

Description**BACKGROUND OF THE INVENTION**

1. Field of the invention

[0001] The present invention relates to a side gauge, and more particularly to a side gauge for punch, which can be fixed to a punch table and is provided with a gauge guide positioning a sheet material such as papers.

2. Description of the Related Art

[0002] Japanese Patent Application Laid-Open No. H6-226692 (hereinafter reference 1) discloses a conventional perforating punch. In the reference 1, at the side of a base to which a main punch body is fixed, a positioning scale with a paper support is movably provided. Further, by properly positioning the positioning scale according to a size of papers, users can perforate to make given holes to the papers under the condition that the papers are positioned with the paper support.

[0003] Furthermore, Japanese Patent Application Laid-Open No. 2004-9234 (hereinafter reference 2) discloses a conventional center gauge. In the reference 2, a pair of arms is provided, movable in a reciprocal direction relative to a base. Specifically, the end of each arm is pulled out from the base, then papers are placed between a standing section providing at end of each arm so as to calculate the longitudinal center of the papers. Here, since each standing section is provided movable relative to each arm, the standing section can be pulled out only when needed, and pulled in when not necessary.

[0004] In the perforating punch of the reference 1, the positioning scale is provided so as to properly position papers according to their sizes. However, because the paper support is fixed to the positioning scale, when perforation needs to be performed on papers in an irregular shape or at unusual positions, users may experience some difficulties to perform normal operations due to the brims of papers hitting to the paper support.

[0005] Still further, the reference 2 discloses the center gauge, in which the standing section is provided movable relative to the arm; operation thereof can be said as more advanced compared with the perforating punch of the reference 1. However, since the standing section is retained within the arm, user may feel some bother when pulling out the standing section from the arm.

SUMMARY OF THE INVENTION

[0006] The present invention has been made in light of the above circumstances, and it is an object of the present invention to provide a side gauge for punch with operation further advanced.

[0007] In order to achieve the object described above, according to an aspect of the present invention, there is provided a side gauge for punch, the punch comprising: a base having a side gauge mounting groove formed at a bottom surface thereof; a side gauge main body having a marginal portion at one end side, and a first standing end portion, a second standing end portion and a standing wall at another end side, wherein the marginal portion is engaged with the side gauge mounting groove, and the side gauge main body, approximately whole part of which is housed inside of the side gauge mounting groove, is slidable relative to the side gauge mounting groove in a longitudinal direction; and a gauge guide making brims of a sheet material (S) abutted thereto for positioning the sheet material (S), characterized in that the gauge guide has a guide upper wall having height approximately equal to height of a sheet placing surface of the base, and the gauge guide is moved in a vertical direction relative to a major surface of the side gauge main body while covering the first standing end portion, the second standing end portion and the standing wall.

[0008] Because users can shift the gauge guide upward with their fingers by operating specific parts of the gauge guide, efficiency operating the gauge guide is improved.

[0009] In addition, because the guide upper wall of the gauge guide has height approximately equal to height of the sheet placing surface of the base, users are no longer bothered by that brims of the sheet material (S) placed on the base is hit against the gauge guide when conducting perforation. This enables to retain the sheet material (S) in further stable condition.

[0010] Furthermore, in another aspect of the present invention, there is provided a side gauge for punch, wherein the gauge guide has the guide upper wall which is flat, and has interior operation portions at a pair of guide side walls thereof.

[0011] Accordingly, because the guide upper wall of the gauge guide is formed into flat, it can thus provide more area for the sheet material (S) to be placed on. This also enables to retain the sheet material (S) in further stable condition.

BRIEF DESCRIPTION OF THE DRAWING

[0012]

Fig. 1 is a perspective view of a punch base to which a side gauge for punch according to the present invention is placed; a gauge guide is elevated in this figure;

Fig. 2 is a perspective view of the side gauge for punch according to the present invention; the gauge guide is elevated in this figure;

Fig. 3A shows a top plan view of Fig. 1, and Fig. 3B shows a cross-sectional view of Fig. 3A taken along line A-A;

Fig. 4A shows a front view of Fig. 1, and Fig. 4B shows a cross-sectional view of Fig. 4A taken along line B-B;

Fig. 5 is a perspective view of the punch base to which the side gauge for punch according to the present invention is placed; the gauge guide is placed in the lowest position relative to a major surface of the side gauge main body in this figure;

Fig. 6 is a perspective view of the side gauge for punch according to the present invention; the gauge guide is placed in the lowest position relative to the major surface of the side gauge main body in this figure;

Fig. 7A shows a top plan view of Fig. 5, and Fig. 7B shows a cross-sectional view of Fig. 7A taken along line C-C; and

Fig. 8A shows a front view of Fig. 5, and Fig. 8B shows a cross-sectional view of Fig. 8A taken along line D-D.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0013] Preferred embodiments of the present invention will be hereinafter described with reference to the accompanying drawings. Note that Figs. 1 to 4 show that a gauge guide 3 is elevated relative to a major surface 39 of a side gauge main body 2 while Figs 5 to 8 show that the gauge guide 3 is lowered relative to the major surface 39 of the side gauge main body 2. Furthermore, although Figs. 1 to 8 show only singular base 1 of punch, another punch body may be mounted on mounting sections 11 (through mounting holes 12) formed on an upper base 10 of the base 1.

