(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 364 945 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
14.09.2011 Bulletin 2011/37

(21) Application number: **11169552.4**

(22) Date of filing: **14.06.2007**

(51) Int Cl.:
B65H 75/14 *(2006.01)* ***B65H 54/12*** *(2006.01)*

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR
Designated Extension States:
AL BA HR MK RS

(30) Priority: **21.06.2006 JP 2006170962**

(62) Document number(s) of the earlier application(s) in accordance with Art. 76 EPC:
07745222.5 / 2 030 937

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Remarks:
This application was filed on 10-06-2011 as a divisional application to the application mentioned under INID code 62.

(54) Method of winding a tape

(57) A method of winding a tape on a reel comprising a columnar wind-up unit (3) and a pair of side plates (2 and 2) provided such that the wind-up unit (3) is between the side plates (2 and 2), wherein the inner surface of at least one side plate (2) is provided with a peripheral projection (22), while the object being wound is slightly tilted and the side surface of the object being wound is guided by the peripheral part of the side plate.

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Description

REEL

TECHNICAL FIELD

[0001] The invention relates to a reel for winding an adhesive tape (a sticky tape) obtained by cutting into a narrow tape a film material on which an adhesive layer (or a sticky layer) is formed.

BACKGROUND ART

[0002] In recent years, an anisotropic conductive film obtained by incorporating conductive fine particles into an adhesive layer formed on a substrate is widely used in circuit connection of liquid crystal displays. Generally, as stated in Patent Document 1 or the like, this type of anisotropic conductive film is manufactured and supplied by a method in which an adhesive layer is formed by coating or the like on a wide film material and the resultant is cut into a narrow tape.

[0003] Patent Document 1: JP-A-2003-34468

DISCLOSURE OF THE INVENTION

PROBLEM TO BE SOLVED BY THE INVENTION

[0004] The inventors made extensive studies. As a result, the inventors have found that, in producing an anisotropic conductive film, there is yet room for improvement in the production method in which a film material on which an adhesive layer is formed by coating is wound around a reel while cutting it into a narrow tape. Specifically, during winding around a reel or during storage of the wound tape, an adhesive forming the adhesive layer tends to adhere to the inner surface of the reel, resulting in formation of defective products. The inventors have found that, when winding is performed while guiding the side surface of the object being wound with the peripheral part of a reel in order to avoid un-uniform winding, a significant amount of an adhesive tends to adhere to the peripheral part.

[0005] The invention has been made based on the above-mentioned studies by the inventors. An object of the invention, in manufacturing and supplying an adhesive film (tape) such as an anisotropic conductive film by a method in which a film material on which an adhesive layer is formed by coating is wound around a reel while cutting it into a narrow tape, is to provide a reel which, when winding is performed while guiding the side surface of the object being wound with the peripheral part of the reel, can prevent adherence of an adhesive constituting the adhesive layer to the peripheral part to improve yield, as well as ensure stable unwinding of the adhesive tape for use.

MEANS FOR SOLVING THE PROBLEM

[0006] In order to solve the above-mentioned problem, the reel of the invention comprises a columnar wind-up unit and a pair of side plates provided such that the wind-up unit is between the side plates, wherein the inner surface of one or both of the side plates is provided with a peripheral projection.

[0007] The reel of the invention with the above-mentioned configuration has a novel shape which cannot be found in conventional reels. If adhesive tapes are manufactured and supplied by a method in which a film material on which an adhesive layer is formed by coating is wound up around the reel of the invention while cutting it into a narrow tape, it is possible to prevent an adhesive from adhering to the peripheral part of the side plate when winding is performed such that un-uniform winding is avoided by guiding the side surface of the adhesive tape as the object being wound with the peripheral part of the side plate since an area of the adhesive tape in contact with the peripheral part is reduced.

[0008] In the reel of the invention, in order to reduce the area of the adhesive tape in contact with the peripheral part, which is the object being wound, when winding the adhesive tape while guiding the side surface thereof with the peripheral part of the side plate, it is preferred that at least part of the peripheral projection which is in contact with the object being wound be circular in shape.

[0009] In the reel of the invention, in order to further ensure prevention of adherence of an adhesive to the peripheral part of the side plates without causing problems, it is preferred that the peripheral projection be 0.05 to 1.00 mm in height and 0.5 to 20.0 mm in width.

ADVANTAGEOUS EFFECTS OF THE INVENTION

[0010] According to the invention, when winding around a reel a film material on which an adhesive layer is formed by coating while cutting it into a narrow tape while guiding the side surface with the peripheral part of the side plate in order to avoid un-uniform winding, it is possible to prevent adherence of an adhesive constituting an adhesive layer to the peripheral part of the side plate, thereby improving yield by eliminating formation of defective products.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

FIG. 1 is a view illustrating an embodiment of the reel of the invention;

FIG. 2 is an end view taken along the line B-B of FIG. 1(b);

FIG. 3 is an end view taken along the line C-C of FIG. 1(b);

FIG. 4 is an explanatory view showing the winding state of the adhesive tape;

FIG. 5 is a conceptual view showing the position of the projection on the inner surface of the side plate according to a modification example of the reel of the invention;

FIG. 6 is an explanatory view showing the outline of the cross section of the projection provided on the inner surface of the side plate or the peripheral projection provided on the inner surface along the peripheral part of the side plate according to a modification example of the reel of the invention;

FIG. 7 is a conceptual view showing the position of the peripheral projection provided on the inner surface along the peripheral part of the side plate according to a modification example of the reel of the invention; and

FIG. 8 is a conceptual view showing the positions of the projections provided on the inner surface of the side plate and the peripheral projections provided on the inner surface along the peripheral part of the side plate according to a modification example of the reel of the invention.

