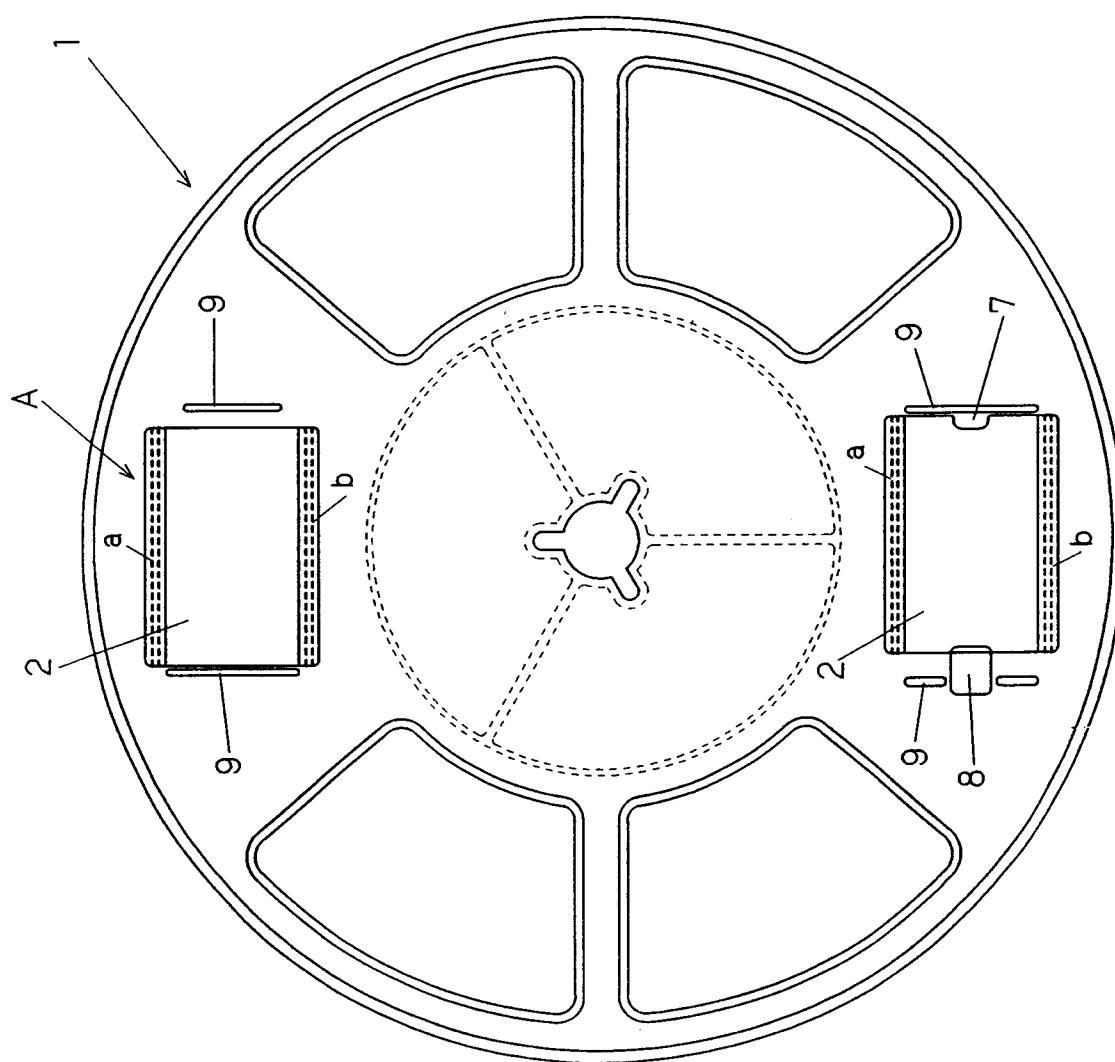


Fig. 10

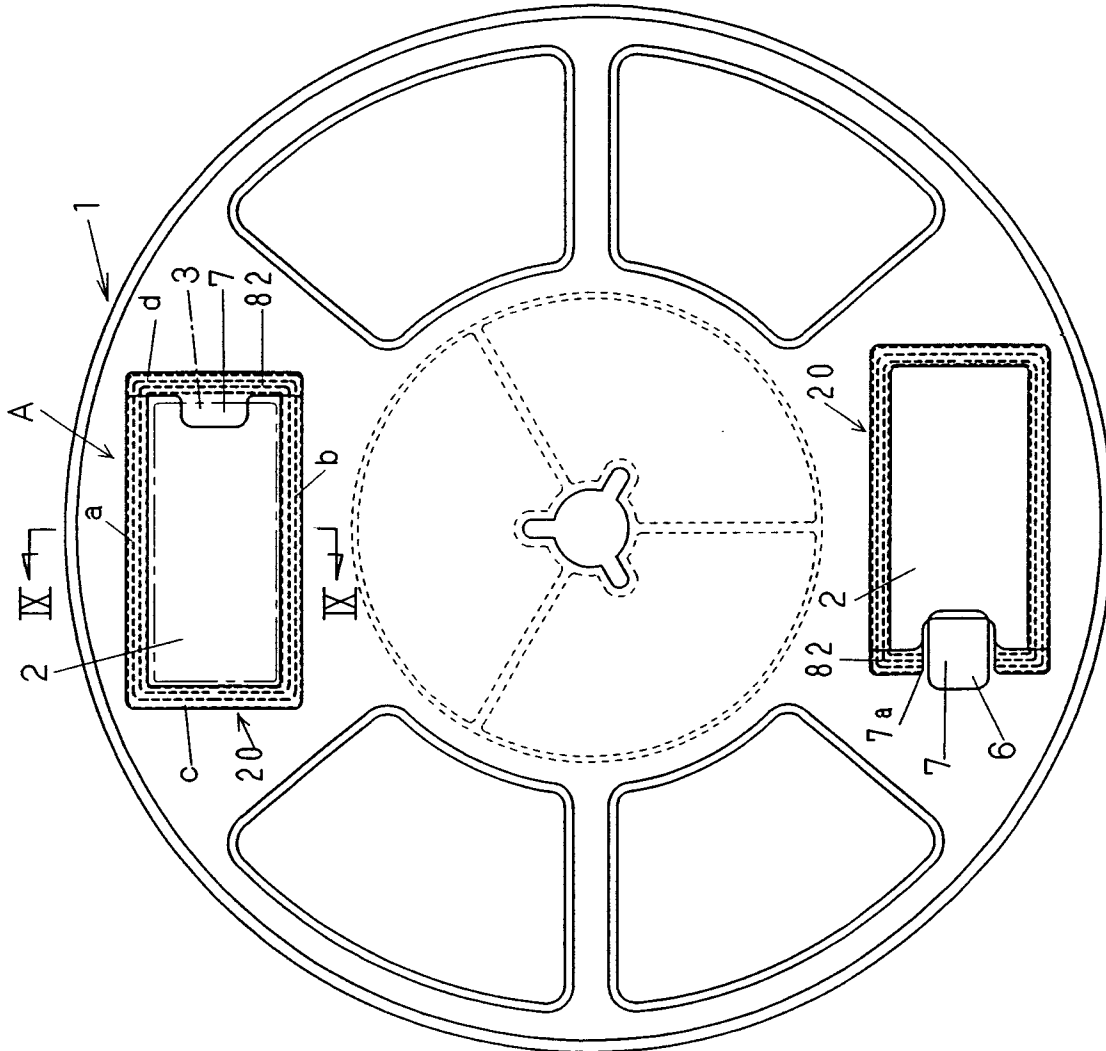


Fig. 11

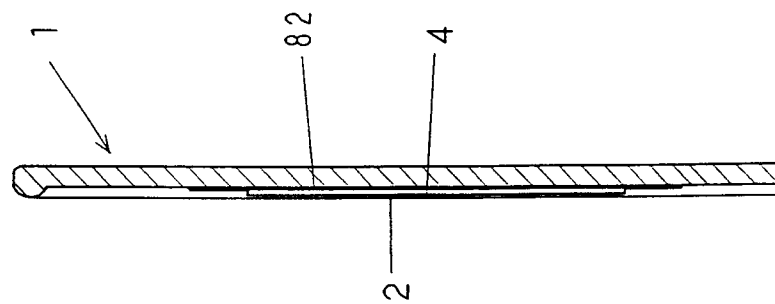


