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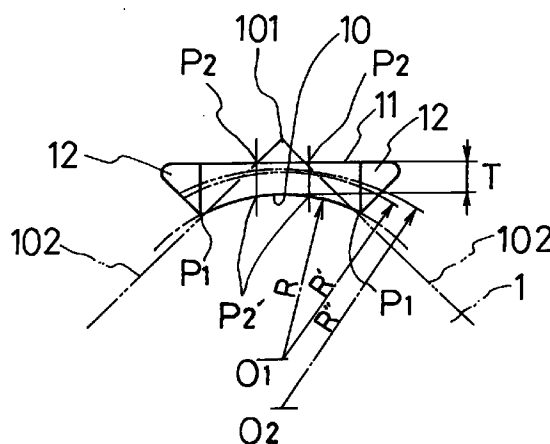
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(54) **A corner cutter**

(57) A movable blade provided with a circular edge (10) for cutting the corner (102) of the paper (1) and a straight edge (11) for cutting the corner edge (101) is inserted in a movable blade inserting hole provided in the stationary blade, and the corner (102) of the paper (1) inserted in a slit is cut between the stationary edge, and the circular edge (10) and the straight edge (11). Thereby, during the cutting of the corner (102) by the straight edge (11), both of the circular edge (10) and the straight edge (11) cut the corner (102), the corner (102) is cut in the state of being tensioned between the circular edge (10) and the straight edge (11), as if the corner edge (101) is held by the straight edge (11), thereby, the bite of the paper is disappeared to be handled easily and an uneven alignment of the cut corners is diminished.

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EP 0 761 394 A1

Description

Background of the invention

Field of the invention

The present invention relates to a corner cutter to cut a corner of sheet of paper in a rounded shape.

Prior art

Conventionally, in general, there is a case where the corners of sheet of papers such as "Loose Leaf" (a trade name) to be bound in a binder are to be cut in a rounded shape. In this case, since there has not been an appropriate corner cutter, it has been cut to make the corner circle with normal scissors. And, the corners of such as loose leaf found in a market are mostly rounded, which usually have been cut, as shown in Fig. 10, by pushing down a cutter 3 of a semi-circular shape and cutting the corner 4 of the stacked sheets of paper 1.

In the above conventional manner, when cutting the corner of sheet of paper using a scissors, the rounded or circle arch of the cut corners are not set in order to show good appearance, and not efficient for making the plural corners rounded at a time. And, when using the semi-circular cutter 3 as shown in Fig. 10, although the circular shape cut in a rounded or circle arch is in order, in the case of not an adult, for instance a child, he is apt to be hurt, so that it is not appropriate as a stationery, in addition it becomes expensive when it is arranged to be adapted to push down the cutter 3 mechanically.

Summary of the invention

The present invention relates to a corner cutter, which gives corners of the paper the stable rounded shape and is very simple in operation as a business machine and cheap in the cost.

The present invention according to the claim 1 comprises, in order to solve the above problem, a stationary blade and a movable blade. The stationary blade is provided with a slit for papers to be inserted for being cut and a hole perpendicular to the slit, into which the movable blade is inserted. The stationary edge is formed at the position, where said slit and the hole to be inserted by the movable blade intersect. The bottom end of the movable blade is provided with a circular edge for cutting away a corner of the paper in a rounded corner shape and a straight edge for cutting the corner in a linear line, and the radius of the circular edge is made larger than the radius of any circle tangential to the sides of square corner.

The present invention according to the claim 2, the circular edge and the straight edge of the movable blade are formed concave to the stationary edge respectively.

The present invention according to the claim 3, guide portions are formed on both sides of the above

circular edge and the straight edge of the movable blade.

The present invention is attained as mentioned below according to the claim 1. As shown in Fig. 1, the cutter comprises a stationary blade 5 and a movable blade 7, and the stationary blade 5 is provided with a slit 6 for being inserted by the papers to be cut in rounded corner shape, and perpendicular to this slit 6 a movable blade inserting hole 8 is provided. A stationary edge 9 is formed at the intersection of the slit 6 and the movable blade inserting hole 8. And, as shown in Fig. 2, on the bottom end of the movable blade 7 to be inserted in the hole 8 the circular edge 10 for cutting the corner 102 of the paper 1 and the straight edge 11 for cutting the corner edge 101 of the paper 1 are provided, and the radius R of the circular edge 10 is made larger than the radius R1 (refer to Fig. 11) of any circle which is tangential to the sides of a square corner of a paper.

The present invention obtained from the claim 2 resides in that the circular edge 10 and the straight edge 11, which are provided on the bottom of the movable blade 7, are configured concave to the stationary edge 9.

The present invention obtained from the claim 3 resides in that there is provided the guide portions 12 on both sides of the concave edge of the above circular edge 10 and the straight edge 11 respectively.