BEST MODE FOR CARRYING OUT THE INVENTION

[0012] The preferred embodiments of the invention will be described with reference to the drawings.
FIG. 1 is an explanatory view showing the outline of the reel according to the invention, in which FIG. 1(a) is a front view and FIG. 1(b) is a cross sectional view of FIG. 1(a) taken along the line A-A in FIG. 1(a).

[0013] A reel 1 shown in FIG. 1 is provided with a columnar wind-up unit 3 and a pair of side plates 2 and 2 provided in parallel with or substantially in parallel with each other such that a wind-up unit 3 is between the side plates. A D-shaped shaft hole 4 penetrates through almost the center of the reel 1. By inserting the wind-up shaft of a wind-up apparatus (not shown) into this shaft hole 4, the reel 1 is installed on this wind-up apparatus, and the reel is allowed to rotate when the wind-up shaft is driven.

[0014] The reel 1 with such a configuration is used for manufacturing and supplying various adhesive tapes 5 by a method in which a film material on which an adhesive layer is formed by coating is cut into a narrow tape and the narrow tape is wound around the reel. The width of the wind-up unit 3, namely the distance between the side plates 2 and 2 which are separated by the wind-up unit 3 can be appropriately set according to the cut width of an adhesive tape 5 as the object being wound. In addition, the side plate 2 is normally formed in a circular shape, and the diameter thereof can be appropriately set according .td the winding length of the adhesive tape 5.

[0015] In this embodiment, the reel 1 may be a reel which is integrally formed by injection molding or the like. However, the pair of the side plates 2 and 2 and the wind-up unit 3 may be formed separately, and these parts may be connected by an appropriate means such as fitting and adhesion. By forming the side plates 2 and 2 and the wind-up unit 3 separately, the following configuration can be realized. For example, the side plates 2 differing in diameter can be combined with the common wind-up unit 3, thereby allowing the reel 1 to correspond to various winding lengths, or the wind-up units 3 differing in width can be combined with the common side plate 2, thereby allowing the reel to correspond to various cutting widths.

[0016] In this embodiment, as shown in FIG. 1 (b) and FIG. 2, a projection 21 extending in the radial direction may be provided on the inner surface of the side plates 2 and 2.
FIG. 2 is an end view taken along the line B-B in FIG. 1(b).

[0017] The projection 21 provided on the inner surface of the side plate 2 serves to avoid contact of the adhesive layer exposed on the side surface of an adhesive tape 4 with the inner surface of the reel 1 (inner surface of the side plate 2) when winding up the adhesive tape 5 around the reel 1 or during the storage of the wound adhesive tape 5, whereby the adhesive constituting the adhesive layer is prevented from adhering to the inner surface of the reel 1.

[0018] That is, the distance between the side plates 2 and 2, which are separated by the wind-up unit 3, is set to be larger to some extent than the cut width of the adhesive tape 5 such that the adhesive tape 5 to be wound around the wind-up unit 3 is prevented from being adhered to the inner surface of the side plate 2. Even with this distance, if the winding position of the adhesive tape 5 is shifted due to irregular rotation or the like of the reel 1 during winding of the adhesive tape 5, or the position of the adhesive tape 5 which has been wound is shifted due to impact or vibration during storage, the adhesive tape 5 may come in contact with the inner surface of the side plate 2.
In this embodiment, even in such a case, by providing a projection 21 on the inner surface of the side plate 2, the contact area of 'the adhesive layer exposed on the side surface of the adhesive tape 5 and the inner surface of the side plate 2 can be reduced, whereby adherence of the adhesive constituting the adhesive layer to the inner surface of the reel 1 can be prevented.

[0019] In this embodiment, when such projection 21 is provided, the height h1 of the projection 21 is preferably 0.05 to 1.00 mm, more preferably 0.05 to 0.30 mm, and particularly preferably 0.05 to 0.20 mm.
If the height h1 of the projection 21 is less than 0.05 mm, it may be hard to obtain the effects of suppressing contact of the adhesive tape 5 with the inner surface of the side plate 2. In addition, the height hi of less than 0.05 mm is not preferable, since the injection molding conditions of the reel 1 are required to be controlled accurately. On the other hand, if the height hi of the projection 21 ex-

ceeds 1.00 mm, the projection 21 becomes excessively high, affecting the width dimensions of the reel 1. In addition, this height is not preferable since pushing pressure to the side surface of the adhesive tape 5 increases, and as a result, the side surface of the adhesive tape 5 may acquire marks from the projection 21.

[0020] The width w1 of the projection 21 is preferably 0.5 to 20.0 mm, more preferably 0.5 to 10.0 mm, and particularly preferably 0.5 to 5.0 mm.

If the width w1 of the projections 21 is less than 0.5 mm, the side surface of the adhesive tape 5 may become damaged. In addition, the width w1 of the projection 21 of less than 0.5 mm is not preferable since the injection molding conditions of the reel 1 are required to be controlled accurately. On the other hand, when the width w1 of the projection 21 exceeds 20.0 mm, the adhesive may adhere to the projection 21.

