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(54) PAPER HANDKERCHIEF FOLDING DEVICE

(57) A paper handkerchief folding device, comprises a longitudinal folding unit (1), a transverse folding unit (2) and a flower plate unit (5) in a sequential connection, and paper webs (3) are strung on the longitudinal folding unit (1) and the transverse folding unit (2) sequentially in a tensioning mode. A paper handkerchief is folded into three folding surfaces in a zigzag manner along its width direction by the longitudinal folding unit (1), and then folded in half twice along its length direction to form four folding surfaces by the transverse folding unit (2). The paper handkerchief folding device ensures high production efficiency, high production speed, low production cost, and the produced paper handkerchief has adjustable specification, and is more exquisite.

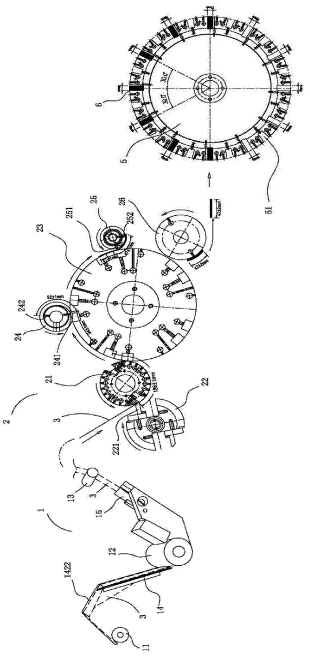


Fig.12

EP 3 018 084 A1

Description

FIELD OF THE INVENTION

[0001] The invention relates to a field of producing paper handkerchief, in particular to a paper handkerchief folding device.

BACKGROUND OF THE INVENTION

[0002] Paper handkerchief is a new-style hygiene paper made of soft paper and is functionally equivalent to a traditional handkerchief in wiping. Paper handkerchief has brought great convenience to people's daily life as it is small, portable, convenient to carry, and capable of absorbing water and wiping off stains. Therefore, as one of the articles of daily use favored by all families without exception, it is highly appreciated by consumers.

[0003] At present, commercially available paper handkerchiefs are generally fixed in size and specification, even with oversized packages, thus they are inconvenient to carry. Accordingly, production equipment for paper handkerchiefs can only produce such paper handkerchief with fixed specification or those close to that specification.

[0004] Moreover, extensive labor is required to assist with most of the packaging process in an existing paper handkerchief production line. Such production mode may not only result in higher labor cost, lower productivity and speed, but also give rise to nonadjustable specifications of papers produced as well as single shapes and sizes. Also, some paper handkerchiefs are too big to carry conveniently after being packed into packaging bags, and cause people uncomfortable visually. Thus, an ultramini paper handkerchief with smaller size, more attractive appearance, more convenient to carry and higher utilization has become an urgent demand for both producers and consumers. However, the existing technology can no longer meet the demands of industrial production.

SUMMARY OF THE INVENTION

Technical problems of the invention

[0005] In order to overcome the above defects in the prior art, a paper handkerchief folding device is provided to solve technical problems of higher labor cost, lower productivity and speed during the prior paper handkerchief folding process, as well as that the produced paper handkerchief is nonadjustable in specification, single in shape and size, and inconvenient to carry.

Technical solutions

[0006] The invention provides a paper handkerchief folding device, comprising at least one longitudinal folding unit, at least one transverse folding unit and a flower plate unit which are connected sequentially on a cabinet, wherein paper webs are strung on the longitudinal folding unit and the transverse folding unit sequentially in a tensioning mode, the longitudinal folding unit comprises at least two traction rollers, and a longitudinal folding component is arranged between the two traction rollers, and wherein, the longitudinal folding component comprises two folding plates, one of which is provided with a bevel edge, and a partially overlapped area formed with a gap for the paper webs to pass through is arranged between the two folding plates, and the paper webs are folded along one side of the other folding plate under the limit of the bevel edge.

[0007] Further, the traction rollers comprises a first traction roller, a second traction roller, a third traction roller and two longitudinal folding components, a first longitudinal folding component is arranged between the first traction roller and the second traction roller, and a second longitudinal folding component is arranged between the second traction roller and the third traction roller.

[0008] Further, the first longitudinal folding component comprises a first folding plate and a second folding plate, the first folding plate is provided with a first bevel edge, and a partially-overlapped area formed with a first gap for the paper webs to pass through is arranged between the first folding plate and the second folding plate.

[0009] The second longitudinal folding component comprises a third folding plate and a fourth folding plate, the third folding plate is provided with a second bevel edge, and a partially-overlapped area formed with a second gap for the paper webs to pass through is arranged between the third folding plate and the fourth folding plate.

[0010] Further, the first folding plate and the third folding plate are of a right-angled trapezoid shape, the second folding plate and the fourth folding plate are of a rectangular shape, and the first bevel edge and the second bevel edge are bevel edges of the right trapezoid. A line segment is vertically made downwards along the peak of the bevel edge in such a way that length of the line segment is equal to the height of the trapezoid, and the second folding plate and the fourth folding plate just coincide with the line segment at one side of each folding plate.

[0011] Further, the other folding plate is provided with a guide plate for lead-in of the paper webs, and a certain angle is formed between the guide plate and the other folding plate.

[0012] Further, the second folding plate is 160-183 mm wide, preferably 182 mm; and the fourth folding plate is 52-62 mm or 79-92 mm wide, preferably 61 mm or 91 mm.

[0013] Further, the transverse folding unit comprises a lead-in bed knife roller, a surface knife roller, a folding main roller, a first paper folding roller and a second paper folding roller which are arranged on a cabinet, wherein the surface knife roller is tangent to the lead-in bed knife roller, and the first paper folding roller and the second paper folding roller are respectively tangent to the folding main roller; and wherein, the lead-in bed knife roller is

provided with two slitting bed knives, the surface knife roller is provided with two slitting surface knives, the first paper folding roller is provided with a first paper folding knife and a first air hole, and the second paper folding roller is provided with a second paper folding knife and a second air hole.

[0014] Further, the cabinet is further provided with a throwing roller tangent to the folding main roller, and the throwing roller and the folding main roller are used for extruding the paper webs that are folded into quarter.

[0015] Further, the length of an arc between the two slitting bed knives is half the circumference of the lead-in bed knife roller.

[0016] Further, the arc between the two slitting bed knives has a length of148-188 mm, preferably 186 mm; the lead-in bed knife roller has a circumference of 296-376 mm, preferably 372 mm; the lead-in bed knife roller has a radius of 46-61 mm, preferably 59.24 mm; an arc between the first air hole and the first paper folding knife has a length of 69-96 mm. preferably 92 mm; and an arc between the second air hole and the second paper folding knife has a length of 34-49 mm, preferably 47 mm.

[0017] Further, the depth of a notch of the flower plate unit is 37-48 mm, preferably 47 mm, and the width is 17-19 mm, preferably 18 mm.

Beneficial effects of the invention

[0018] Compared with the prior art, the paper handkerchief folding device of the present invention has achieved the following technical effects:

(1) According to the paper handkerchief folding device provided by the invention, the cabinet is provided with a longitudinal folding unit, a transverse folding unit and a flower plate unit in a sequential connection, and paper webs are strung on the longitudinal folding unit and the transverse folding unit sequentially in a tensioning mode. A paper handkerchief is folded into three folding surfaces in a zigzag manner along its width direction, and then refolded in half twice along its length direction to form four folding surfaces. The paper handkerchiefs are produced by flow production line, and the paper handkerchief folding device has high production efficiency and speed, and production cost is greatly reduced as well.

(2) According to the paper handkerchief folding device provided by the invention, minor modifications have been made to components of the longitudinal folding unit, the transverse folding unit and a piece counter to achieve more harmonious and smoother operation among them, decreased faults in process, greatly reduced manual procedures. The paper handkerchief folding device provided by the invention not only increases the production quantity of the paper handkerchief, but also enhances its quality, embossing is clearer, folding is neater and the defective rate is lower.