Brief description of the drawings

Fig. 1 is a front view of the main part of the movable blade in the embodiment of the present invention

Fig. 2 is a bottom view of Fig. 1

Fig. 3 is a sectional view of the main portion along A - A line of Fig. 1

Fig. 4 is a plan view of the holding portion provided on the stationary blade

Fig. 5 is a perspective view of a broken corner cutter

Fig. 6 is a vertically sectional view of the corner cutter assembled

Fig. 7 is a sectional view in vertical along B - B line of Fig. 6

Fig. 8 shows the portion of punching out blade in vertical section, which is provided together with the corner cutter

Fig. 9 is a bottom view of the bottom plate of Fig. 5

Fig. 10 is a perspective view of a conventional art

Fig. 11 is for general explanation for a corner cutting

Fig. 12 is for general explanation for a corner cutting

Embodiment

Hereinafter, an embodiment of the present invention will be explained. First, based on Fig. 5, a corner cutter is explained as a whole. The movable blade 7 is fastened to the member which is in a unit with a spring

receiver 16 for accepting a spring 17 and a holding portion 15 for operating the movable blade 7 into the pushing down. And, above the upper surface of the stationary blade 5 a spring holding portion 22 for holding the spring 17 is projected, and the movable blade inserting hole 8 passes through the slit 6 in such a manner as it intersects perpendicular to the slit 6. A cap 13 is covered while inserting the spring 17 between the stationary blade 5 and the spring receiver 16, by inserting the holding portion 15 in the hole 14 pierced the cap 13 and coupling the cap 13 with the stationary blade 5, the spring 17 is fixed between the stationary blade 5 and the spring receiver 16. And, when pushing the holding portion 15 projected from the hole 14 provided on the cap 13, the movable blade 7 pushed down is adapted to be lifted up by the spring 17.

On the bottom plate 18, the guide portions 19 for guiding the corner 102 of the paper 1 are provided, and by inserting the corner 102 of the paper 1 into the slit 6 guiding it along the guide portions 19, the corner edge 101 is positioned at an appropriate position in respect to the stationary edge 9 (Fig. 1) of the stationary blade 5. 20 is a hole for disposing the cut wastes. The cut wastes are adapted to be disposed from this hole. 21 is a cover which protects hand from touching the edge of the blade when pushing down the movable blade 7. This bottom plate 18 is mounted removably on the back surface of the stationary blade 5.

Figs. 6 and 7 show the assembled corner cutter in vertical section. As appeared in Figs. 6 and 7, when the cap 13 is covered on the upper surface 181 (Fig. 5) of the bottom plate 18 so as to get in touch with the bottom end of the cap 13, a gap 191 is formed due to the step of the guide portions 19. This gap 191 is in line with the slit 6 provided in the stationary blade 5, so that the paper 1 can be inserted by being guided in the guide portions 19 into the slit 6.

Figs. 1 and 2 show the details of the main portion of the movable blade 7 of Fig. 5, and in Fig. 2 showing the bottom of the movable blade 7, at the bottom end of the movable blade 7, the circular edge 10 for cutting the corner of the paper 1 in a rounded shape and the straight edge 11 for cutting the corner edge 101 of the paper 1 are provided. The width T between the center of the circular edge 10 and the straight edge 11 is settled in such a manner as the corner edge 101 of the paper 1 projects from the straight edge 11 when it is set along the guide portions 19 provided on the bottom plate 18 in respect to the corner 102 of the paper 1 and inserted in the slit 6. Further, the radius of curvature of the radius R of the circular edge 10 of the blade is, as shown in Fig. 11, set larger than the one of the radius R1 of the circle which is tangential to the corner 102 of the paper 1. On the other hand, the straight edge 11 is formed linear in this embodiment. That is, by setting $R > R1$, the circular edge 10 and the corner 102 intersects at the point P1, and as seen in Fig. 1, the front view of the movable blade 7, by making the configuration of the circular edge 10 and the straight edge 11 to be concave to the station-

ary edge 9, the paper 1, as shown in Fig. 12, is cut from the intersection P1 (hereinafter referred to "P1") formed between the circular edge 10 and the corner 102 toward inside like an arrow. This cutting is carried out like a scissors which cuts a paper. Thus, by cutting the paper 1 from P1 toward inside like an arrow, the stuffing up of the corner 102 between the movable blade 7 and the stationary blade 5 may be prevented, and secure the cutting of the paper from the intersection P1 to make the operation lighter.

Further, as shown in Fig. 2, by projection of the corner edge 101 from the straight edge 11, during cutting the corner 102 of the paper 1 by the circular edge 10 from the P1 to the intersection P2' (hereinafter referred to "P2'"), the straight edge 11 has not started to cut the corner 102, thereby the cutting load during that time becomes lighter. And when the cutting of the circular edge 10 progresses to the P2', the straight edge 11 starts to cut the corner 102 from the intersection P2 (hereinafter referred to "P2") formed between the straight edge 11 and the corner 102. Thereby, the cutting of the circular edge 10 and the straight edge 11 is carried out simultaneously. That is, during the cutting the space between P2' by the circular edge 10, the straight edge 11 cuts the space between P2, which may cause the straight edge 11 to hold the corner edge 101 of the paper 1 (actually simultaneous cutting), so that the circular edge 10 can cut the space between P2' securely.