[0021] In this embodiment, as shown in FIG. 1, radial provision of a plurality of (8 in the shown example) projections 21 which extend in the radial direction is preferable, since adherence of the adhesive constituting the adhesive layer to the inner surface of the reel 1 can be prevented more surely.

[0022] In this embodiment, on the inner surface along the peripheral part of the side plate 2, the peripheral projection 22 extending in the circumference direction are provided as shown in FIG. 1(b) and FIG. 3.

FIG. 3 is an end view showing the cross section taken along the line C-C in FIG. 1(b).

[0023] When winding the adhesive tape 5 around the reel 1, which has been cut to have a narrow width, as shown in FIG. 4(a) , if the adhesive tape 5 is slightly tilted and the side surface of the adhesive tape 5 is guided by the peripheral part of the side plate 2, the adhesive tape 5 can be wound uniformly with flushed stacked side surfaces.

FIG. 4 is an explanatory view showing the winding-up state of the adhesive tape 5. FIG. 4(b) is a left side view of the state shown in FIG. 4(a) . In this figure, the adhesive tape 5 is wound around the reel 1 which rotates in the direction shown by the arrow.

[0024] In this embodiment, the peripheral projection 22 provided on the inner surface along the peripheral part of the side plate 2 can prevent adherence of the adhesive constituting the adhesive layer to the peripheral part of the side plate 2, which is caused by the contact of the adhesive layer exposed on the side surface of the adhesive tape 5 with the peripheral part of the side plate 2 when winding the adhesive tape 5 around the reel 1 as mentioned above.

[0025] That is, in this embodiment , when guiding the side surface of the adhesive tape 5 with the peripheral part of the side plate 2, in order to reduce the contact area with the adhesive tape 5, the peripheral projection 22 extending in the circumference direction is provided on the inner surface along the peripheral part of the side plate 2 to suppress the adhesion of the adhesive.

[0026] Therefore, it is preferred that at least part of the peripheral projection 22 which is in contact with the adhesive tape 5 have a circular shape. The radius of curvature thereof is preferably 0.3 to 1.5 mm, more preferably 0.5 to 1.0 mm in order to reduce the contact area of the peripheral projection 21 with the adhesive tape 5.

[0027] In this embodiment, in providing such peripheral projection 22, the height h2 of the peripheral projection 22 is preferably 0.05 to 1.00 mm, more preferably 0.05 to 0.30 mm, and particularly preferably 0.05 to 0.20 mm.

If the height h2 of the peripheral projection 22 is less than 0.05 mm, the effects of suppressing contact of the adhesive tape 5 with the inner surface of the side plate 2 are impaired. In addition, such a small height of the peripheral projection 22 is not preferable since the adhesive tape 5 may become scratched due to interference of the projection 21 and the adhesive tape 5 when winding the adhesive tape 5. If the height h2 of the peripheral projection 22 exceeds 1.00 mm, the peripheral projection 22 becomes excessively high, and as a result, the peripheral projection 22 may interfere with the adhesive tape 5 when winding up the adhesive tape 5. In addition, since the gap between the wound adhesive tape 5 and the side plates 2 and 2 increases after winding of the adhesive tape 5 is completed, weaving may occur during storage, resulting in lowered storage stability.

[0028] The width w2 of the peripheral projection 22 is preferably 0.5 to 20.0 mm, more preferably 0.5 to 10.0 mm, and particularly preferably 0.5 to 5.0 mm.

If the width w2 of the peripheral projection 22 is less than 0.5 mm, the side surface of the adhesive tape 5 may become scratched. If the width w2 of the peripheral projection 22 exceeds 20.0 mm, the problem of adherence of the adhesive to the peripheral projection 22 occurs. In addition, when the adhesive tape 5 which has been wound up around the reel 1 is unwound for use, the adhesive tape 5 may become caught in the peripheral projection 22.

[0029] The preferred embodiments of the invention have been described hereinabove. The invention is not limited to the embodiments mentioned above, and it is needless to say that various modifications are possible within the scope of the invention.

[0030] For example, in the above-mentioned embodiments, both of the pair of side plates 2 and 2 are provided with the projection 21 or the peripheral projection 22. However, if necessary, the projection 21 and the peripheral projection 22 may be provided on only one of the one side plates 2 and 2.

That is, if the adhesive tape 5 is wound near one of the side plates 2 in order to increase the distance between the other side plate 2 and the adhesive tape 5, the projection 21 and the peripheral projection 22 can be provided on the one side plate 2.

[0031] In the above embodiment, the shaft hole 4 in the shape of the letter D is shown. However, the shaft hole 4 may contain a key groove corresponding to a key provided on the winding shaft . The specific configuration of the shaft hole 4 can be changed corresponding to a

means for mounting the winding apparatus to the winding shaft.

[0032] In the above-mentioned embodiment, the configuration of the winding unit 3 is roughly shown. The winding unit 3 may have various configurations which can be applied to this type of reel, for example, provision of a rib for ensuring rigidity.

[0033] In the above-mentioned embodiment, the adhesive tape 5 provided with an adhesive layer is used as the object being wound. However, the reel of the invention can preferably be applied to the object being wound provided with a sticky layer formed by applying a material generally known as a "sticky adhesive".