(3) Paper produced by the device of the invention is adjustable in specification. Specifically, a packaging bag is 54-62 mm long, 37-48 mm wide, and 17-19 mm high. The paper handkerchief in the packaging bag is 161-182 mm wide and 149-187 mm long, and is smaller, more attractive in appearance, and more convenient to carry.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019]

Fig.1 is a structural diagram of a longitudinal folding unit of the invention.

Fig. 2 is a front view of a structural diagram of a first longitudinal folding component of the invention.

Fig. 3 is a rear view of the structural diagram of a first longitudinal folding component of the invention.

Fig. 4 is a sectional view along line A-A in Fig. 3.

Fig. 5 is a structural diagram of the first longitudinal folding component without paper webs of the invention.

Fig. 6 is a structural diagram 1 of the first longitudinal folding component with paper webs of the invention.

Fig. 7 is a structural diagram 2 of the first longitudinal folding component with paper webs of the invention.

Fig. 8A is a structural schematic diagram 1 of a paper web, while being longitudinally folded, of the invention.

Fig. 8B is a transverse sectional view of a paper web while being folded according to the structural schematic diagram 1 in Fig. 8A.

Fig. 9A is a structural schematic diagram 2 of a paper web, while being longitudinally folded, of the invention.

Fig. 9B is a transverse sectional view of a paper web while being folded according to the structural schematic diagram 2 in Fig. 9A.

Fig. 10 is a schematic diagram of a transverse folding unit of the invention.

Fig. 11 is a schematic diagram of a flower plate unit of the invention.

Fig. 12 is a schematic diagram of the handkerchief folding device of the invention.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0020] The invention will be described in further detail with reference to the appended drawings, without any limitation thereto.

[0021] As shown in Fig. 12, a paper handkerchief folding device provided by an embodiment of the invention comprises a longitudinal folding unit 1, a transverse folding unit 2 and a flower plate unit 5 in a sequential connection on a cabinet, and paper webs 3 are sequentially strung on the longitudinal folding unit 1 and the transverse folding unit 2 in a tensioning mode.

[0022] With reference to Fig. 1, the longitudinal folding unit 1 comprises a first traction roller 11, a second traction roller 12, a third traction roller 13 as well as a first longitudinal folding component 14 and a second longitudinal folding component 15, wherein the first longitudinal folding component 14 is arranged between the first traction roller 11 and the second traction roller 12, and the second longitudinal folding component 15 is arranged between the second traction roller 12 and the third traction roller 13.

[0023] The first longitudinal folding component comprises a first folding plate and a second folding plate. The first folding plate is provided with a first bevel edge, a partially overlapped area formed with a first gap for the paper webs to pass through is arranged between the first folding plate and the second folding plate.

[0024] With reference to Figs. 2, 3 and 4, the first longitudinal folding component 14 comprises a first folding plate 141 and a second folding plate 142, the first folding plate 141 is provided with a first bevel edge 1411, a partially overlapped area formed with a first gap 4 for the paper webs 3 to pass through is arranged between the first folding plate 141 and the second folding plate 142.

[0025] Particularly, the first folding plate 141 may be of a right trapezoid shape, the second folding plate 142 may be of a rectangular shape, and a bevel edge of the right trapezoid is the first bevel edge 1411. A line segment, of which the length is just equal to the height of the trapezoid, is vertically made downwards from a peak A of the bevel edge of the first folding plate 141, and a first edge 1421 of the second folding plate 142 coincides with the height of the trapezoid so that an area, in which the first folding plate 141 and the second folding plate 142 are overlapped, is of a triangular shape. A leading-in end of the paper webs 3 of the second folding plate 142 is bent to form a first guide plate 1422. The second longitudinal folding component 15, of which the structure is identical to that of the first longitudinal folding component 14, comprises a third folding plate and a fourth folding plate, the position and direction of the second longitudinal folding component 15 are adjusted appropriately so as to fold the paper webs in a zigzag manner, the detailed description thereof will be omitted.

[0026] As shown in Fig. 10, the transverse folding unit 2 comprises a lead-in bed knife roller 21, a surface knife roller 22, a folding main roller 23, a first paper folding roller 24 and a second paper folding roller 25 which are arranged on a cabinet, wherein the surface knife roller 22 is tangent to the lead-in bed knife roller 21, and the first paper folding roller 24 and the second paper folding roller 25 are respectively tangent to the folding main roller 23; the lead-in bed knife roller 21 is provided with two slitting bed knives 211, the surface knife roller 22 is provided with two slitting surface knives 221, the first paper folding roller 24 is provided with a first paper folding knife 241 and a first air hole 242, and the second paper folding roller 25 is provided with a second paper folding knife 251 and a second air hole 252; and a throwing roller 26 and the folding main roller 23 are tangent to each other and then are fixedly installed on the cabinet.

[0027] As shown in Figs. 1, 5, 6 and 7, when folded longitudinally, the paper webs 3, under the action of the first traction roller 11, is transmitted to the first gap 4 of the first longitudinal folding component 14 along the first guide plate 1422. During this process, the first guide plate 1422 is used for guiding the paper webs 3 to make sure the latter are smoothly transmitted to the first gap 4 of the first longitudinal folding component 14, so as to prevent the paper webs 3 from being damaged, or avoid production cessation due to the breakage of the paper webs 3. Under the limit of the first bevel edge 1411 of the first folding plate 141, the paper webs 3 are folded along the first edge 1421 of the second folding plate 142 and then transmitted to a second gap of the second longitudinal folding component 15, and another side of the paper webs 3, in a longitudinal direction, is folded according to the above principal, as shown in Figs 8A and 8B, the paper webs 3 are averagely folded into three folding surfaces along its width in a zigzag manner. To be specific, the paper webs 3 of an embodiment of the invention has a width ranging from 161 mm to 182 mm, and correspondingly, edge a of the second folding plate 142 of the first longitudinal folding component 14 has a width ranging from 160 mm to 183 mm, and edge b of the fourth folding plate of the second longitudinal folding plate 15 has a width ranging from 52 mm to 62 mm. Preferably, the width of the edge a is 182 mm, and the width of the edge b is 61 mm.

[0028] As an another embodiment, as shown in Figs. 9A and 9B, the paper webs 3 are folded into three folding surfaces along its width in a zigzag manner. The paper web 3 is folded by a quarter of its width at the first time and then the paper web 3 is folded by a quarter of its width at the second time, therefore, the paper web 3 folded has 1/2 width of its original width. The width of the paper webs 3 ranges from 161 mm to 182 mm, and correspondingly, edge a of the second folding plate 142 of the first longitudinal folding component 14 has a width ranging from 160 mm to 183 mm, and edge b of the fourth folding plate of the second longitudinal folding plate 15 has a width ranging from 79 mm to 92 mm. Preferably,

the width of the edge a is 182 mm, and the width of the edge b is 91 mm. After being folded longitudinally, the paper webs 3 are transmitted to the transverse folding unit 2 under the action of the third traction roller 13.