Further, in the present embodiment the circular edge 10 is formed semi-circular of the radius R, and linear in respect to the straight edge 11, since the guide portions 12 can guarantee the strength, the dimension of T of Fig. 2 can be set as small as possible. Thereby, the P2 can reach to the P1 at the time of cutting, the starting of holding (actually simultaneous cutting) the corner edge 101 begins as soon as possible, and while preventing the corner edge 101 from slipping away, the circular edge 10 can cut the corner in the radius R more securely.

In addition, although the configuration of the straight edge 11 is linear, by making the dimension T as small as possible as long as the circular edge 10 and the straight edge 11 can allow, i.e. making the straight edge 11 approach to an arch-like having the concentric radius R' same to the center O₁ of the circular edge 10, as shown in Fig. 2, to approach P2 to P1, at an early time the holding (actually simultaneous cutting) of the corner edge 101 can be carried out, the cutting in the radius R by the circular edge 10 may be more secured. Further, the straight edge 11 may be formed in a larger radius of R'', the center of which is shifted from the center O₁ of the circular arch of the circular edge 10 to O₂. In that case, the configuration of the hole 8 for inserting the movable blade shown in Fig. 4 is made to the circular arch having the radius R'' of the center O₂ from the radius R' of the center O₁.

Thus, by both of the circular edge 10 and the straight 11 the corner 102 of the paper 1 is cut, so that

the escape of the corner edge 101 from being cut is prevented, and the corner 102 is cut in a tensioned state. Thereby, comparing this with the case in which the paper is cut only between, for instance, the circular edge 10 and the stationary blade 9, the allowance of the clearance precision between the stationary blade 9 and, the circular edge 10 and the straight edge 11 can be loosened by 1/2 of the conventional one. Accordingly, the workability of the circular edge 10, the straight edge 11 and the stationary blade 9 becomes improved.

On both sides of the concave edge of the circular edge 10 and the straight edge 11, there are provided with the guide portions 12, and the length of the guide portions 12 is adapted to remain in crossing the stationary edge even when the movable blade 7 is lifted at upper most due to the elastic force of the spring 17. Thereby, the circular edge 10 and the straight edge 11 can cross the slit 6 smoothly, and the clearance precision between the stationary edge 9 is increased, and as shown in Fig. 9, while the corner 102 of the paper 1 inserted in the slit 6 is guided by the guide portions 19 provided on the bottom plate 18, the positioning precision of the paper 1 to the circular edge 10 is more increased. Thereby, the uneven cut of the corner 102 of the paper 1 in the roundness of radius R is avoided.

Fig. 4 shows the plan view of a spring holding portion 22 of the stationary blade 5, and the configuration of the movable blade inserting hole 8 is similar to the one of the movable blade 7. Fig. 8 shows the case where a punch 23 is provided together with the movable blade 7, in which, for instance as shown in Fig. 12, the cutting of the corner 102 in a rounded shape is carried out simultaneously with the punching a pattern 103. In the case where this punch 23 is provided, a hole which is similar to the pattern and crosses through the slit 6 perpendicularly is provided in the stationary blade 5 separately from the movable blade inserting hole 8.

The function of the present invention thus constituted will be explained next. As shown in Fig. 3, since the corner 102 of the paper 1 inserted in the slit 6 is adapted to be cut between the stationary blade 5, and the circular edge 10 for cutting the corner of the paper 1 and the straight edge 11 for cutting the corner edge 101 of the paper 1, which are provided on the bottom end of the movable blade 7 crossing through the hole 8, during the cutting of the corner 102 by the straight edge 11, both of the circular edge 10 and the straight edge 11 can cut the corner 102. Thus, simultaneously, both of the circular edge 10 and the straight edge 11 can cut the corner 102, so that the corner 102 is in the state where it is tensioned between the circular edge 10 and the straight edge 11, and as if the corner edge 101 is held by the straight edge 11, when the corner 102 is cut in the given radius by the circular edge 10.

Since the radius R of the circular edge 10, in the cutting of the corner 102 by the circular edge 10, is made larger than the radius R1 (refer to Fig. 11) tangential to the square sides of the corner 102, by which the corner 102 does not bite between the circular edge 10

and the stationary edge 9, and the circular edge 10 is secured to cut in the corner 102 at the P1.

Further, the movable blade inserting hole 8 is provided by crossing laterally perpendicular to the slit 6 provided on the stationary blade 5, so that at the intersection where the slit 6 and the movable blade inserting hole 8 cross the stationary edge 9 is formed, and the corners 102 of the paper 1 stacked and inserted in the slit 6 are cut the corners in the same radius.