Fig. 13

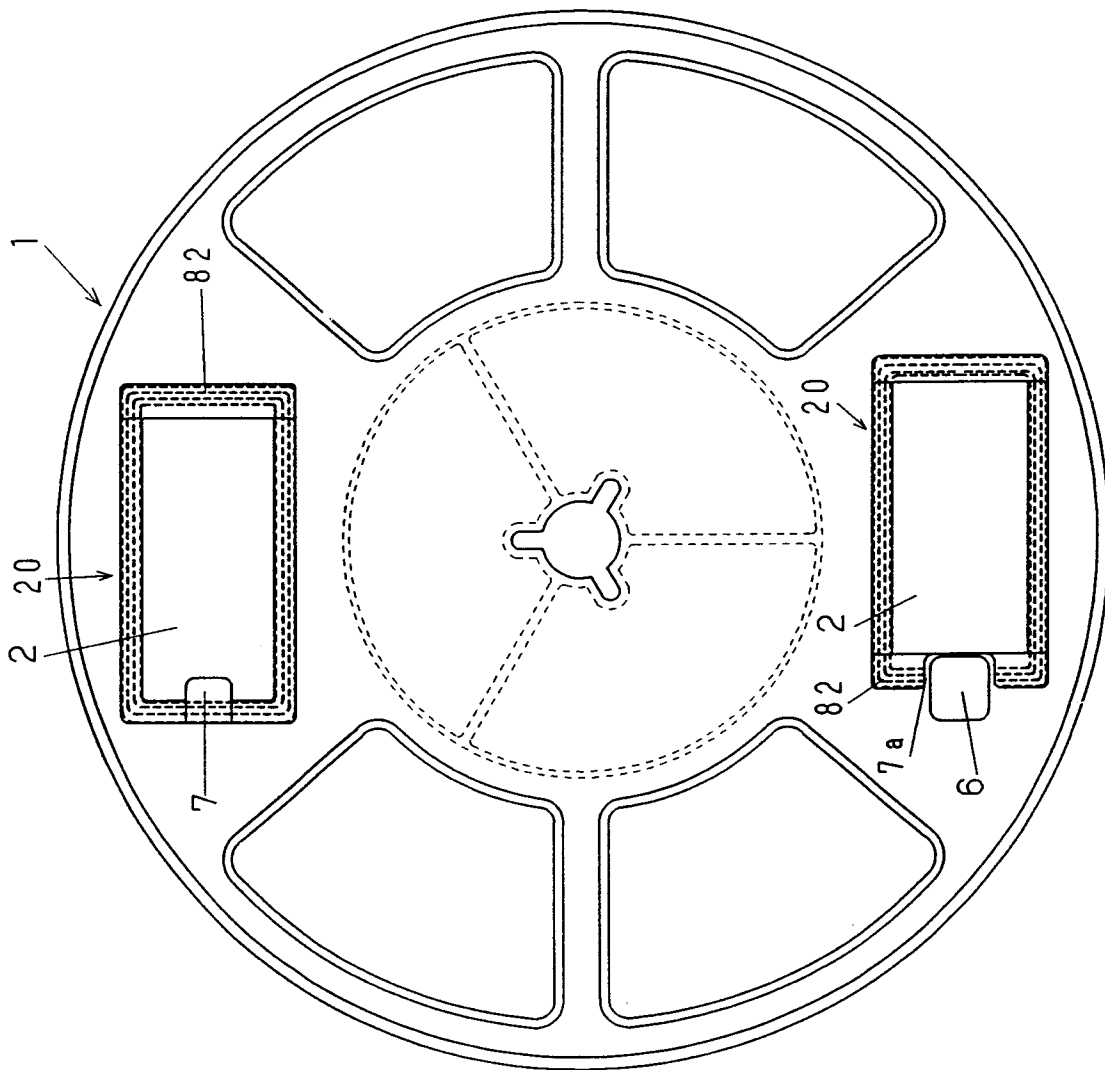


Fig. 14

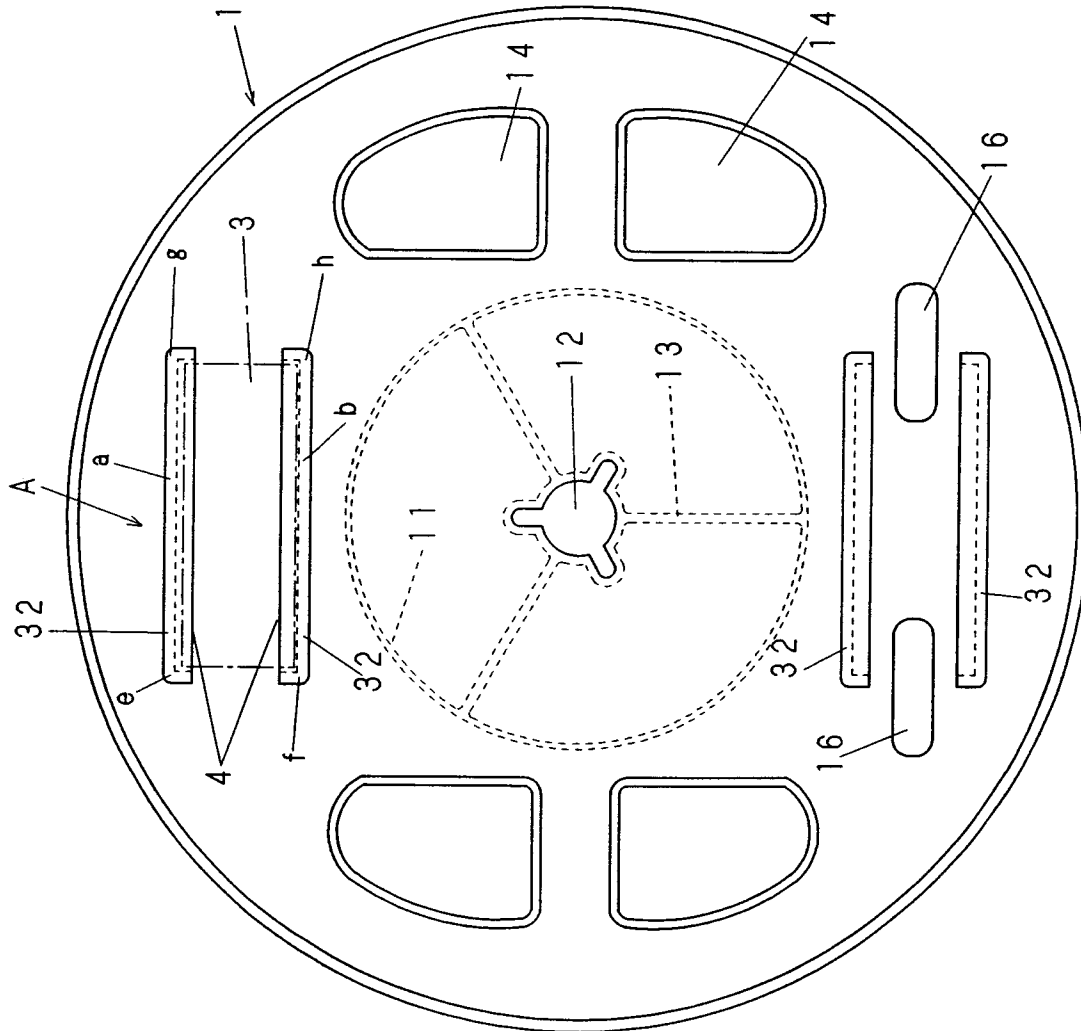
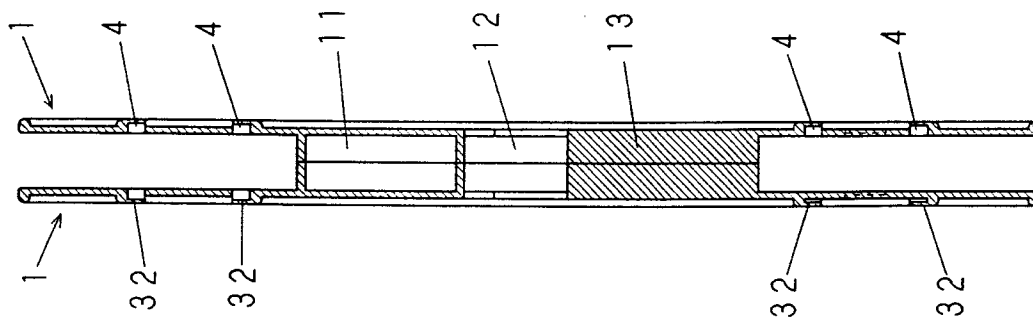