[0029] As shown in Fig. 10, in the transverse folding unit 2, the paper web 3 is first cut into a preset length, then is folded in half along its length, and finally folded in quarter. In particular, the lead-in bed knife roller 21 is provided with two slitting bottom knives 211, an arc between the two slitting bed knives 211 has a length that is half the circumference of the lead-in bed knife roller 21. The paper webs 3 are first introduced into the lead-in bed knife roller 21 and then cut into sections by the slitting surface knife 221 between the lead-in bed knife roller 21 and the surface knife roller 22, and the slitting length is equal to the length of the arc between the two slitting bed knives 211, i.e. half the circumference of the lead-in bed knife roller 21. Since the paper handkerchief has a length ranging from 149 mm to 187 mm, correspondingly, an arc between the two slitting bed knives 211 has a length ranging from 148 mm to 188 mm, the lead-in bed knife roller 21 has a circumference ranging from 296 mm to 376 mm, and the lead-in bed knife roller 21 has a radius ranging from 46 mm to 61 mm. Preferably, an arc between the two slitting bed knives 211 has a length of 186 mm, correspondingly, the length of circumference of the lead-in bed knife roller is 372 mm. When a single row production line is used for producing, the radius of the lead-in bed knife roller 21 is 59.24 mm preferably, while when a double row production line is used for producing, the radius of the lead-in bed knife roller 21 is preferably 88.85 mm. Correspondingly, the circumference of the lead-in bed knife roller 21 and the length of the arc between the two slitting bed knives 211 should be adjusted accordingly, and the detailed description thereof will be omitted.

[0030] After slitting, the paper webs 3 will be cut into sizes actually needed for packaging and drawn on the folding main roller 23, moving along with the folding main roller 23 clockwise. The first folding roller 24 is provided with the first air hole 242 for drawing heads of the paper webs 3, and the first paper folding knife 241. As shown in Fig. 10, a theoretical value of the length of an arc between the first air hole 242 and the first paper folding knife 241 is 1/2 the length of each paper web 3, in view that the size of the first air hole 242 will not be taken into account and the first air hole 242 and the first paper folding knife 241 are regarded as a point. At the moment when the heads of the paper webs 3 are in contact with the first air hole 242 of the first paper folding roller 24, the paper webs 3 are drawn onto the first paper folding roller 24, moving anticlockwise along the first paper folding roller 24. When the length of each paper web 3 drawn onto the first paper folding roller 24 is equal to half the total length of the paper web 3, the first air hole 242 will discharge air, and the paper webs 3 will not be drawn, thus will not move along with the first paper folding roller 24. Then the first half of each paper web 3 will be overlapped with the latter half, and move with the folding main roller 23 clockwise. An arc between the first air hole 242 and the first paper folding knife 241 has a length ranging from 69 mm to 96 mm, and preferably 92 mm.

[0031] After being folded in half, the paper webs 3 are drawn onto the folding main roller 23, moving together with the folding main roller 23 clockwise. The second paper folding roller 25 is provided with the second air hole 252 for drawing the head of each paper web 3, and the second paper folding knife 251. When a theoretical value of the length of the arc between the second air hole 252 and the second paper folding knife 251 is 1/4 the length of each paper web 3, in view that the size of the second air hole 252 will not be taken into account, and the second air hole 252 and the second paper folding knife 251 are regarded as a point. At the moment when the head of each paper web 3 is in contact with the second air hole 252 of the second paper folding roller 25, the paper webs 3 are drawn onto the second paper folding roller 25, moving with the second paper folding roller 25 anticlockwise. When the length of each paper web 3 drawn onto the second paper folding roller 25 is equal to a quarter of the total length of each paper web 3, the second air hole 252 will discharge air, and the paper webs 3 will not be drawn, thus will not move along with the second paper folding roller 25. Then the first quarter of each paper web 3 will be overlapped with the latter quarter, and moves with the folding main roller 23 clockwise. The arc between the second air hole 252 and the second paper folding knife 251 has a length ranging from 34 mm to 49 mm, and is preferably 47 mm.

[0032] After being folded in quarter, the paper webs 3 will be extruded between the throwing roller 26 and the folding main roller 23, making the folding result better.

[0033] The paper webs 3 folded by the transverse folding unit 2 are sent into the flower plate unit 5 for piling up and packaging.

[0034] As shown in Fig. 11, a notch 51 of the flower plate unit 5 is 37-48 mm deep and 17-19 mm wide. Preferably, the notch 51 of the flower plate unit 5 is 47 mm deep and 18 mm wide, so that a tissue package 6 of a paper handkerchief formed by folding the paper web 3 is just accommodated into the notch 51, and its size is limited.

[0035] As shown in Fig. 12, according to the paper handkerchief folding device provided by the invention, the longitudinal folding unit 1, the transverse folding unit 2 and the flower plate unit 5 are connected on the cabinet sequentially, and paper webs are sequentially strung on the longitudinal folding unit 1 and the transverse folding unit 2 in a tensioning mode. The paper handkerchiefs are produced by flow production line, and the paper handkerchief folding device has high production efficiency and speed, low production cost, and the produced paper is adjustable in specification, and smaller and more exquisite. Minor modifications have been made to the components of the longitudinal folding unit, the transverse folding unit and a piece counting machine to achieve more

harmonious and smoother operation among them, decreased faults in process, greatly reduced manual procedures. The paper handkerchief folding device provided by the invention not only increases the production quantity of the paper handkerchief, but also enhances its quality, embossing is clearer, folding is neater and the defective rate is lower.

[0036] It is noted that the above mentioned are only the preferred embodiments of the invention, without limiting the protection scope of the invention. Furthermore, the structures of various parts above can be modified equivalently. Thus, all equivalent structure changes made according to the specification and graphic contents of the invention, and that are directly or indirectly applied to other relevant technical fields, are included in the scope covered by the invention.

Claims

1. A paper handkerchief folding device, comprising at least one longitudinal folding unit, at least one transverse folding unit and a flower plate unit, which are connected on a cabinet sequentially, wherein paper webs are sequentially strung on the longitudinal folding unit and the transverse folding unit in a tensioning mode, wherein, the longitudinal folding unit comprises at least two traction rollers, and a longitudinal folding component is arranged between the two traction rollers; the paper handkerchief folding device is **characterized in that**:

   the longitudinal folding component comprises two folding plates, one of which is provided with a bevel edge, and a partially overlapped area is arranged between the two folding plates; a gap for paper webs to pass through is formed in the partially overlapped area, and the paper webs are folded along one side of the other folding plate under the limit of the bevel edge.

2. The paper handkerchief folding device according to claim 1, **characterized in that**: the traction rollers comprise a first traction roller, a second traction roller, a third traction roller and two longitudinal folding components, a first longitudinal folding component is arranged between the first traction roller and the second traction roller, and a second longitudinal folding component is arranged between the second traction roller and the third traction roller.

3. The paper handkerchief folding device according to claim 2, **characterized in that**: the first longitudinal folding component comprises a first folding plate and a second folding plate, the first folding plate is provided with a first bevel edge, a partially overlapped area, in which a first gap for the paper webs to pass through is formed, is arranged between the first folding plate and the second folding plate;
   the second longitudinal folding component comprises a third folding plate and a fourth folding plate, the third folding plate is provided with a second bevel edge, and a partially-overlapped area formed with a second gap for the paper webs to pass through is arranged between the third folding plate and the fourth folding plate.

4. The paper handkerchief folding device according to claim 3, **characterized in that**: the first folding plate and the third folding plate are of a right-angled trapezoid shape, the second folding plate and the fourth folding plate are of a rectangular shape, and the first bevel edge and the second bevel edge are bevel edges of the right trapezoid; a line segment is vertically made downwards along the peak of the bevel edge in such a way that the length of the line segment is equal to the height of the trapezoid, and the second folding plate and the fourth folding plate just coincide with the line segment at one side thereof.

5. The paper handkerchief folding device according to claim 1, **characterized in that**: the other folding plate is provided with a guide plate for the lead-in of the paper webs, and a certain angle is formed between the guide plate and the other folding plate.

6. The paper handkerchief folding device according to claim 3, **characterized in that** the second folding plate is 160-183 mm wide, preferably 182 mm; the fourth folding plate is 52-62 mm or 79-92 mm wide, preferably 61-91 mm.