And, since the configuration of the circular edge 10 and the straight edge 11 of the movable blade 7 has been concave to the stationary edge 9, when the movable blade 7 is pushed down, as shown in a phantom line of Fig. 1, the corner of the paper 1 is cut at the intersections of P1' and P1" which are formed between the stationary edge 9, and the circular edge 10 and the straight edge 11 respectively, which is operated lightly like a scissors, and that, as shown in Fig. 12, the corner 102 is cut from both sides similarly in the arrow direction, so that the paper 1 positioned is not displaced at the time of cutting.

Since, on both sides of the concave edge of the circular edge 10 and the straight edge 11, the guide portions 12 are provided, as shown in Fig. 2, the corner edge 101 can be positioned to the circular edge 10. Further, as shown in Fig. 6, when the movable blade 7 is lifted up mostly due to the resilient force of the spring 17, the guide portions 12 are adapted to employ the length by which the guide portions 12 remain still in the stationary edge 9, thereby the clearance between the stationary edge 9, and the circular edge and the straight edge 11 can be maintained precisely, to cut well.

As mentioned above, according to the present invention obtained from the detailed explanation based on the claim 1, the movable blade having the circular edge for cutting the corner of the paper and the straight edge for cutting the corner edge of the paper at the bottom end is inserted in the movable blade inserting hole and adapted to cut the corner of the paper inserted in the slit between the stationary edge, and the circular edge and the straight edge. And during the cutting of the corner by the straight edge, both of the circular edge and the straight edge cut the corner, so that the corner is in the state tensioned between the circular edge and the straight edge as if the straight edge holds the corner edge, and the corner is cut in a given radius. Thereby, there is no bite of the paper, the easy handling is secured and the uneven alignment of the cut corners is disappeared.

Further, since the movable blade inserting hole is provided in such a manner as crossing laterally in a right angle direction, the stationary blade is formed at the intersection where the slit and the movable edge intersect and the stacked corners inserted in the slit are cut vertically in the same radius, the productivity is effective and there is no anxiety of displacement even if the stacked plural papers are cut, avoiding the uneven alignment of the cut corners.

Further, since the radius R of the circular edge is

larger than the radius of the circle tangential to the sides of the corner and the bite of the corner between the stationary edge and the circular edge is disappeared to secure the cutting in the corner, there is no need for taking away the stuffed corners and the handling as a business machine becomes easy and the cutting position to the corner becomes always stable to diminish the uneven alignment of the cut corners. 5

Next, since, according to the present invention based on the claim 2 obtained from the detailed explanation, the configuration of the circular edge and the straight edge, which are provided on the bottom end of the movable blade is made concave to the stationary edge and the corner can be cut lightly as if a scissors is used, the corner cutter is handled easily as a business machine and the corner can be cut from both sides similarly, which secures the corner as positioned without displacement to diminish the uneven alignment of the cut corners. 10 15

Next, since, according to the present invention based on the claim 3 obtained from the detailed explanation, on both sides of the circular edge and the straight edge, the guide portions are provided and the straight edge is positioned to the circular edge, the positioning precision of the cut corner is increased and stable to diminish the uneven alignment of the cut corners. And, as the structure is simple, it becomes a cheap business machine, and it is sufficient to insert the papers in the slit and push down the holder, and which makes it easy to be handled as the business machine. 20 25 30

Claims

1. A corner cutter comprises:

a stationary blade, 35
a movable blade, said stationary blade being provided with a slit and a movable blade inserting hole which intersects perpendicularly to the slit, 40
a stationary edge which is formed at the intersection between the slit and the movable blade inserting hole
a circular edge and a straight edge, which are provided on the bottom end of the movable blade, the radius R of the circular edge is formed larger than the radius of a circle which is tangential to the sides of a square corner. 45

2. A corner cutter according to the claim 1, wherein the circular edge and the straight edge, which are provided on the bottom end of the movable blade are configured concave to the stationary edge. 50

3. A corner cutter according to the claim 1 or 2, wherein on both sides of the concave edge of the circular edge and the straight edge guide portions are provided. 55