[0034] In the above-mentioned embodiment, the projections 21 provided on the inner surface of the side plate 2 are provided as a concave line formed continuously from the inner perimeter to the outer perimeter of the reel 1. However, as shown in FIG. 5(a) , the projections 21 may be formed intermittently. Furthermore, the projections 21 may be provided from the center of the side plate 2 to the periphery so that they extend in the radial direction. In addition, as shown in FIG. 5(b) , the projections 21 may be provided such that they intersect with the radial direction, and, as shown in FIG. 5(c) , the projections 21 may be provided in a spiral shape.

If the projections 21 are provided radially, the radial center thereof is preferably the same as the center of the side plate 2. However, it is possible to allow the radial center and the center of the side plate 2 to be different, if necessary. Furthermore, it is possible to form the projections 21 in such a manner that the projections 21 extend radially from each of these different radial centers.

[0035] Furthermore, the shape of the cross section of the projection 21 is not limited to the above-mentioned circular shape. The cross section may have a rectangular shape or a rectangular shape with round corners, or the like. The cross section may have a shape as shown in FIG. 6.

[0036] As mentioned above, there are no specific limitations on specific aspects, e.g. the number or shape of the projection 21 provided on the inner surface of the side plate 2, insofar as adherence of the adhesive to the inner surface of the reel 1 can be prevented.

[0037] As in the case of the peripheral projection 22 provided along the peripheral part of the side plate 2, various modifications are possible, as long as adherence of the adhesive can be prevented when winding is performed while guiding the side surface of the adhesive tape 5 with the peripheral part of the side plate 2.

In the above-mentioned embodiment, the peripheral projection 22 is provided along the entire circumference of the peripheral part of the side plate 2. However, as shown in FIG. 7(a) , the peripheral projection may be provided intermittently along the peripheral part of the side plate 2. In addition, as shown in FIG. 7 (b) , the peripheral projection may be provided in a spiral form, and as shown in FIG. 7(c) , a plurality of (2 in the shown example) peripheral projections 22 may be arranged in parallel to each other.

Furthermore, as shown in FIGs . 8(a) to (c), the peripheral projections 22 provided intermittently may be connected with the projections 21, which is provided to avoid adherence of the adhesive to the inner surface of the reel 1.

[0038] The cross section of the peripheral projection 22 may have the same shape as that of the projection 21. Specifically, it may have a circular shape, a rectangular shape, a rectangular shape with round corners, or a shape as shown in FIG. 6.

[0039] Here, FIGs. 5, 7 and 8 are explanatory views which conceptually show the positions of the projections 21 and 22 in the above-mentioned modification example. FIG. 6 is an explanatory view which shows the outline of the shape of the cross section of the projection 21 (or peripheral projection 22) . FIGS . 6(d) and (f) show two projections 21 (or peripheral projections 22) which are arranged in parallel in such a manner that they are close to each other, and FIGs. 6(e) and (g) show two projections 21 (or peripheral projections 22) which are arranged in such a manner that they are in contact with each other.

INDUSTRIAL APPLICABILITY

[0040] As mentioned hereinabove, the invention provides a reel used to manufacture and supply an adhesive tape, which prevents adherence of an adhesive to the inner surface thereof.

A. A reel comprising a columnar wind-up unit and a pair of side plates provided such that the wind-up unit is between the side plates, wherein the inner surface of one or both of the side plates is provided with a peripheral projection.

B. The reel according to A., wherein at least part of the peripheral projection which is in contact with an object being wound when the object is wound while guiding the side surface of the object by the peripheral part of a side plate has a circular shape.

C. The reel according to A or B, wherein the height of the peripheral projection is 0.05 to 1.00 mm.

D. The reel according to any one of A to C, wherein the width of the peripheral projection is 0.5 to 20.0 mm.

Claims

1. A method of winding a tape, wherein a object being wound which is an adhesive tape provided with an adhesive layer or a sticky tape provided with a sticky layer is wound up around a reel which comprising a columnar wind-up unit and a pair of side plates provided such that the wind-up unit is between the side plates, and the inner surface of one or both of the

side plates is provided with a peripheral projection extending in the circumference direction, while the object being wound is slightly tilted and the side surface of the object being wound is guided by the peripheral part of the side plate.

2. The method of winding a tape according to claim 1, wherein the object being wound is an adhesive tape provided with an adhesive layer.

3. The method of winding a tape according to claim 2, wherein the adhesive tape is obtained by cutting into a narrow tape an anisotropic conductive film obtained by incorporating conductive particles into an adhesive layer formed on a substrate.

4. The method of winding a tape according to any one of claims 1 to 3, wherein at least part of the peripheral projection which is in contact with the object being wound has a circular shape when the object being wound is wound while guiding the side surface of the object by the periphery of the side plates.

5. The method of winding a tape according to any one of claims 1 to 4, wherein the height of the peripheral projection is 0.05 to 1.00 mm.

6. The method of winding a tape according to any one of claims 1 to 5, wherein the width of the peripheral projection is 0.5 to 20.0 mm.