Fig. 16



F i g. 15

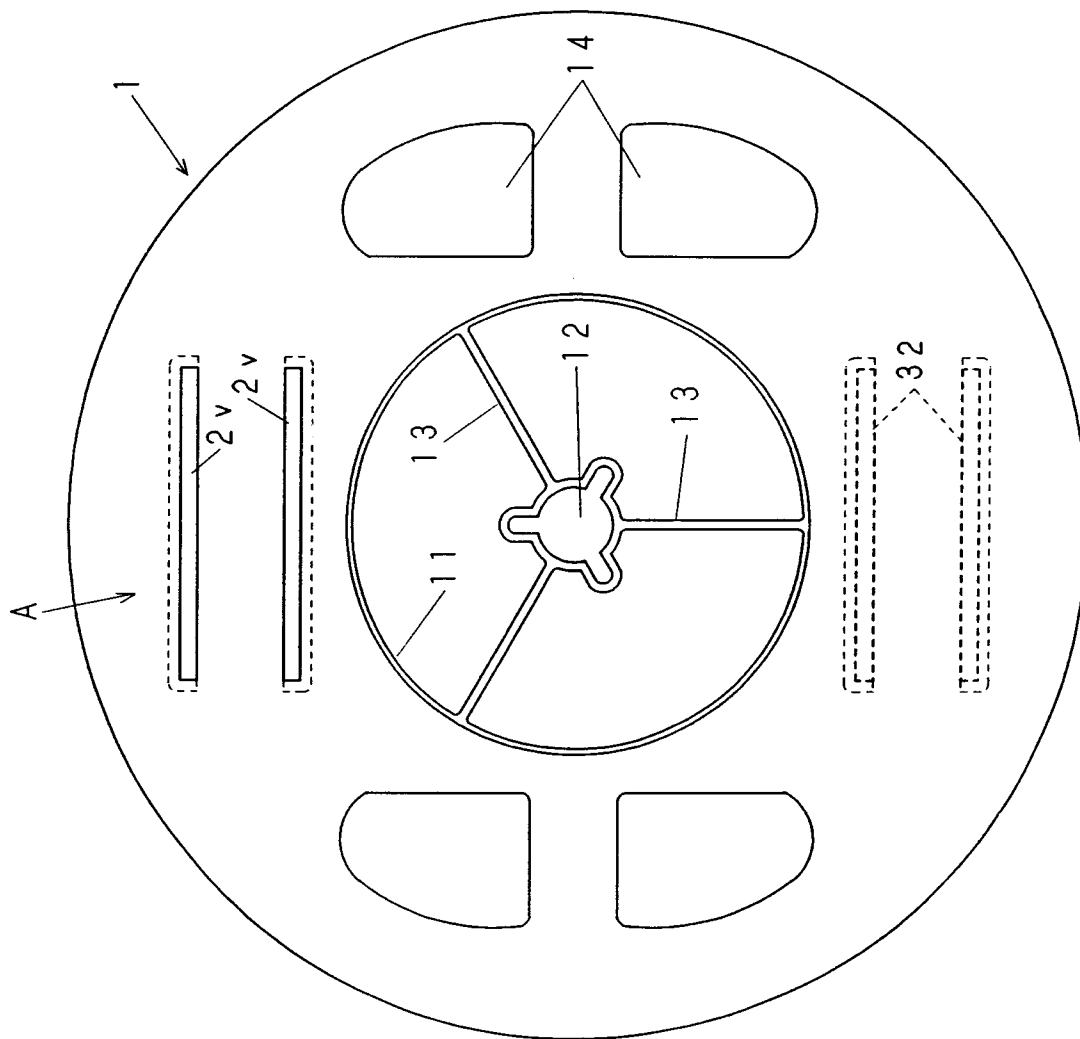


Fig. 17

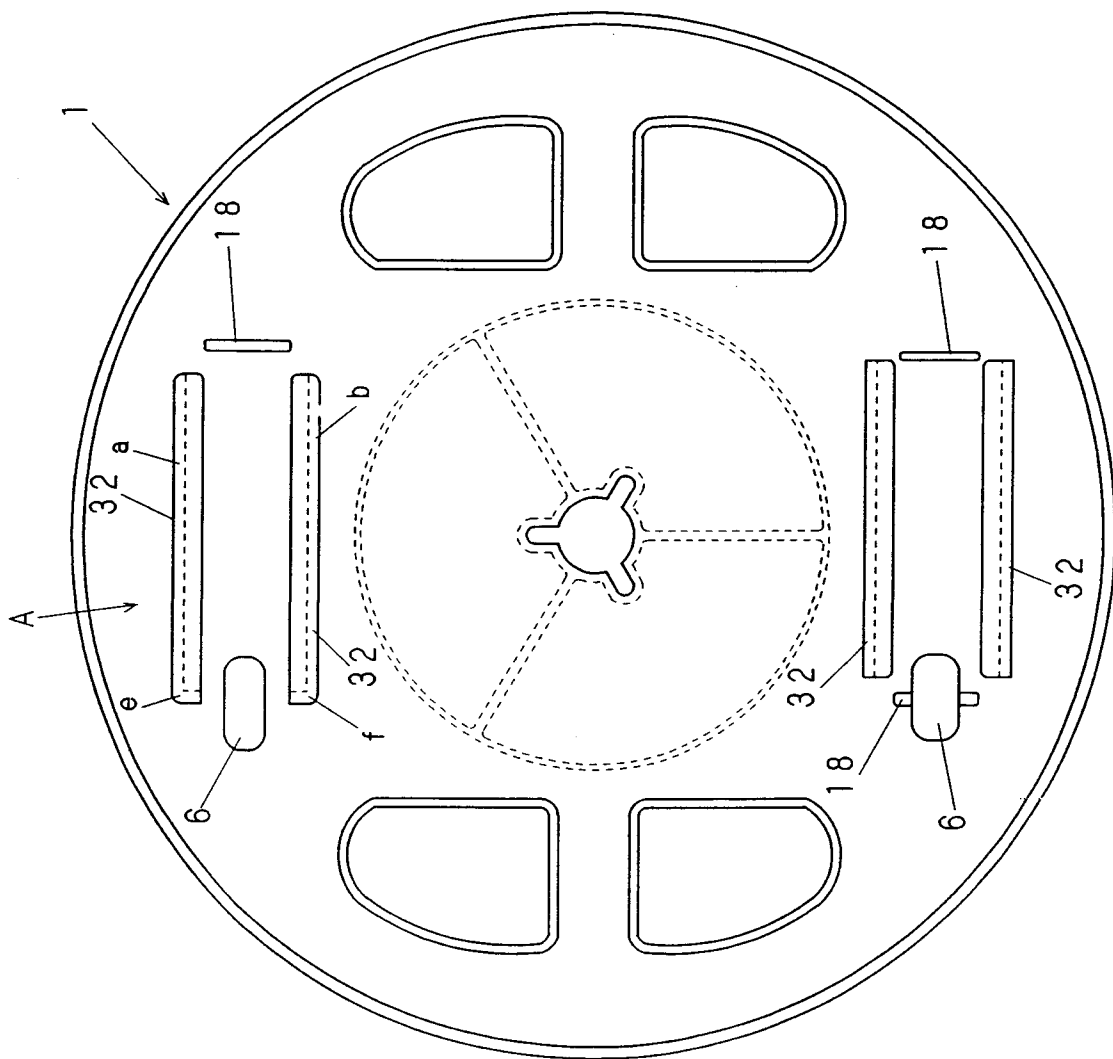


Fig. 18