7. The paper handkerchief folding device according to claim 1, **characterized in that** the transverse folding unit comprises a lead-in bed knife roller, a surface knife roller, a folding main roller, a first paper folding roller and a second paper folding roller, which are arranged on a cabinet, the surface knife roller is tangent to the lead-in bed knife roller, and the first paper folding roller and the second paper folding roller are respectively tangent to the folding main roller; the lead-in bed knife roller is provided with two slitting bed knives, the surface knife roller is provided with two slitting surface knives, the first paper folding roller is provided with a first paper folding knife and a first air hole, and the second paper folding roller is provided with a second paper folding knife and a second air hole.

8. The paper handkerchief folding device according to claim 7, **characterized in that** the cabinet is further provided with a throwing roller tangent to the folding main roller, and the throwing roller and the folding main roller are used for extruding the paper webs folded in quarter.

9. The paper handkerchief folding device according to claim 7, **characterized in that** an arc between the two slitting bed knives has a length of half the circumference of the lead-in bed knife roller.

10. The paper handkerchief folding device according to claim 7, **characterized in that** a length of the arc between the two slitting bed knives is 148-188 mm, preferably 186 mm; the lead-in bed knife roller has a circumference of 296-376 mm, preferably 372 mm; the lead-in bed knife roller has a radius of 46-61mm, preferably 59.24 mm; an arc between the first air hole and the first paper folding knife has a length of 69-96 mm, preferably 92 mm; and an arc between the second air hole and the second paper folding knife has a length of 34-49 mm, preferably 47 mm.

11. The paper handkerchief folding device according to claim 1, **characterized in that** a notch of the flower plate unit has a depth of 37-48 mm, preferably 47 mm, and a width of 17-19 mm, preferably 18 mm.