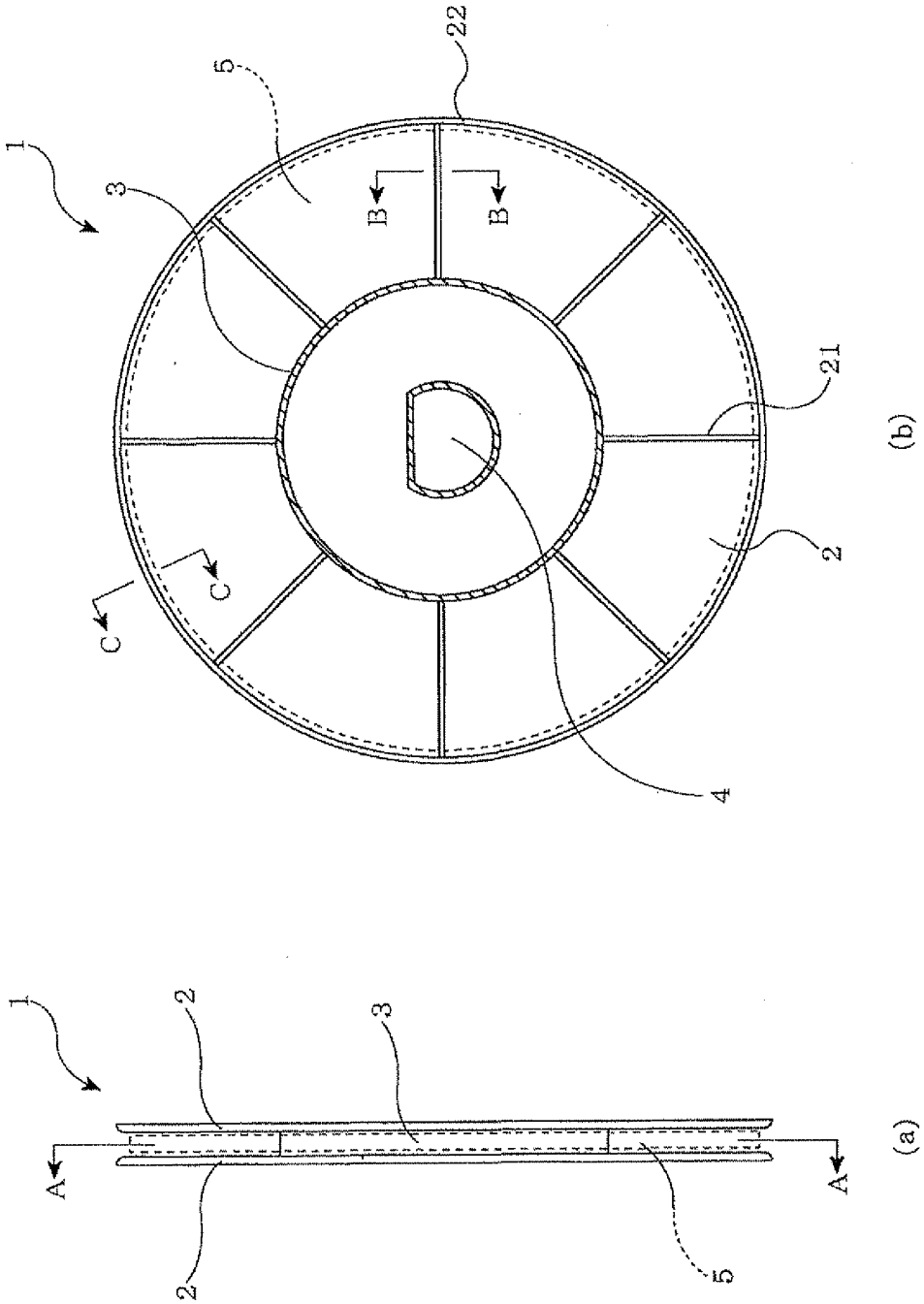


FIG. 1

FIG. 2

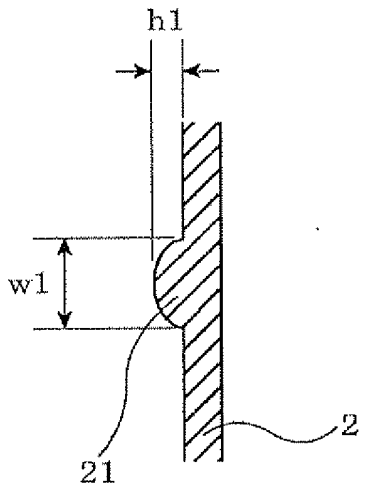
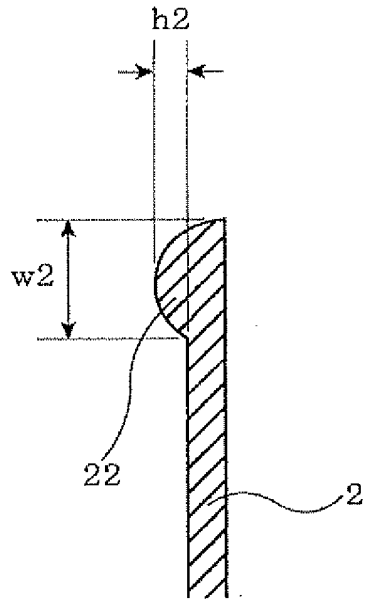