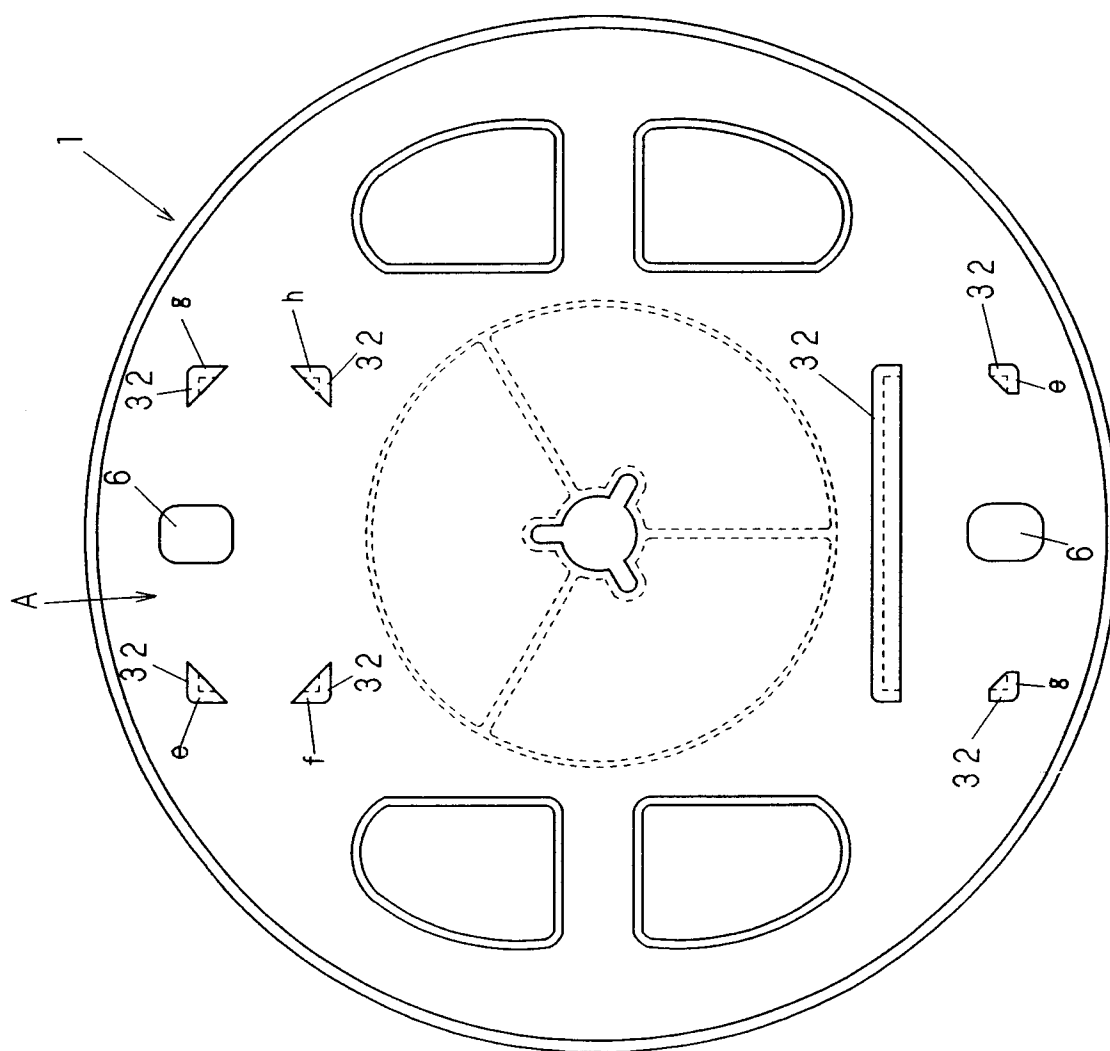


Fig. 19

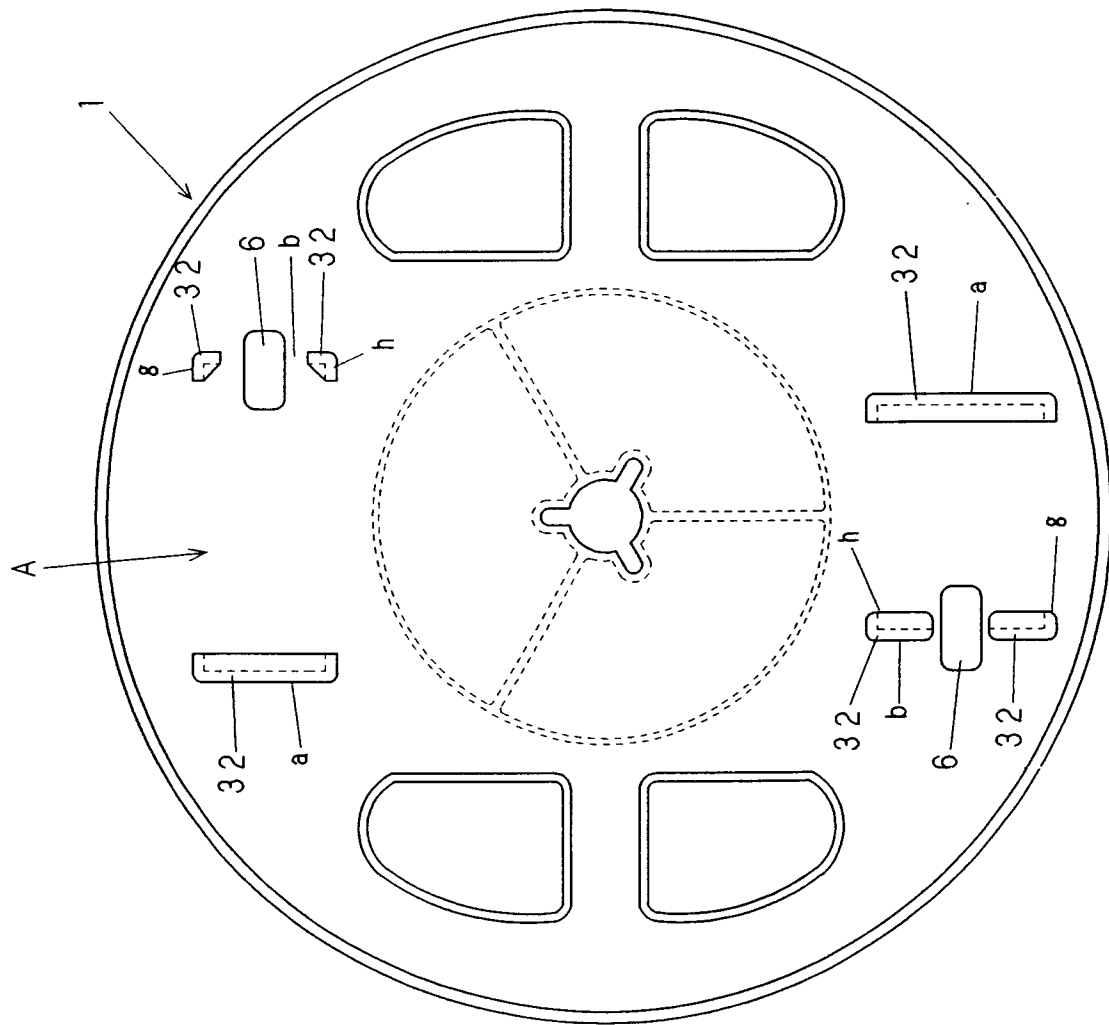
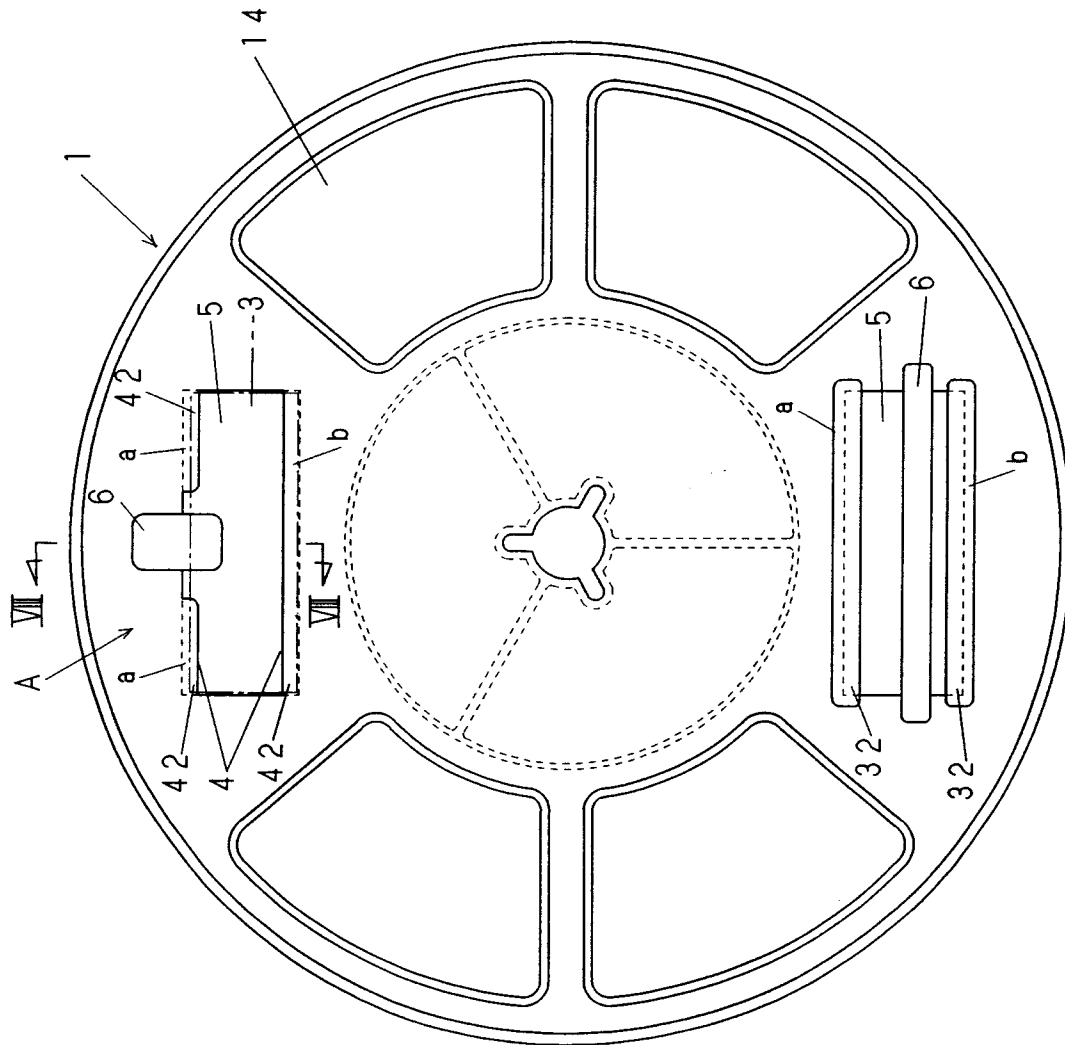