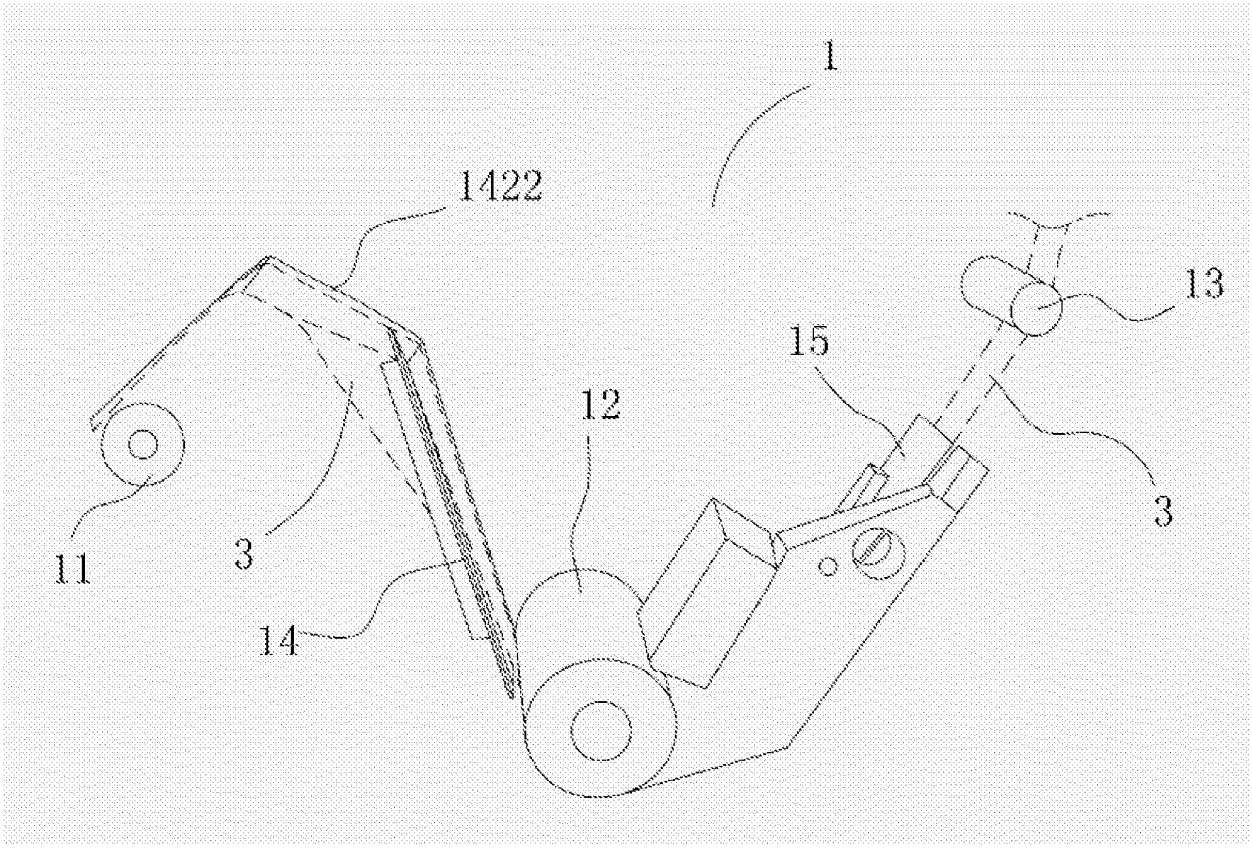


Fig.1

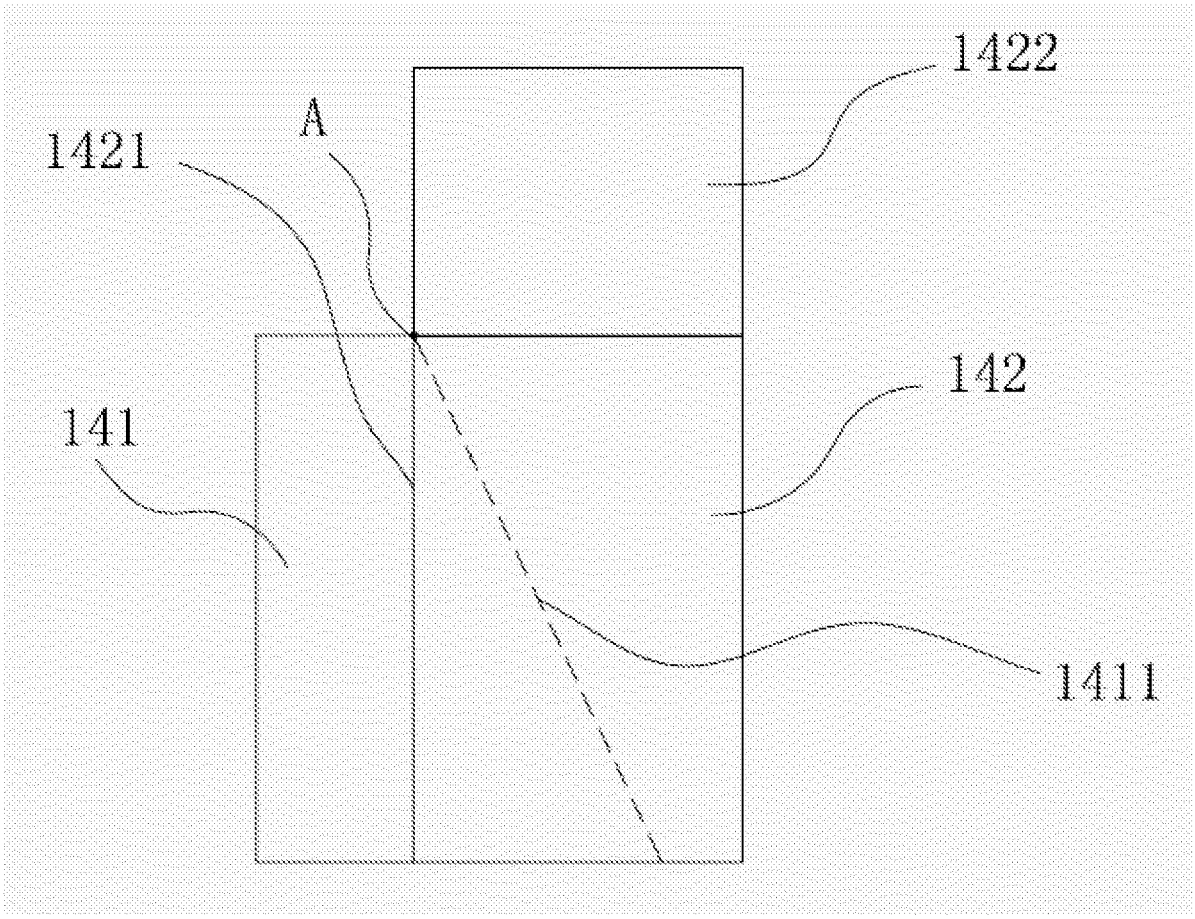


Fig.2

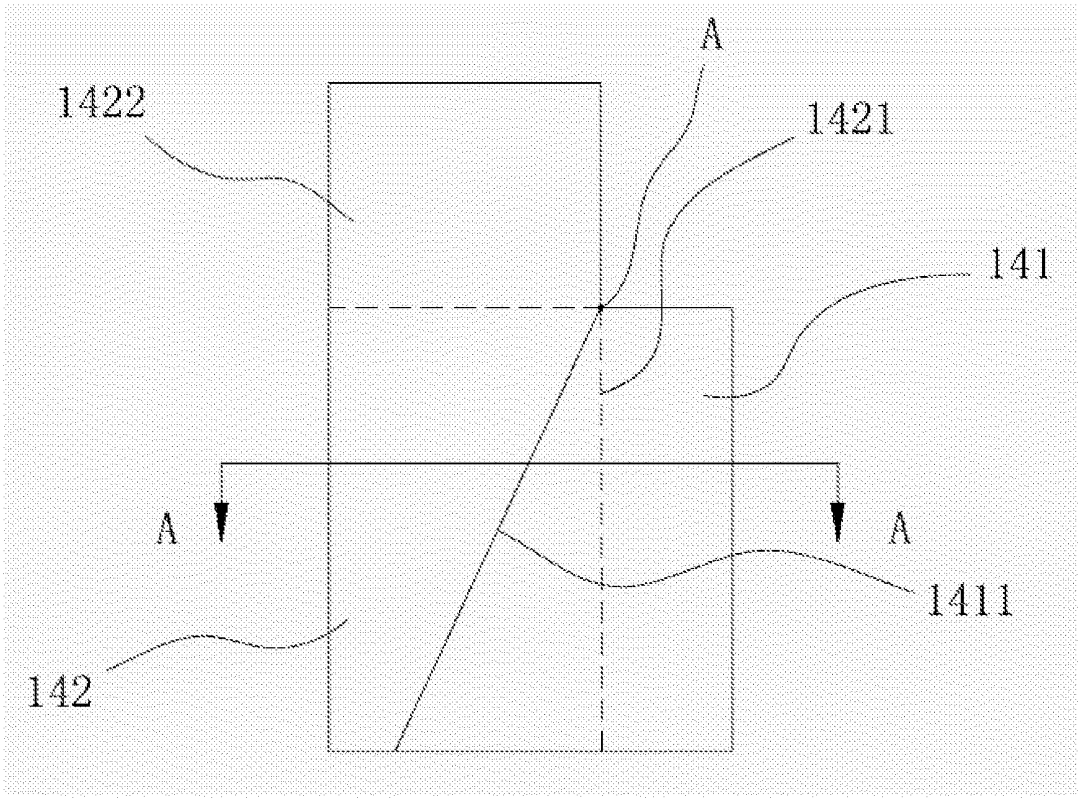


Fig.3

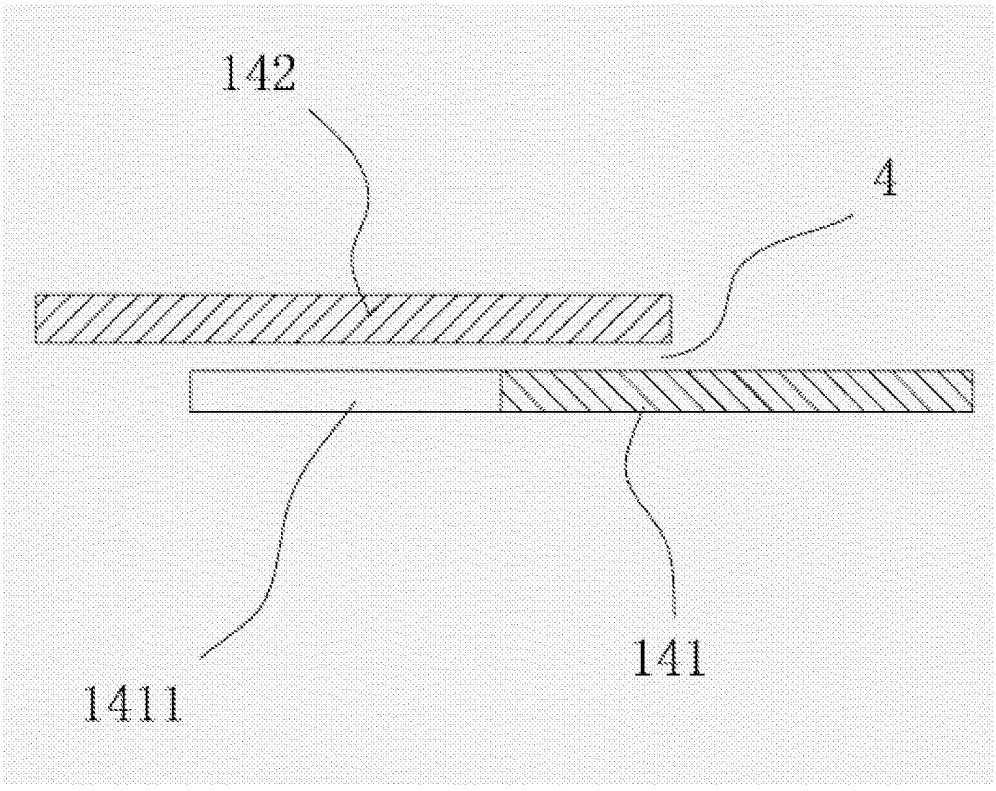


Fig.4

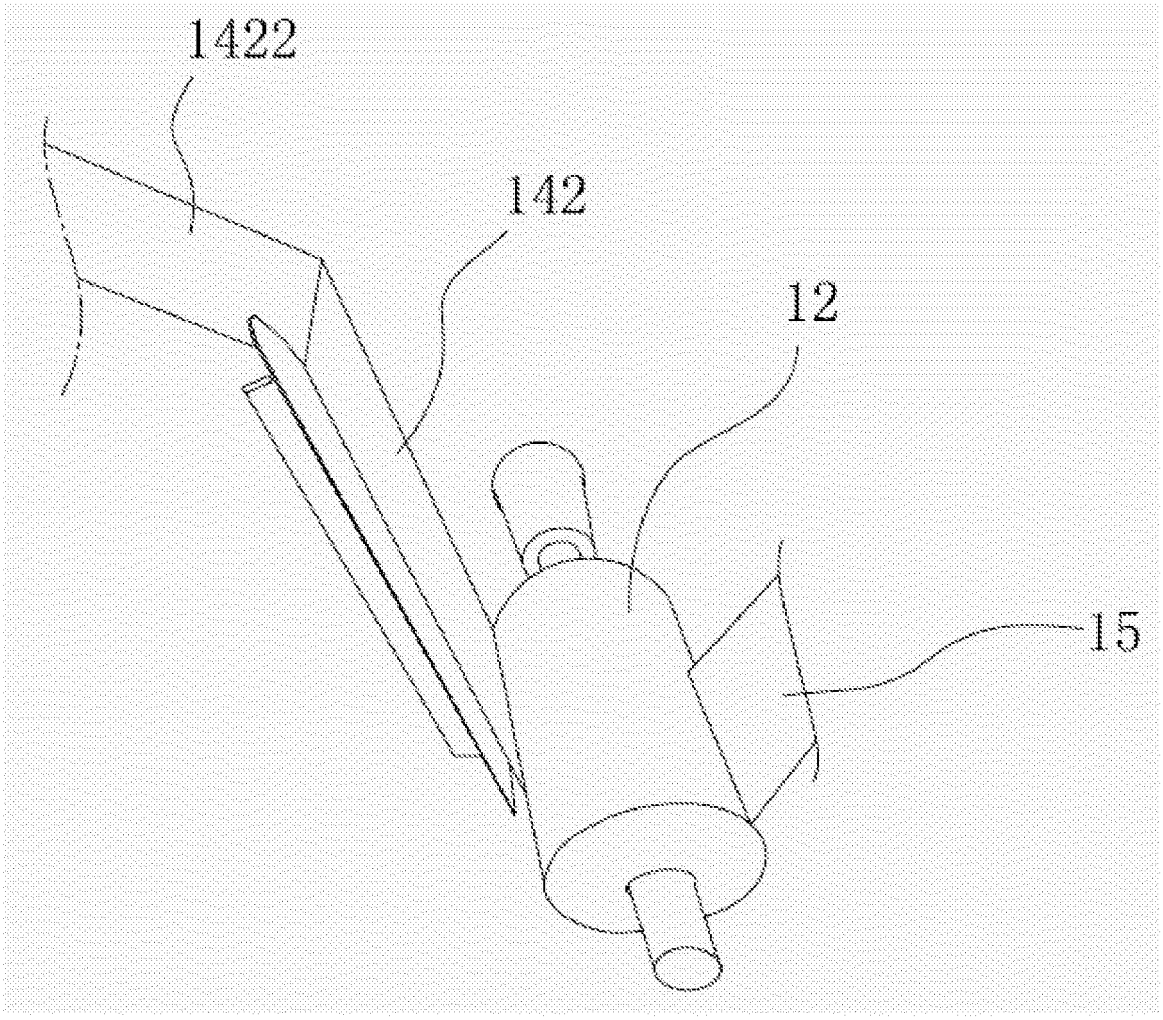


Fig.5

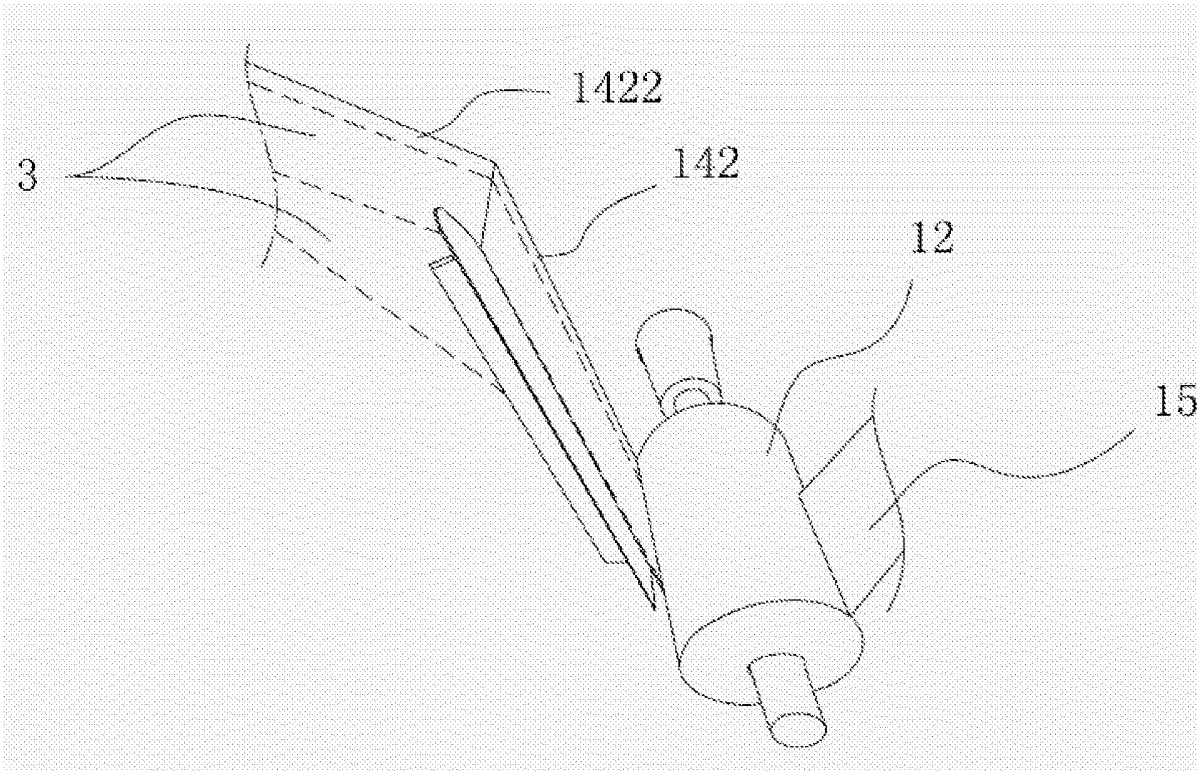


Fig.6

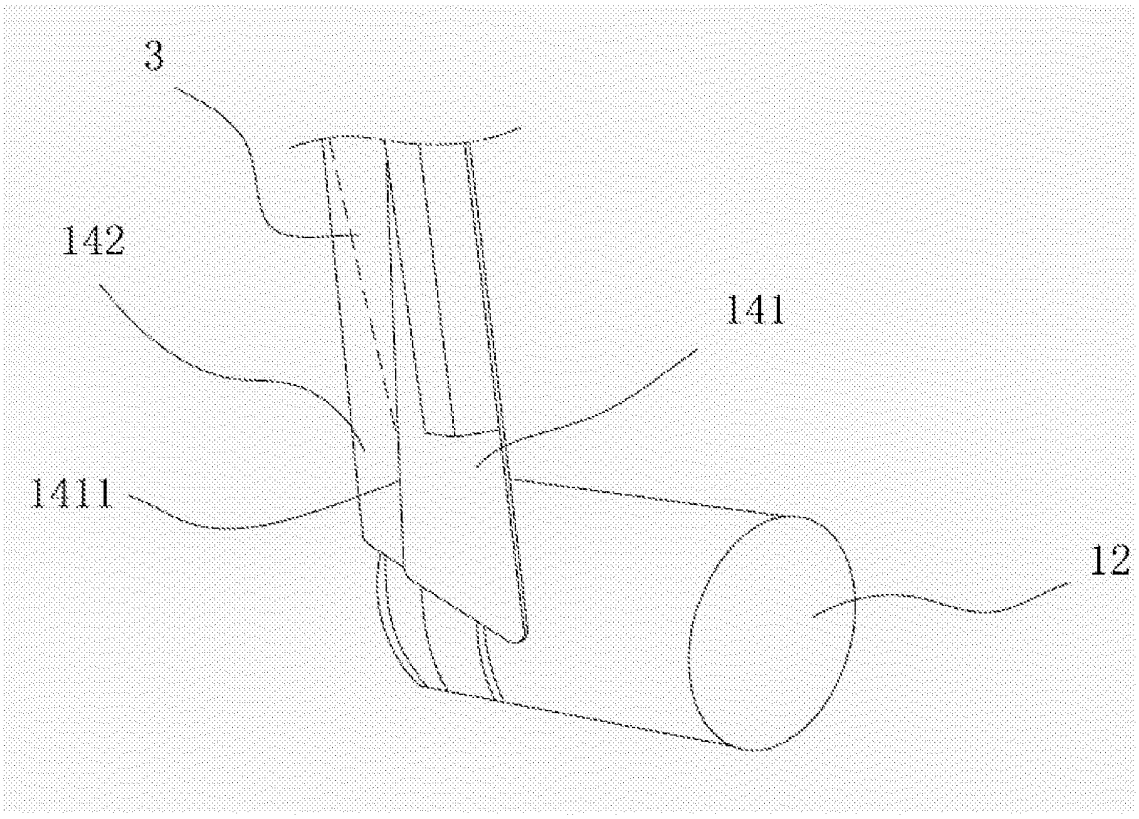


Fig.7

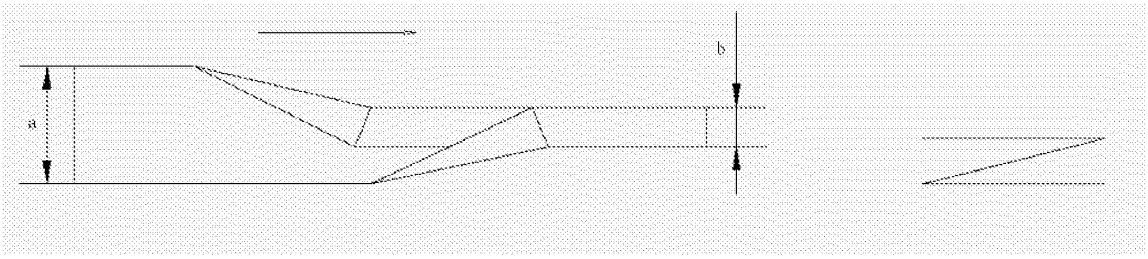


Fig.8A

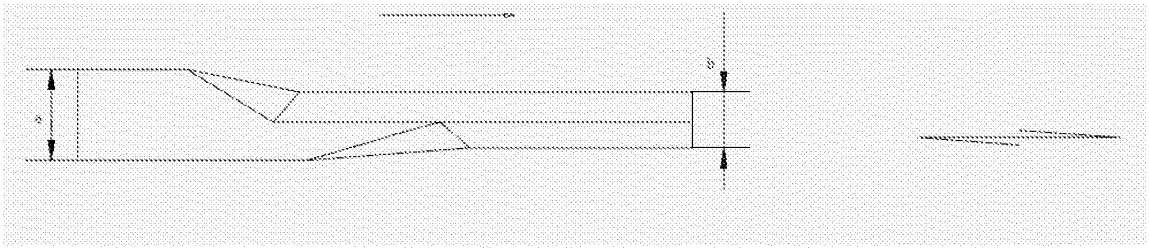


Fig.9A

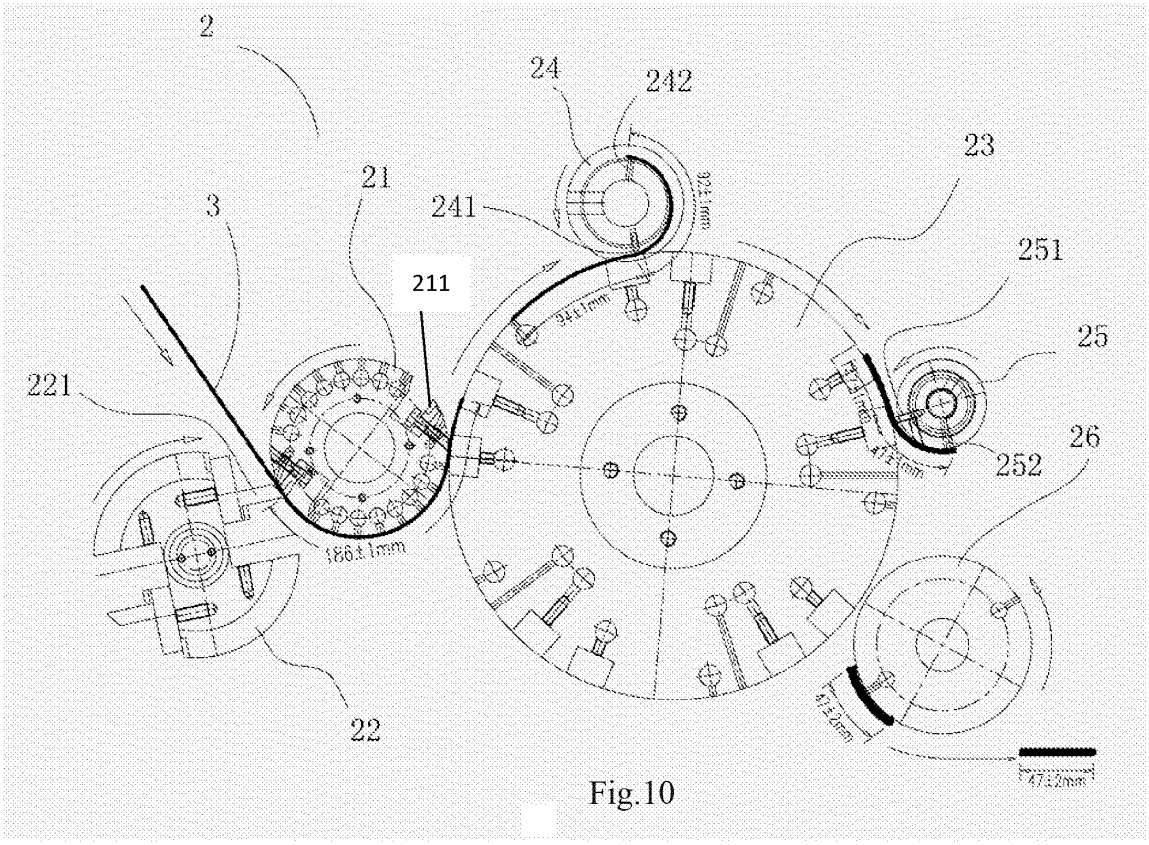


Fig.10

Fig.8B

Fig.9B

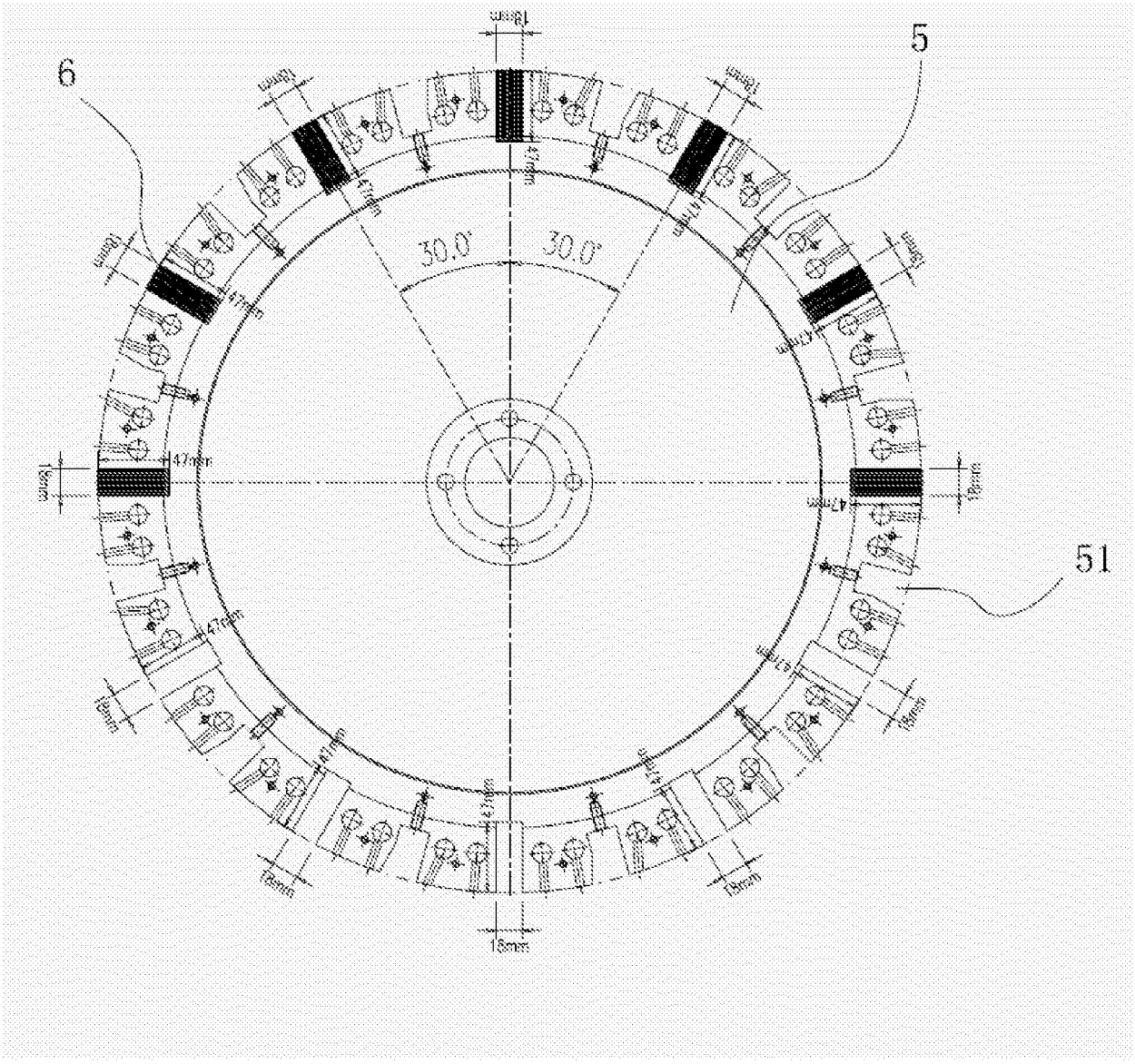
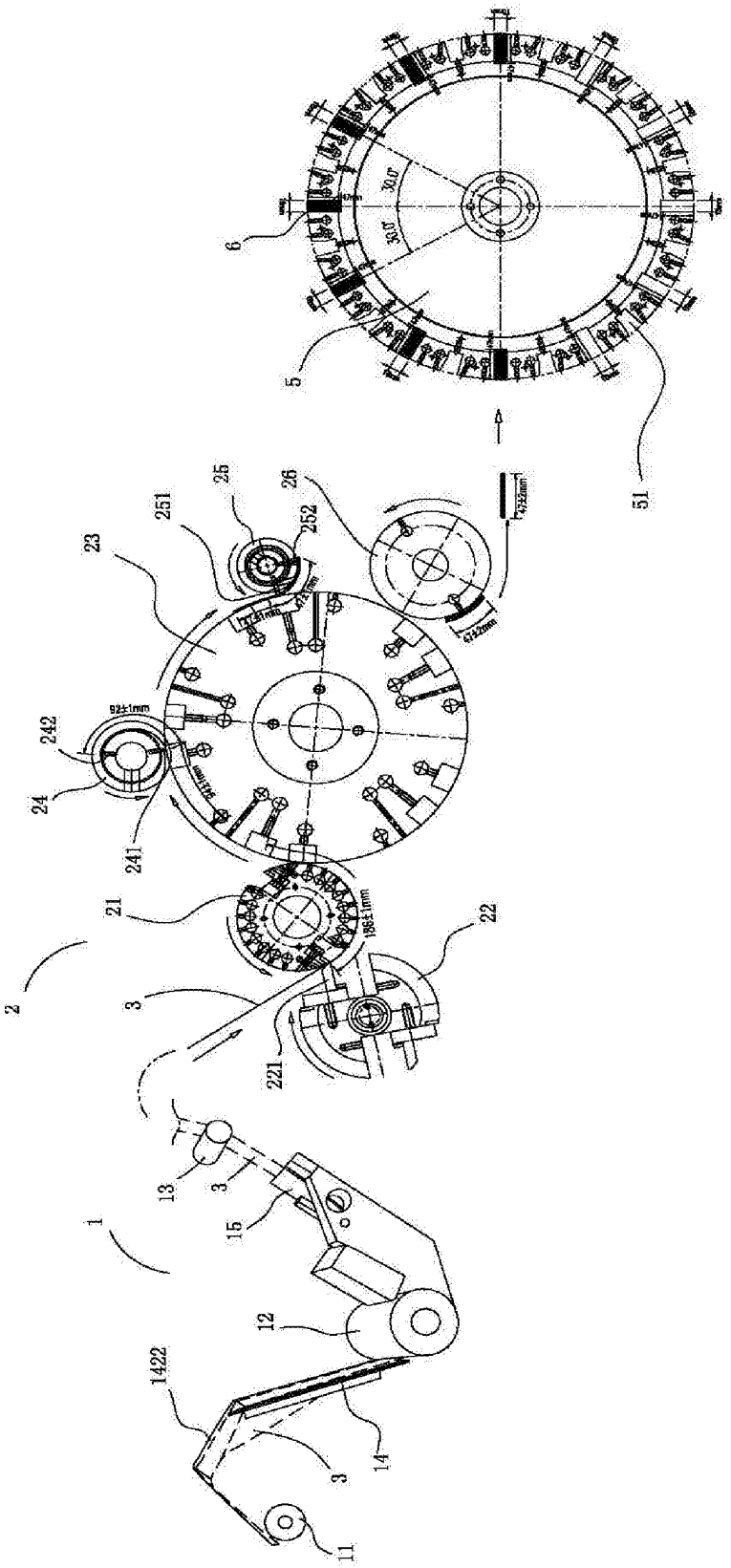


Fig.11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252
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241