FIG. 3



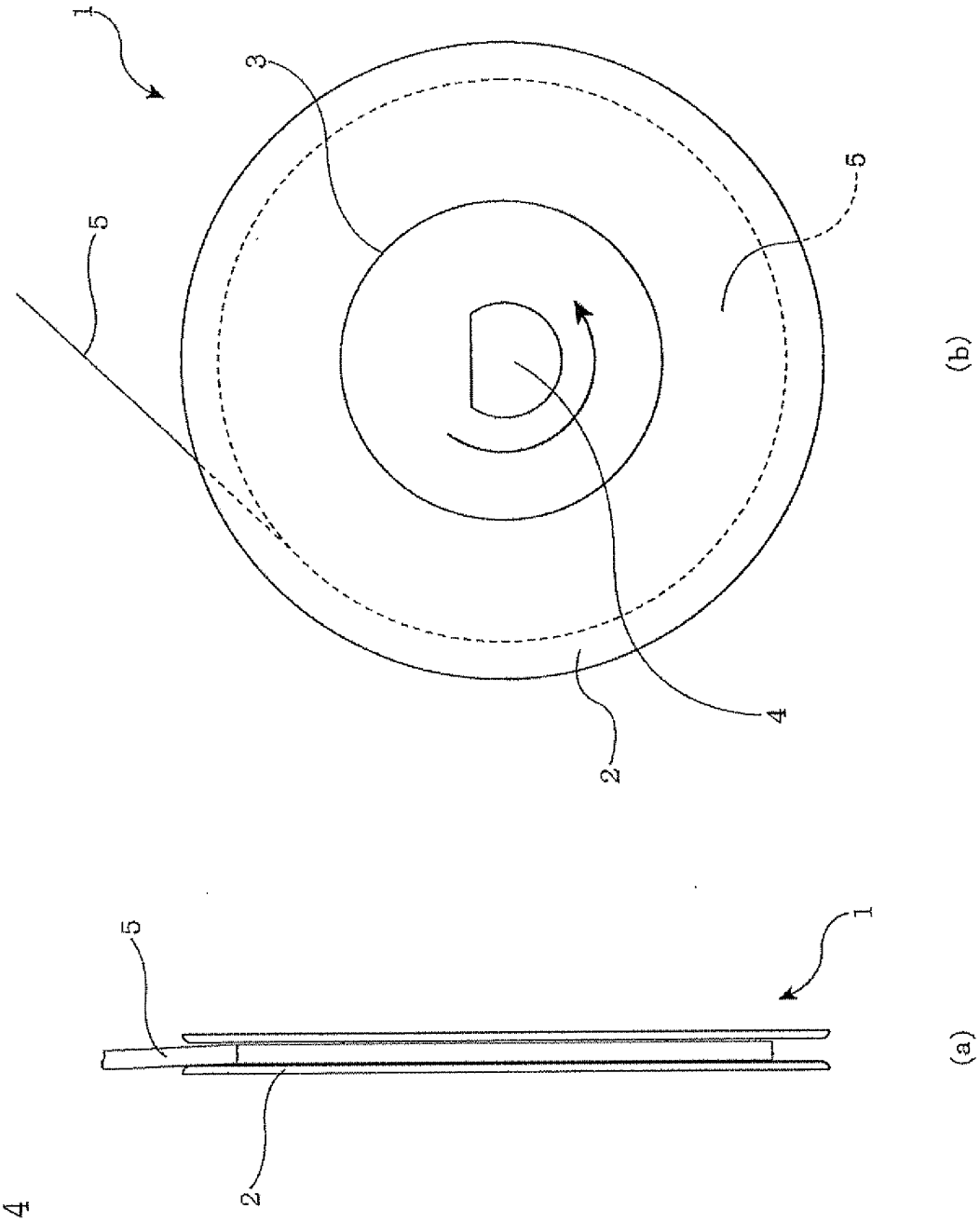
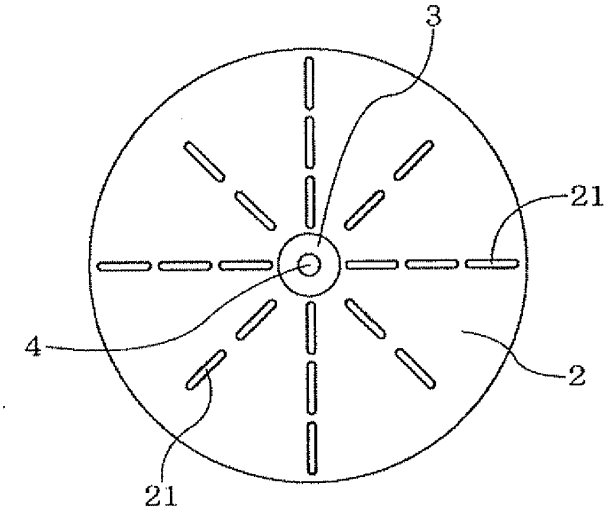


FIG. 4

FIG. 5

(a)



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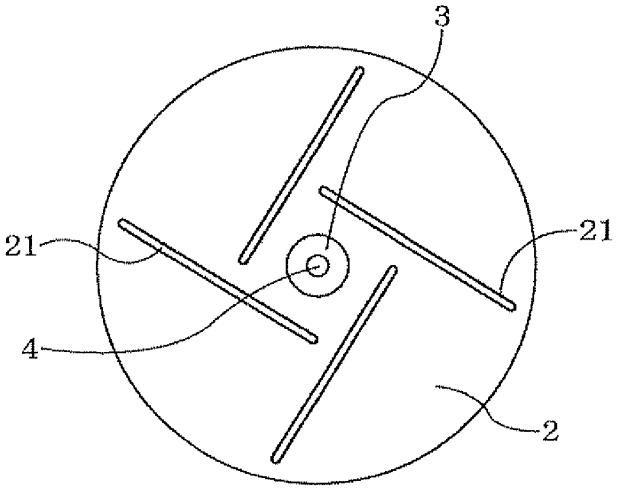