Fig. 20



F i g . 21

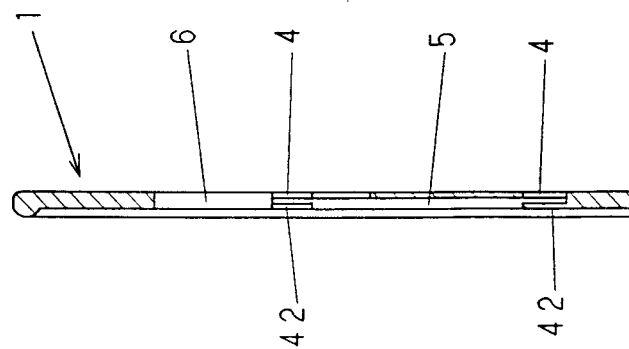


Fig. 22

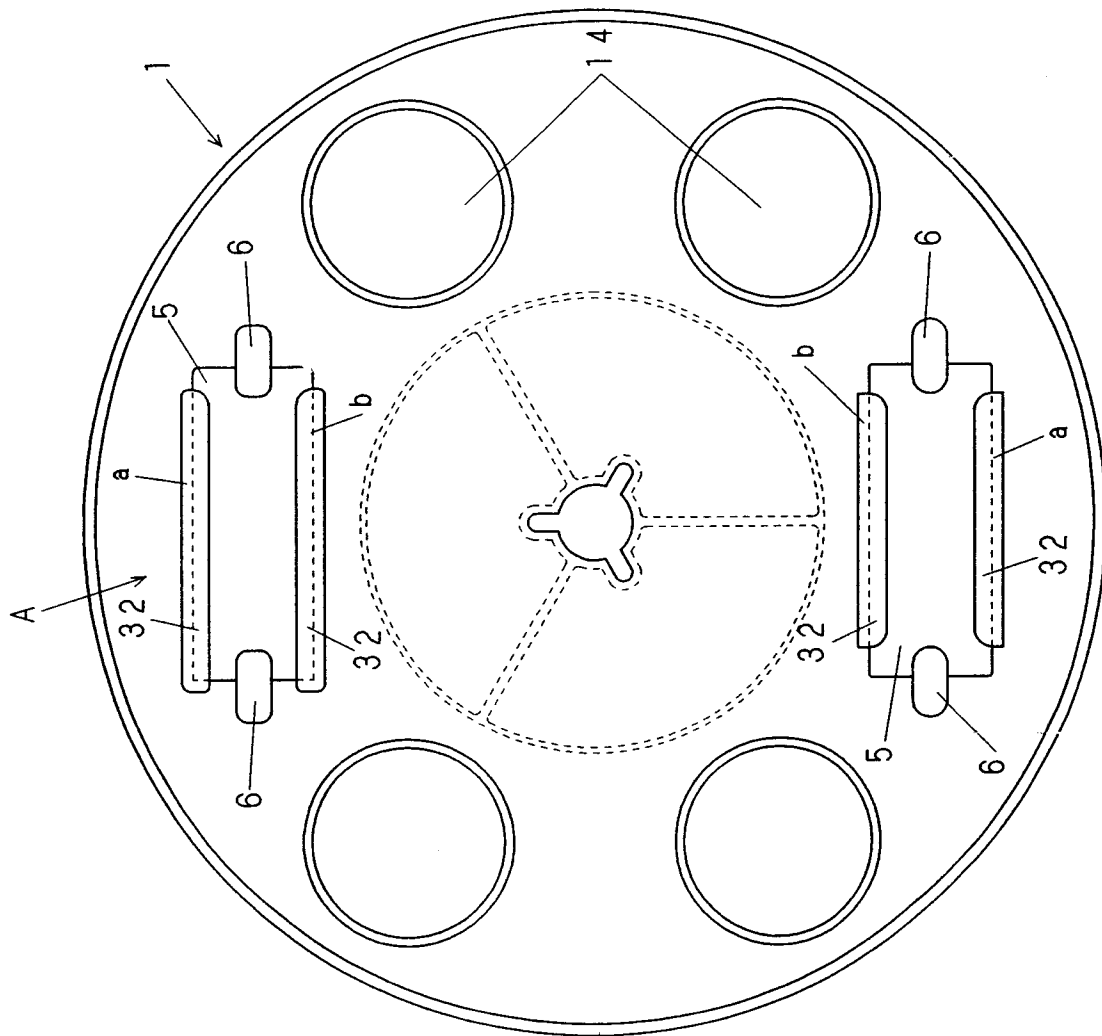


Fig. 23

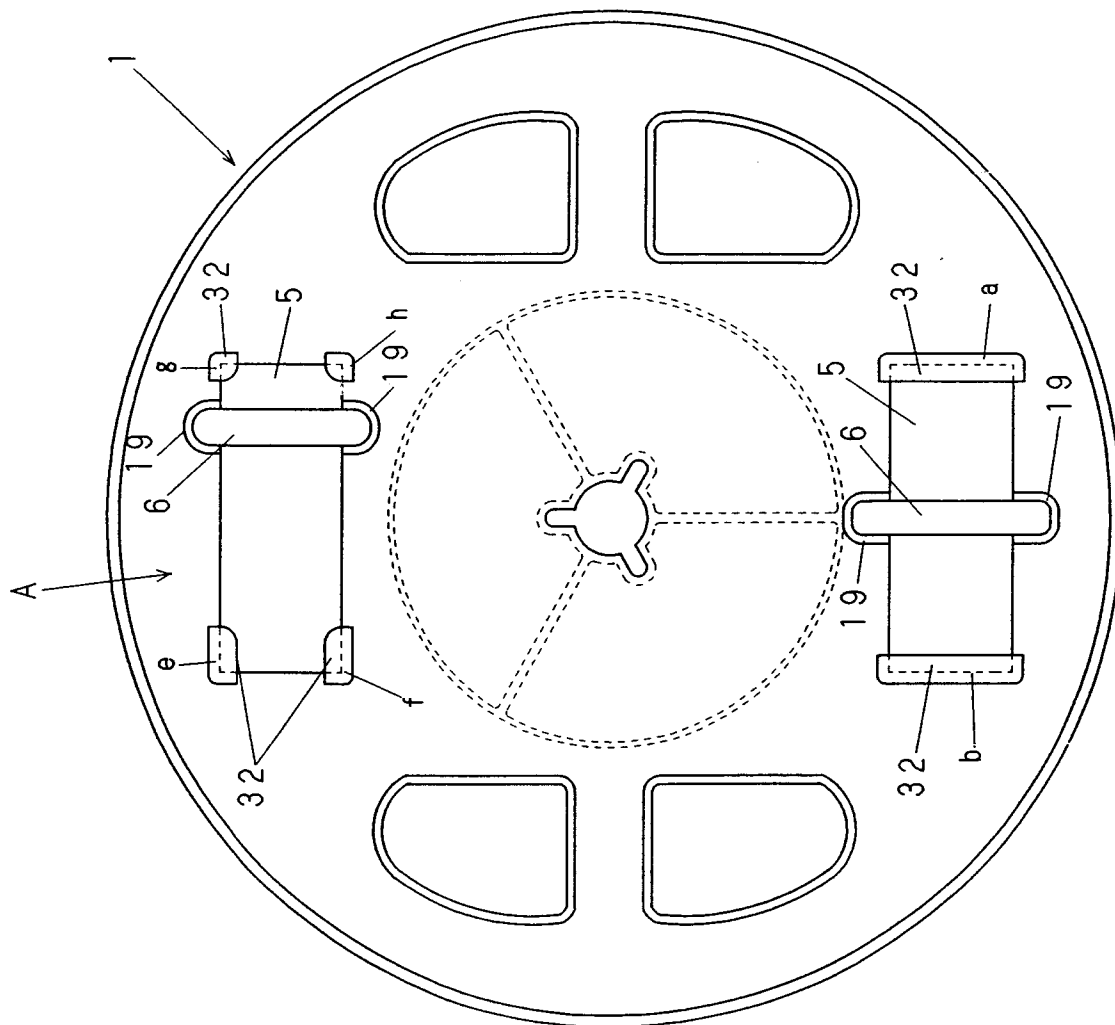
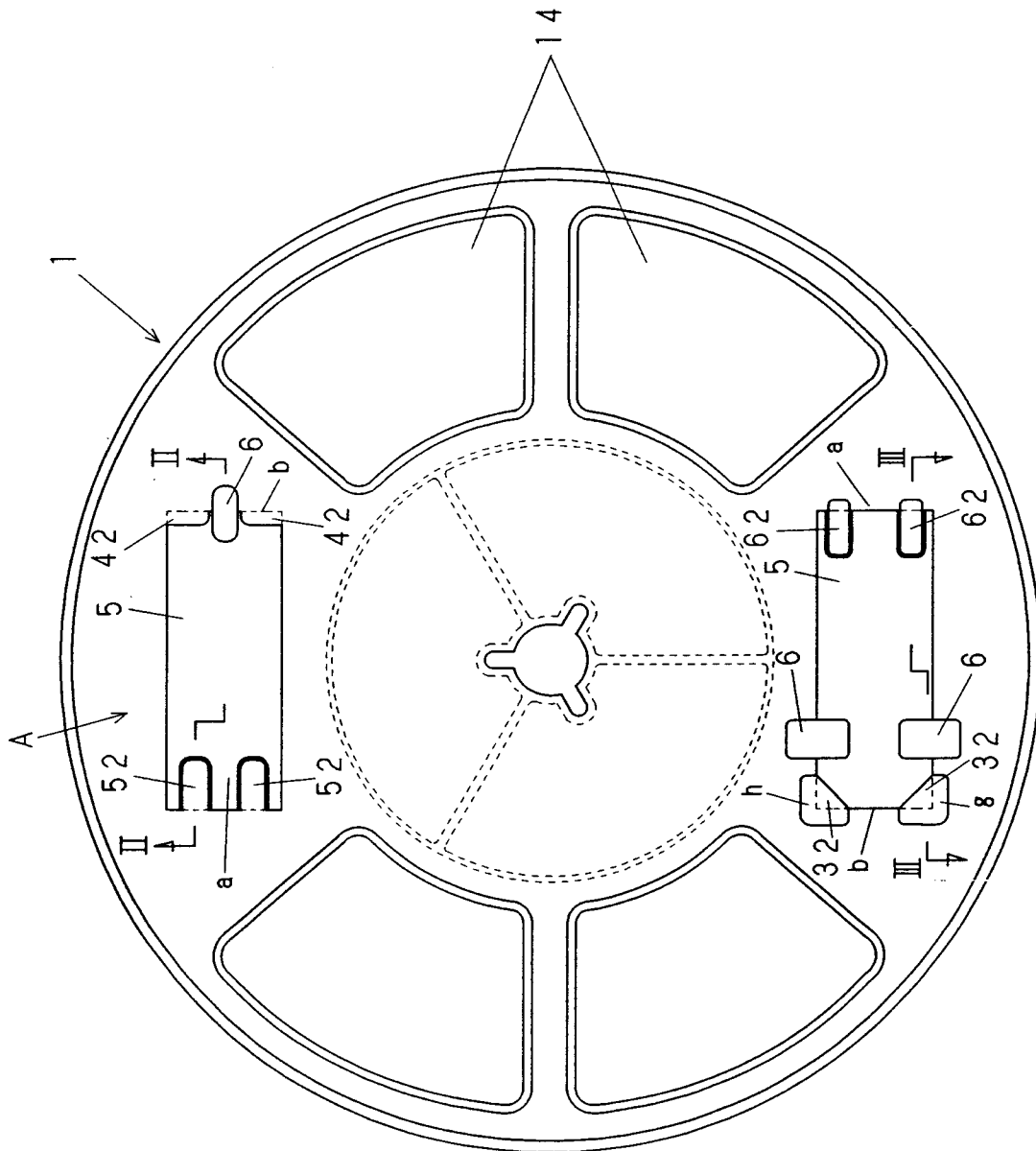
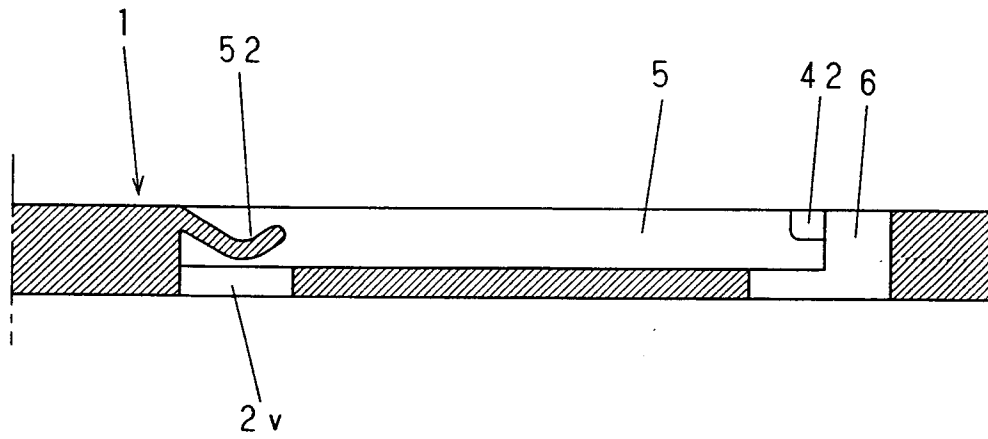