21
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221
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3
15
1
12
1422
3
14
11

Fig.12

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2014/079470

A. CLASSIFICATION OF SUBJECT MATTER

B65H 45/16 (2006.01) i; B65H 45/22 (2006.01) i; B31D 1/04 (2006.01) i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC: B65H 45, B31D 1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CNTXT, CNABS, VEN, SIPOABS: b65h45/+, B31D1/+, fold+, longitudinal, transverse, handkerchief, hank+, napkin, serviette, triangle, bevel, inclin+, oblique, disc

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 103332525 A (C&S PAPER CO., LTD.), 02 October 2013 (02.10.2013), claims 1-11	1-11
PX	CN 203461211 U (C&S PAPER CO., LTD.), 05 March 2014 (05.03.2014), description, paragraphs [0031]-[0041], and figure 12	1-11
PX	CN 103342007 A (C&S PAPER CO., LTD.), 09 October 2013 (09.10.2013), description, paragraphs [0055]-[0072], and figure 12	1-11
Y	JPS 4733210 U (YONEYAMA, G.), 14 December 1972 (14.12.1972), description, page 2, line 19 to page 7, line 3, and figures 1-4	1-11
Y	CN 202293441 U (JIANGXI OUKE TECHNOLOGY CO., LTD.), 04 July 2012 (04.07.2012), description, paragraphs [0025]-[0027], and figures 8-9	1-11
A	CN 101474891 A (LI, Yulong), 08 July 2009 (08.07.2009), the whole document	1-11

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 August 2014 (14.08.2014)	**19 September 2014 (19.09.2014)**
Name and mailing address of the ISA/CN: State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No.: (86-10) 62019451	Authorized officer **WU, Xiaoxia** Telephone No.: (86-10) **010-62084157**

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2014/079470

Patent Documents referred in the Report	Publication Date	Patent Family	Publication Date
CN 103332525 A	02 October 2013	None	
CN 203461211 U	05 March 2014	None	
CN 103342007 A	09 October 2013	None	
JP S4733210 U	14 December 1972	JP S512644 Y2	26 January 1976
CN 202293441 U	04 July 2012	None	
CN 101474891 A	08 July 2009	None	

Form PCT/ISA/210 (patent family annex) (July 2009)