(c)

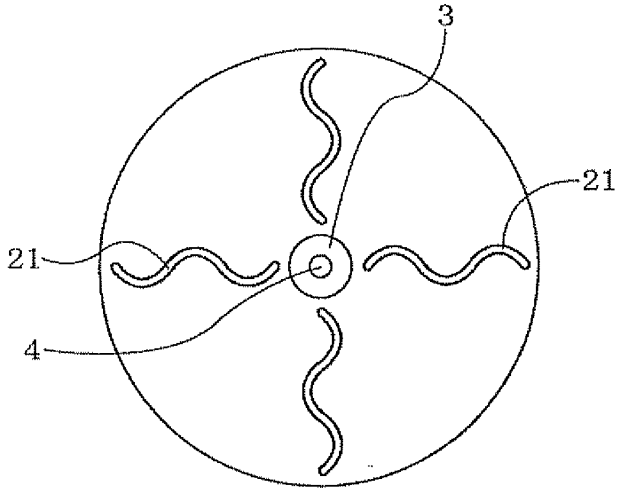


FIG. 6

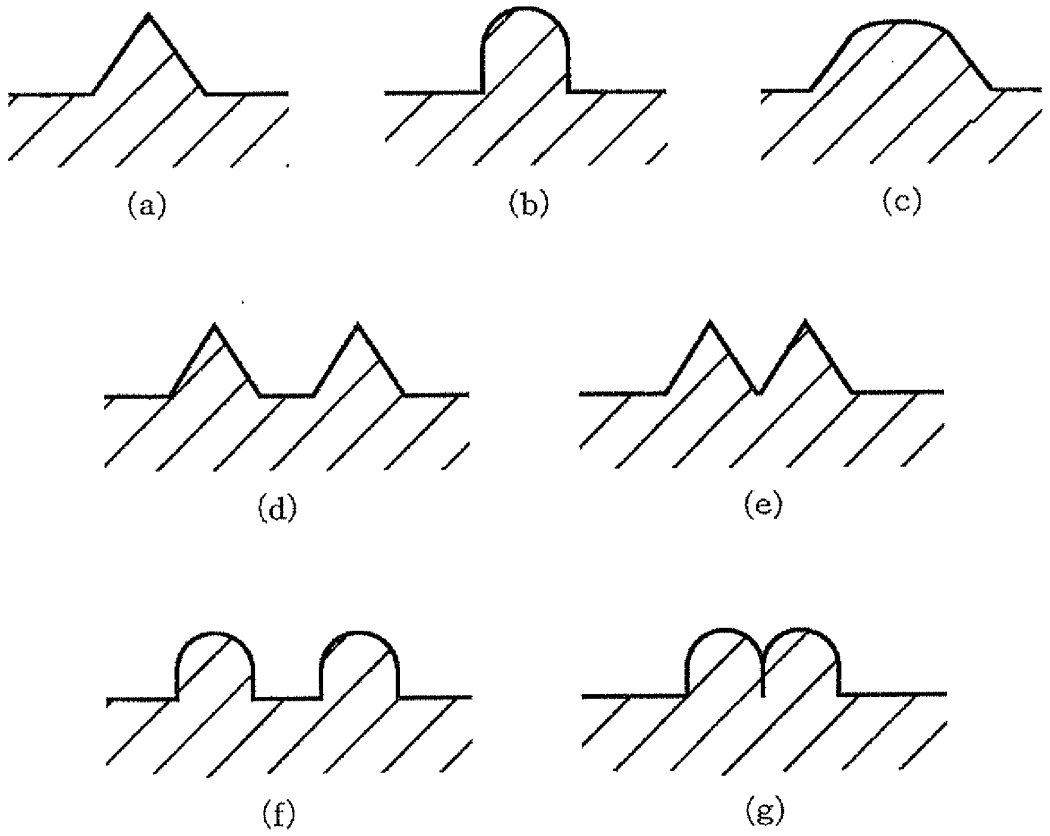
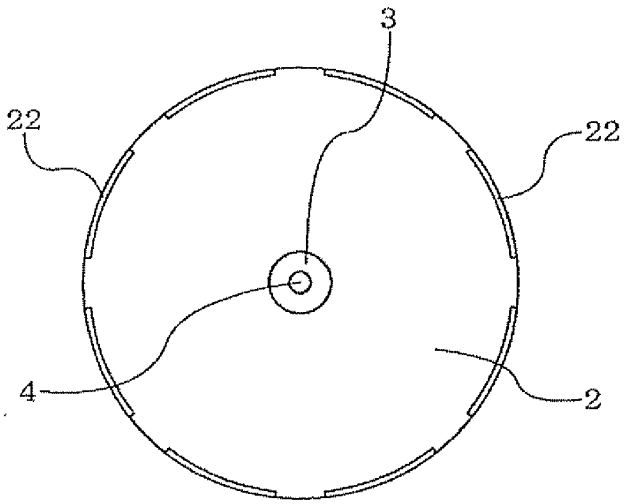


FIG. 7

(a)