Fig. 24



F i g . 2 5



F i g . 2 6

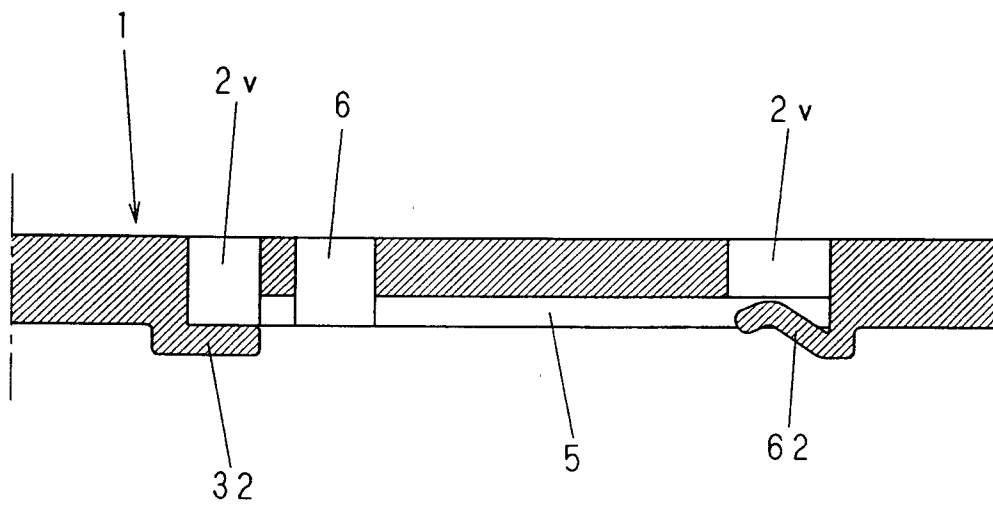


Fig. 27

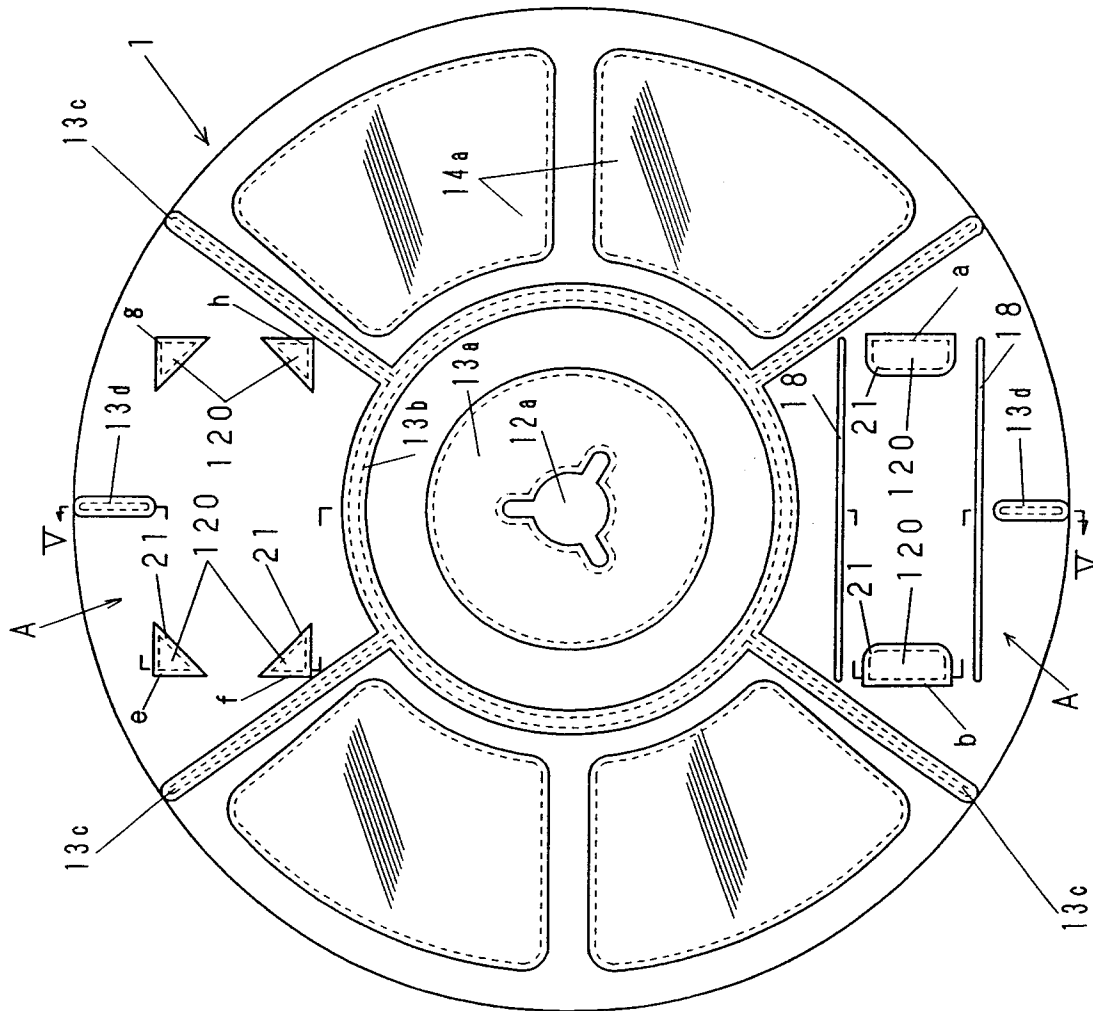
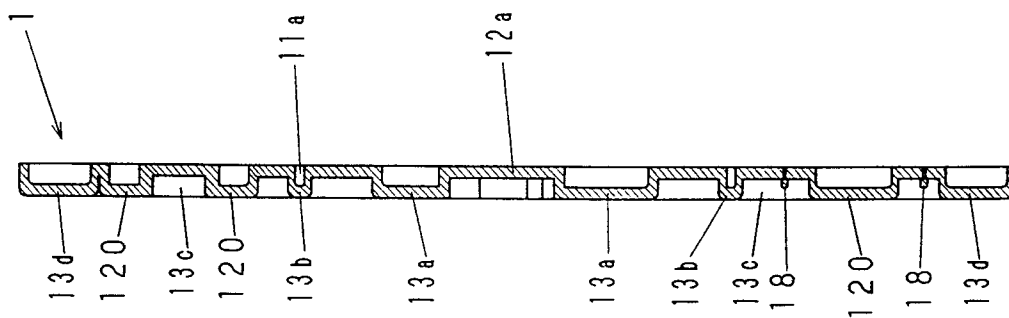