FIG. 1

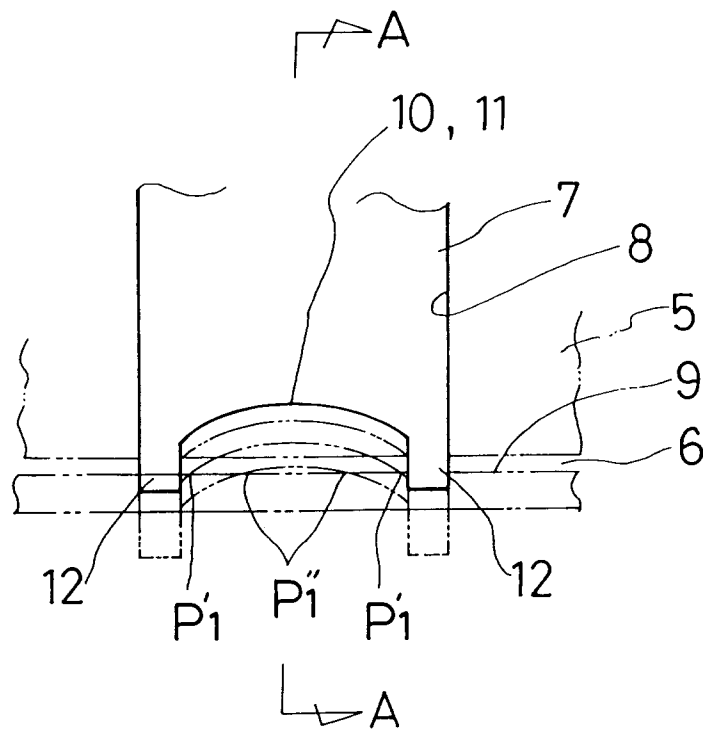


FIG. 2

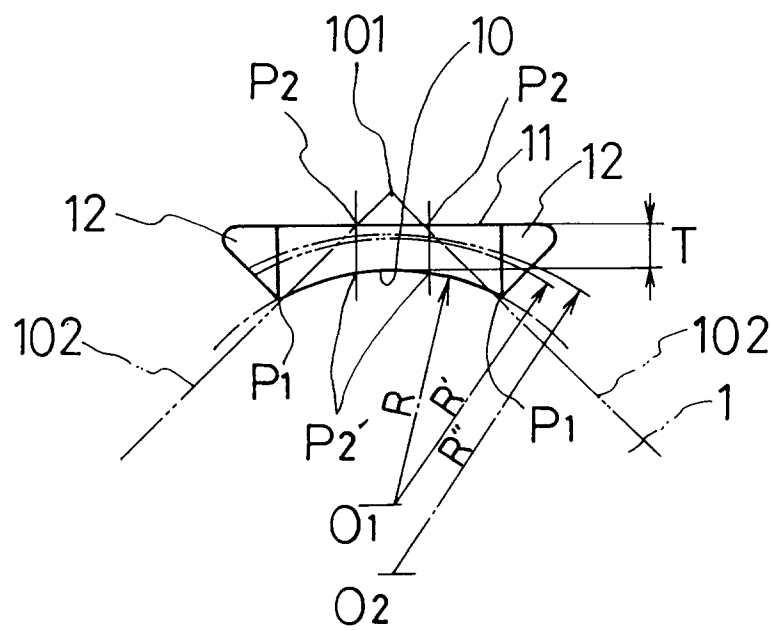


FIG. 3

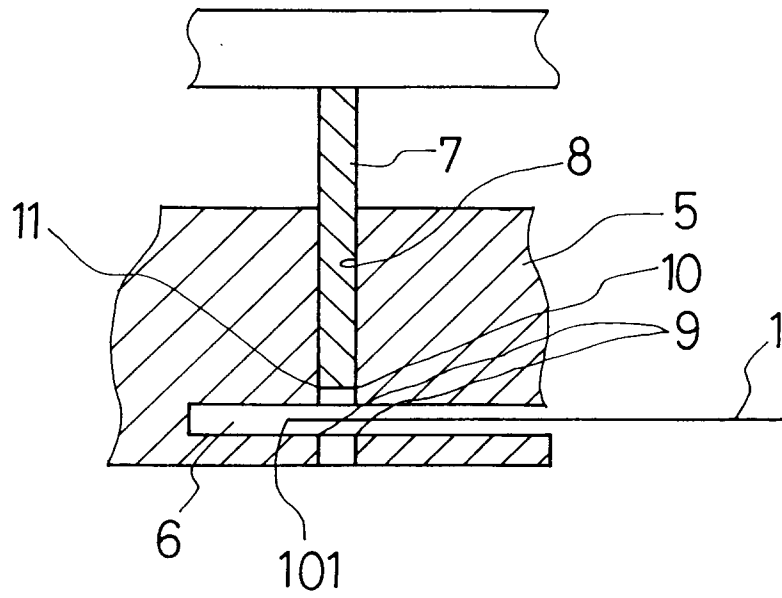


FIG. 4

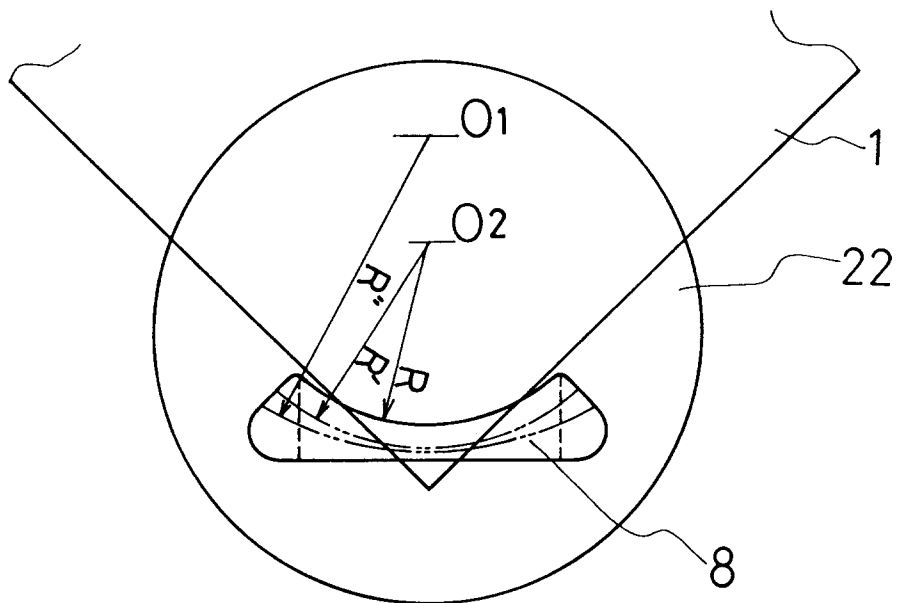


FIG. 5

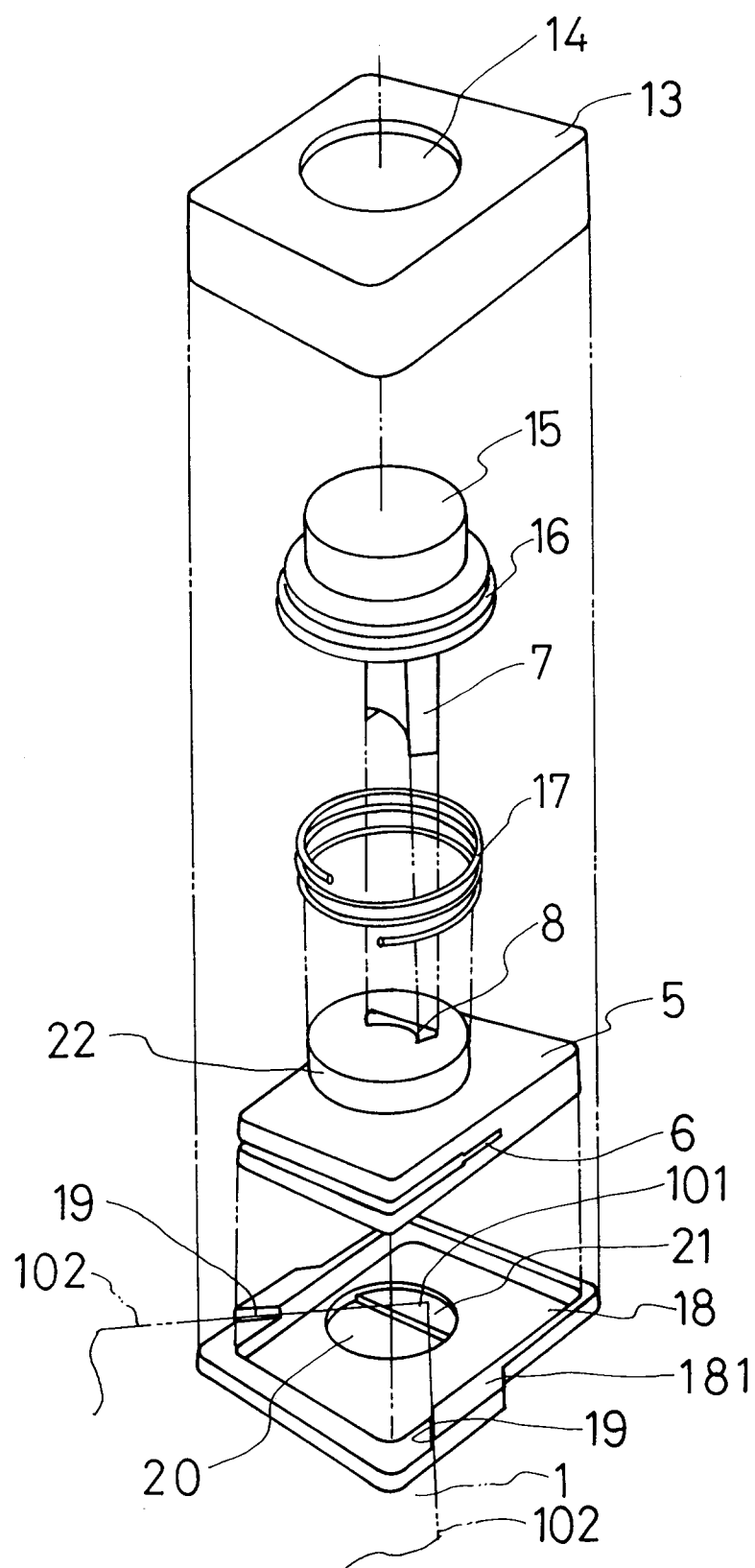


FIG. 6

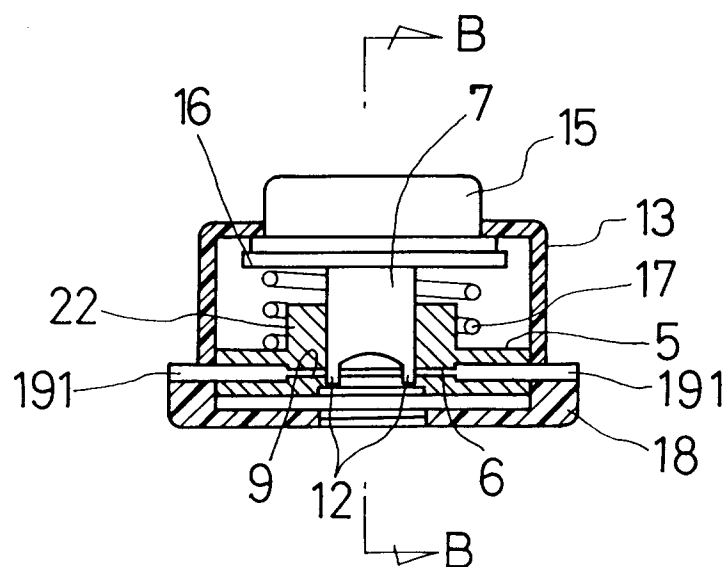


FIG. 7

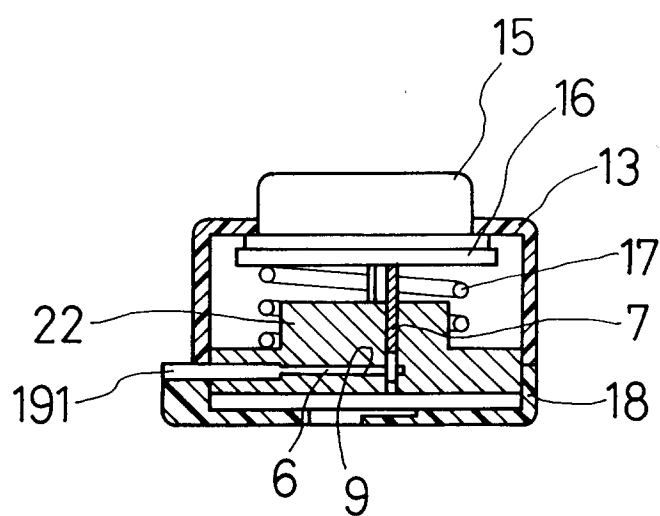