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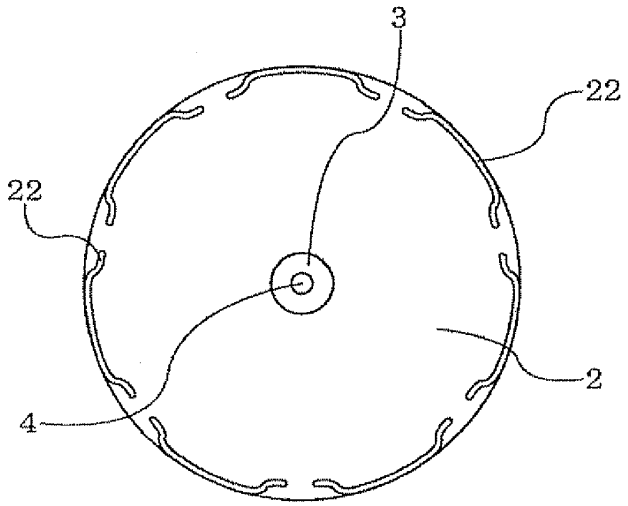

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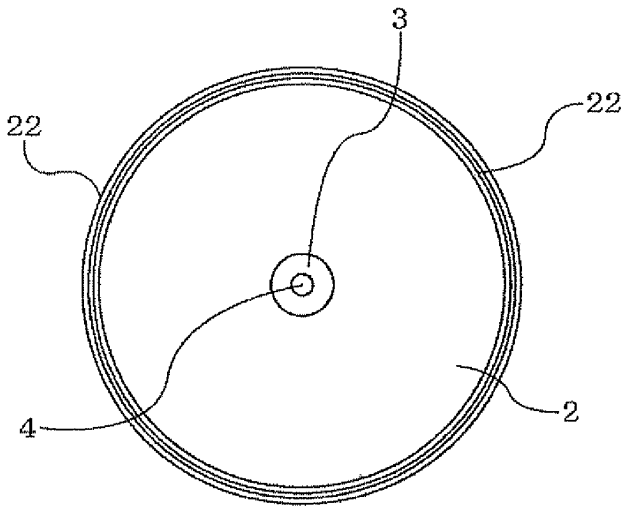
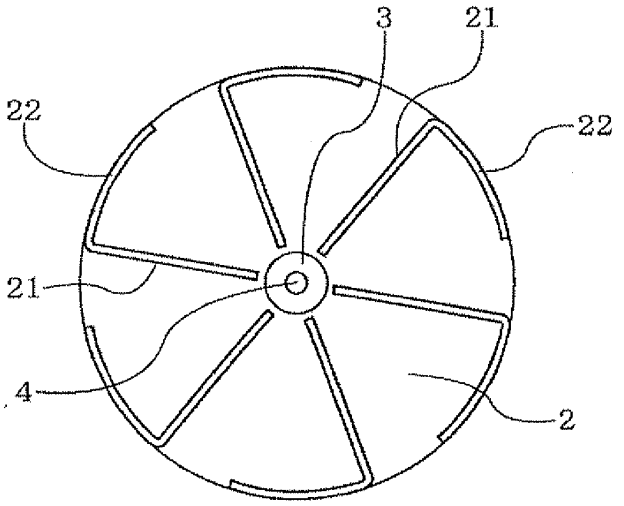


FIG. 8

(a)



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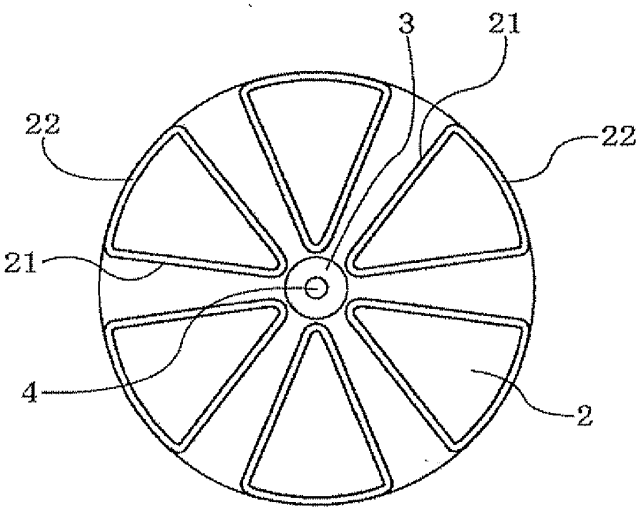

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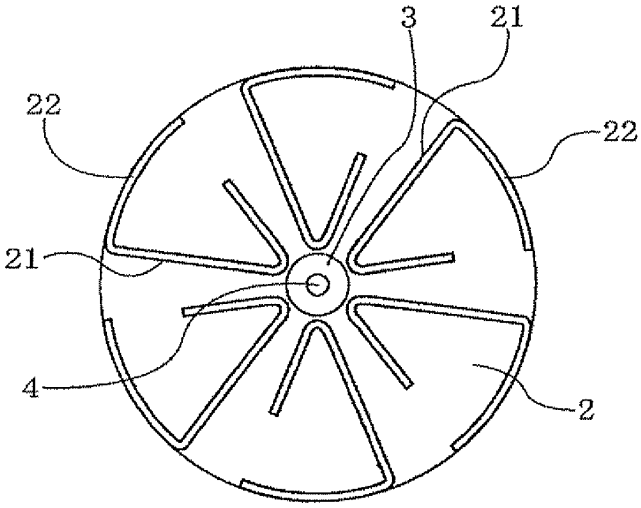

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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