Fig. 28



F i g . 29

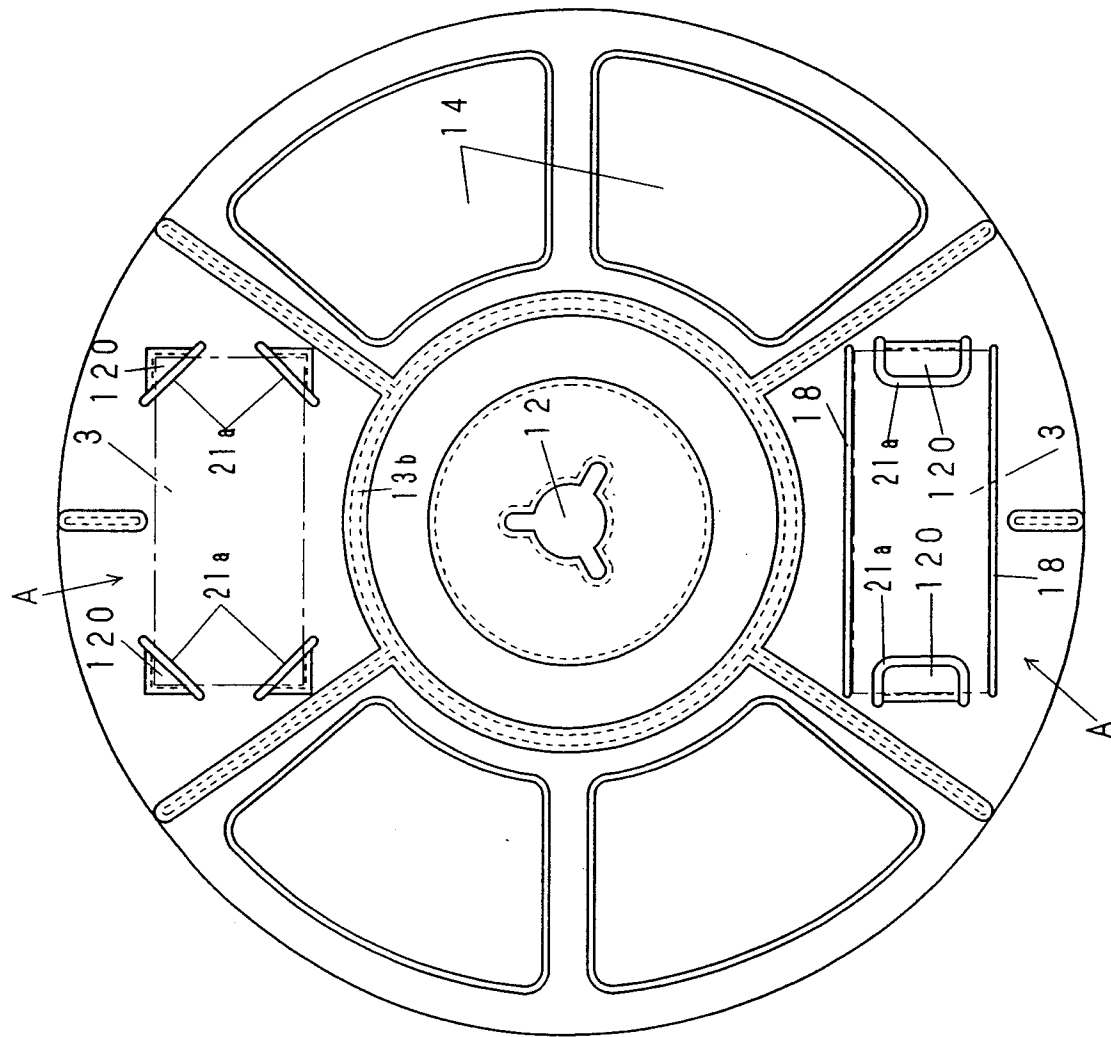
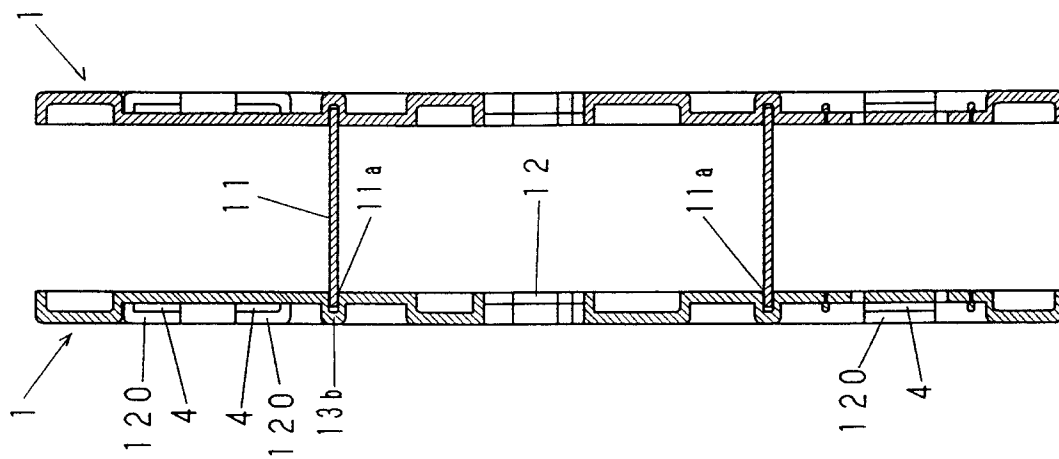
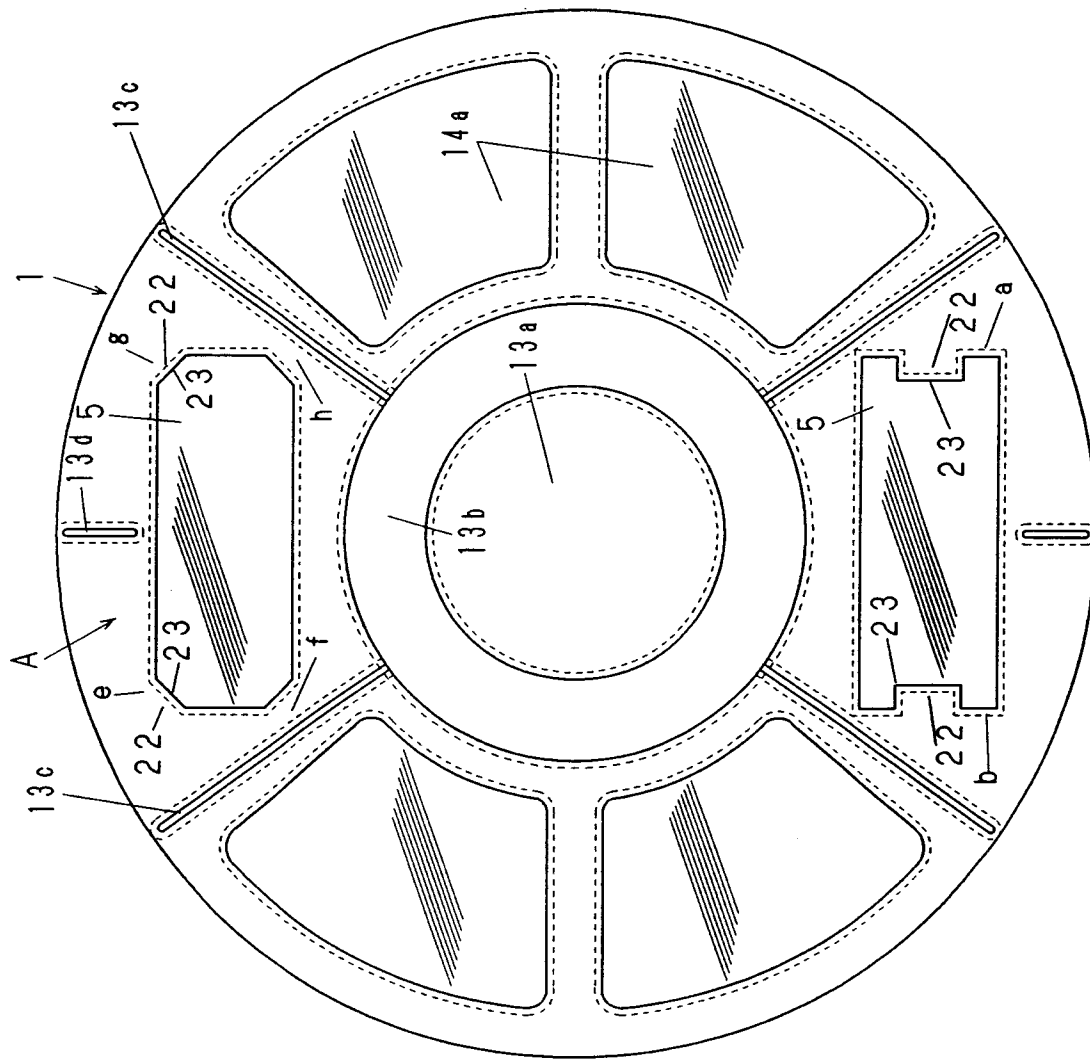