FIG. 8

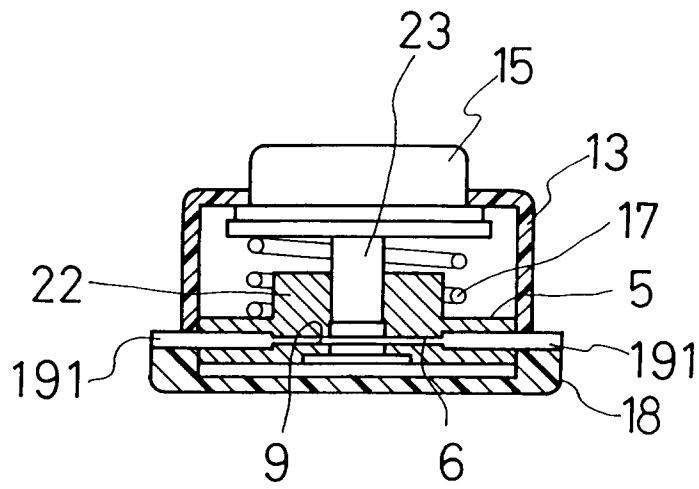


FIG. 9

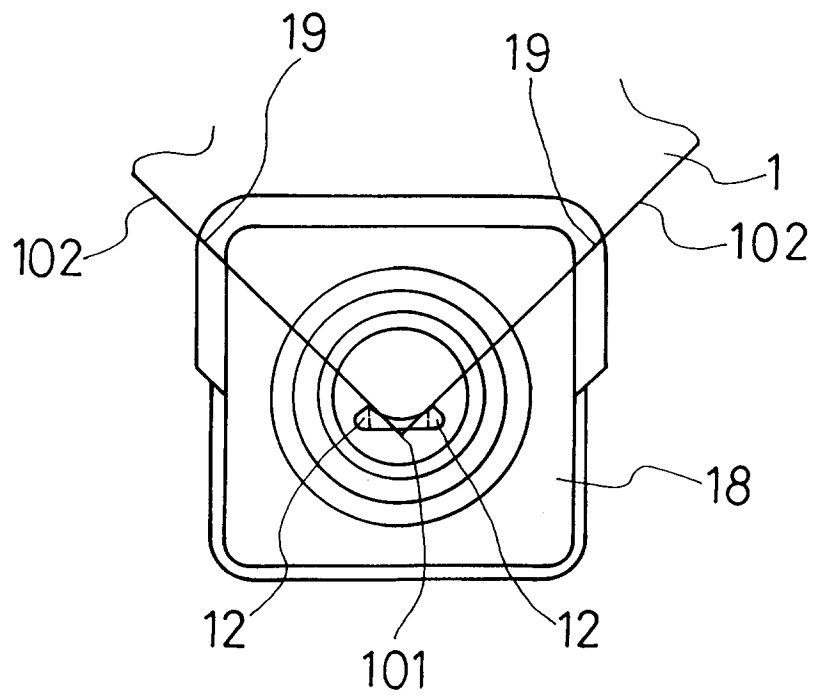


FIG. 10

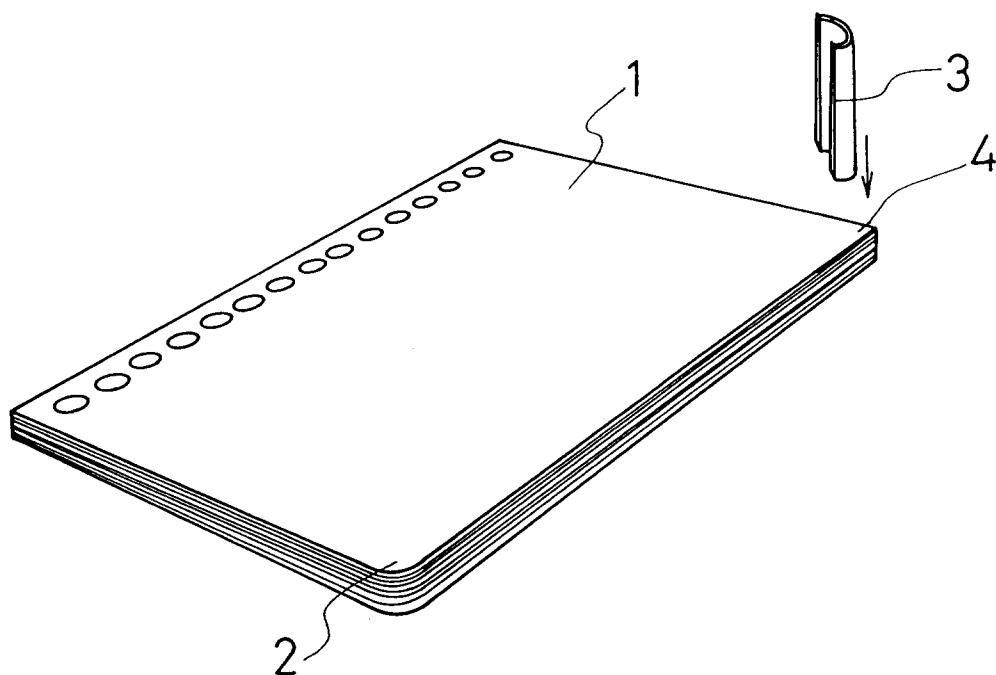


FIG. 11

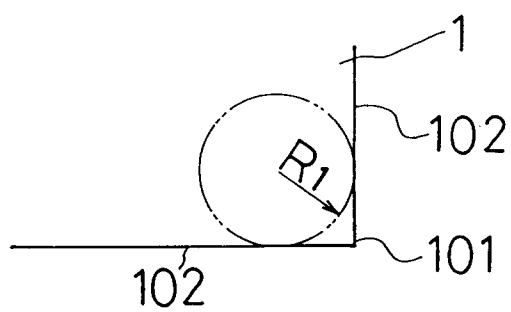
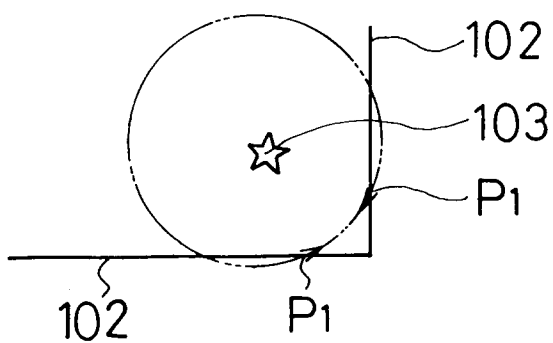


FIG. 12





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EUROPEAN SEARCH REPORT

Application Number
EP 96 10 7405

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	US-A-2 936 665 (NAFFIN) * the whole document *	1,2	B26D3/10
Y	---	3	
Y	GB-A-496 576 (JORGEN CHRISTIAN ANDERSEN) * page 1, line 103 - page 2, line 28; figure 5 *	3	
A	---	1	
A	US-A-2 540 227 (ABERLE) * figure 5 *	1	
A	---	1	
A	US-A-4 706 533 (GIULIE JOE D) 17 November 1987 * column 2, line 47 - line 55; figures 2-5 *	1	
A	---		
A	US-A-2 163 868 (CHRISTIE) ---		
A	JP-A-61 279 500 (CARL MFG. CO) 10 December 1986 * figures 1-4 *		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B26D B27F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		6 November 1996	Huggins, J
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