Fig. 30



F i g. 31



F i g. 32

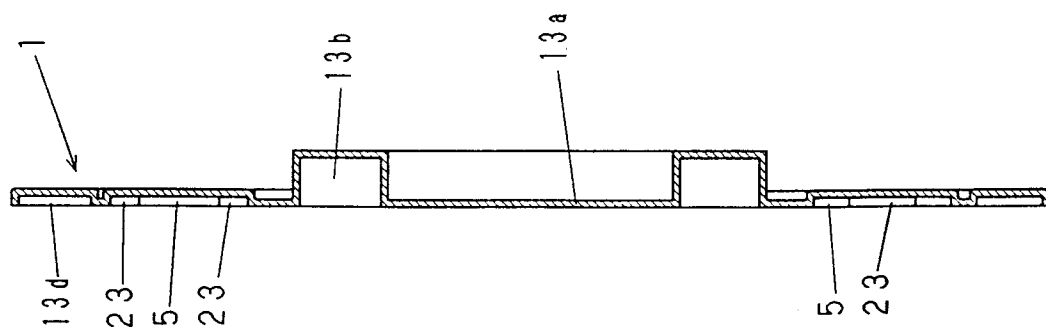


Fig. 33

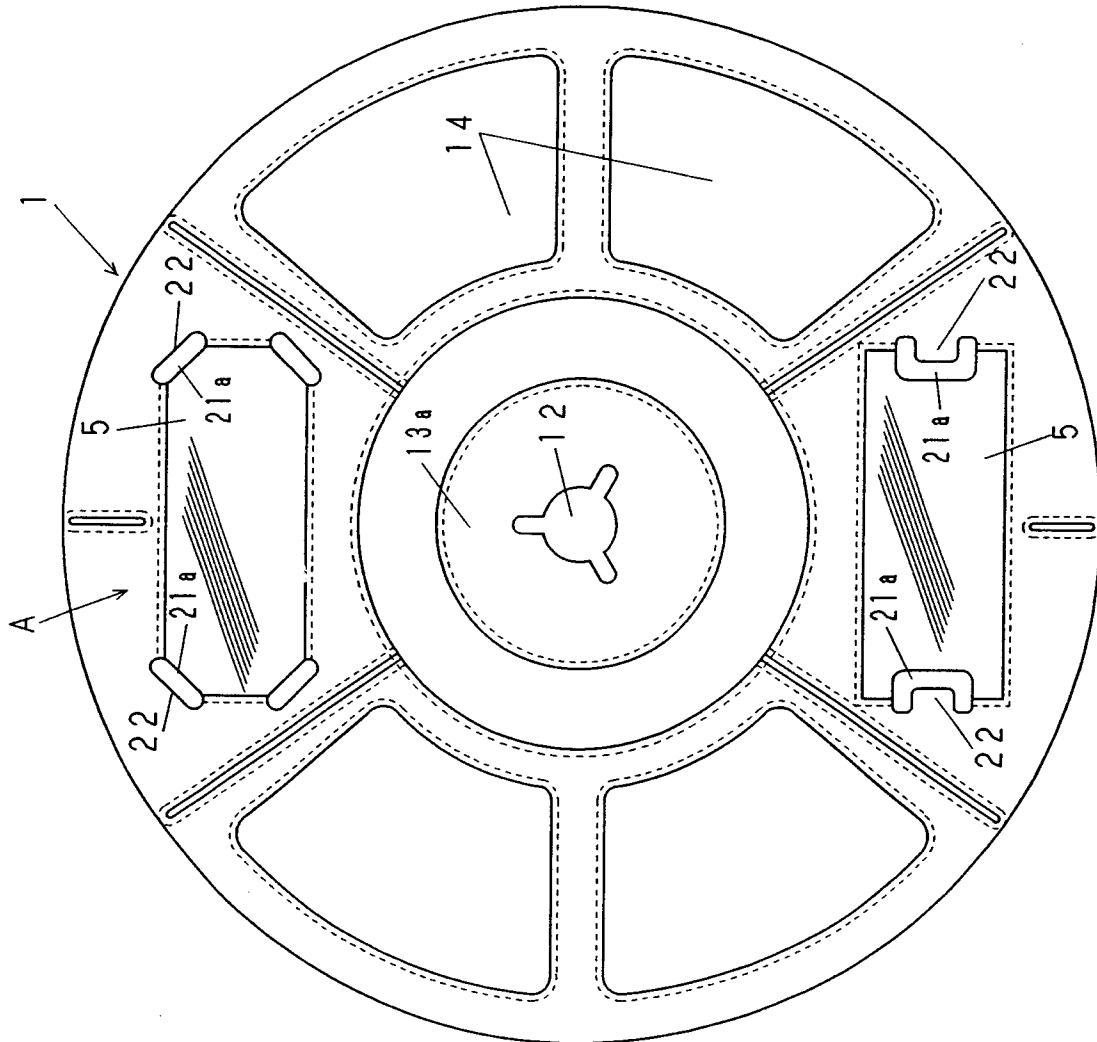


Fig. 34

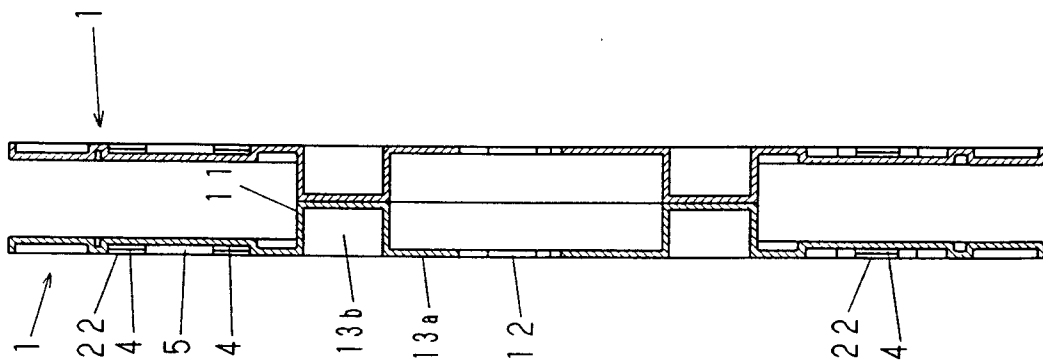


Fig. 35

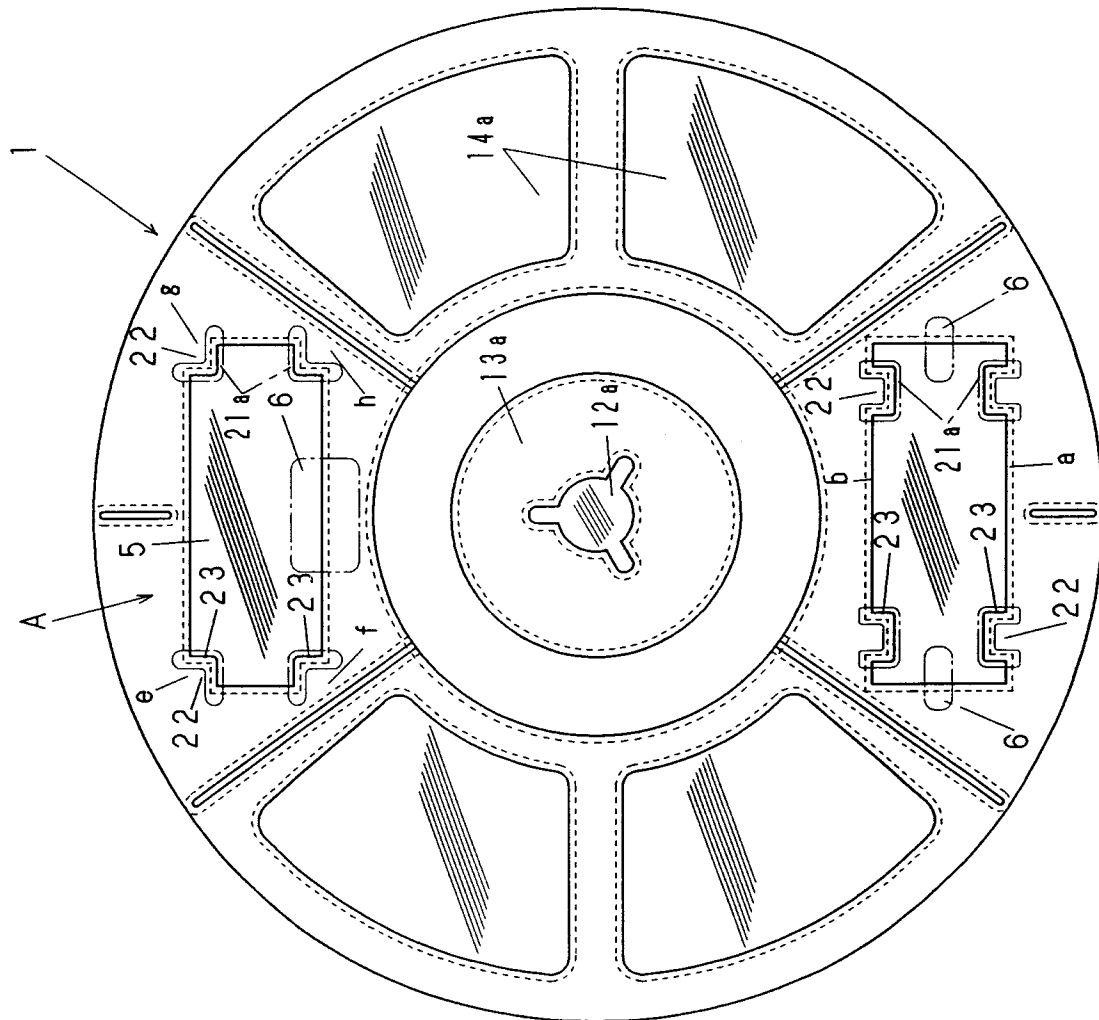
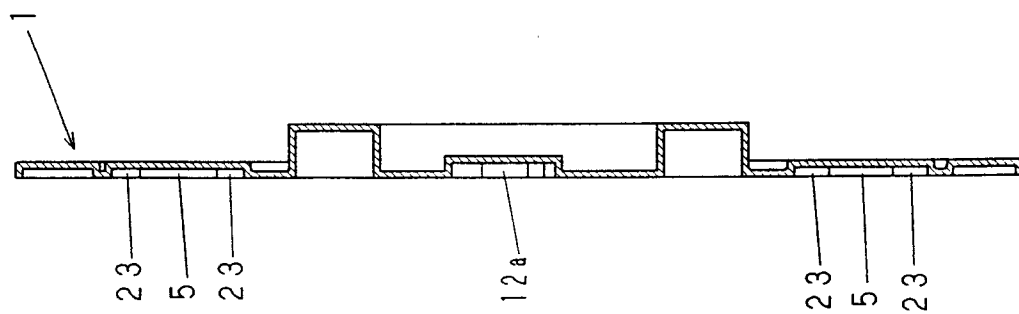


Fig. 36





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 30 1743

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	DE-U-91 15 827 (HÄFNER & KRULLMANN) * page 1, line 15 - page 2, line 30 * * page 3, line 14 - page 4, line 20; figures * ---	1,4-6	B65H75/18
X	FR-A-2 243 139 (FELTEN & GUILLEAUME CARLSWERK) * page 4, line 29 - line 39; figures 1,2 * ---	1	
X	US-A-2 990 133 (G. G. TUCKER, JR) * column 3, line 49 - line 70 * * column 4, line 13 - line 47; figures * ---	1	
A	FR-A-1 208 781 (J.-B. DURAY) * page 1, right column, line 7 - line 35; figures * ---	1	
A	US-A-4 161 075 (ANN S. EUBANKS ET AL.) * column 2, line 19 - line 62; figures 1-3 * ---	1	
A	DE-U-19 43 712 (DRAHTWERK ELISENTAL) * page 5, line 21 - line 26; figures * -----	1	TECHNICAL FIELDS SEARCHED (Int.Cl.6) B65H
The present search report has been drawn up for all claims			
Place of search BERLIN		Date of completion of the search 3 August 1995	Examiner Fuchs, H
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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