[0014] Hereinafter described some embodiments of the side gauge main body 2 which mounts on the base 1 of a bifurcate punch.

[0015] As shown in Figs. 1, 3 and 4, the base 1 of the punch is formed like a front-half part of shoe in a plan view and into a planiform shape in a front view. The upper base 10 of the base 1 can be divided into two portions: the one portion is semi-circular, and the other portion is rectangular. In the semi-circular portion of the upper base 10, a pair of the mounting sections 11 is integrally formed with the upper base 10 in such a manner that the mounting sections 11 are slightly projected relative to the upper base 10. Note that in Fig. 4 the mounting sections 11 are set lower than first sheet positioning members 14 and second sheet positioning members 15. Further, on each mounting sections 11, a pair of mounting holes 12 is provided.

[0016] In addition, in the rectangular portion on the upper base 10, a sheet placing surface 17 is formed, and a pair of rod holes 13 is provided on the sheet placing surface 17. The pair of rod holes 13 is provided in such a manner as to run parallel to the direction in which the side gauge main body 2 is shifted.

[0017] At boundary drawn by the semi-circular portion and the rectangular portion on the upper base 10, a pair of the first sheet positioning members 14 and a pair of the second sheet positioning members 15 are provided on a straight line, running parallel to the pair of rod holes 13.

[0018] Here, the projecting height of the first sheet positioning members 14 and the second sheet positioning members 15 is, as shown in Fig. 4, set slightly higher than the projecting height of the mounting sections 11. The first sheet positioning members 14 are provided near to each other and also placed between the pair of rod holes 13. Still further, the pair of the second sheet positioning members 15 is each provided at both ends of the upper base 10 so as to sandwich the first sheet positioning members 14.

[0019] At the bottom surface of the base 1, just beneath the rectangular portion of the upper base 10, a side gauge mounting groove 16 is provided wherein the side gauge main body 2 is placed; the side gauge main body 2 is made to be slidable relative to the mounting groove 16. In addition, this mounting groove 16 is formed not to overlap the pair of rod holes 13 in a vertical position.

[0020] As clearly shown in Fig. 2, the side gauge main body 2 is an elongated plate, integrally having a pair of projecting edges 20 placed along both brims of the side gauge main body 2. In addition, as shown in Figs. 1, 3 and 4, the side gauge main body 2, not including a portion where the gauge guide 3 is mounted, is slidably provided in the side gauge mounting groove 16, the almost whole body of which can stay at the bottom surface of the base 1.

[0021] Furthermore, at a marginal portion 21 of the side gauge main body 2, a projected piece 22 is provided upward relative to the major surface 39 of the side gauge main body 2 in such a manner that the projected piece 22 is made to engage with an engaging portion (not shown) formed inside of the mounting groove 16. When perforation performs for a sheet material S of both regular or non-regular (including size and shape) sheets, by engaging the projected piece 22 with the engaged portion at appropriate positions, the sheet material S, can be well adjusted to stay at a given position

for comfortable perforation.

[0022] On the other hand, at another marginal portion of the side gauge main body 2, a standing end portion is provided upward relative to the major surface 39 of the side gauge main body 2 in such a manner that the standing end portion holds the gauge guide 3, which is made movable in a vertical direction relative to the major surface 39. Here, the standing end portion includes a first standing end portion 23, a second standing end portion 24, and a pair of standing walls 25 placed between the first standing end portion 23 and the second standing end portion 24. There has a cutout groove 28 between the first standing end portion 23 and each of the pair of the standing walls 25, and there also has a cutout groove 29 between the second standing end portion 24 and each of the pair of the standing walls 25. Each groove is formed by cutting out a given length from the side of a guide upper wall 30 of the gauge guide 3. Because of the cutout grooves 28, 29 being provided, the pair of the standing walls 25 can be shifted right and left (see Fig. 4B).

[0023] Further, the exterior surface of the second standing end portion 24 has a restrained projection 26 projected outward therefrom; this restrained projection 26 is made to engage with the bottom end of a restrained long hole 36 formed on a guide intermediate wall 33 of the gauge guide 3, thereby restraining a vertical position of the gauge guide 3. Still further, each exterior surface of the standing walls 25 has each positioning projection 27 projected outward therefrom; this positioning projection 27 is made to engage with a positioning hole 37 formed on each guide side wall 31 of the gauge guide 3, thereby retaining the gauge guide 3 in both an upper position and a lower position.

[0024] As shown in Figs. 2-4, the gauge guide 3 has the guide upper wall 30, a pair of the guide side walls 31, and a guide front wall 32; rear and bottom of the gauge guide 3 is both open, thus making a open-box shape. In the interior of the gauge guide 3, the guide intermediate wall 33 is integrally provided with the gauge guide 3; the guide intermediate wall 33 is provided to run parallel to the guide front wall 32. The guide upper wall 30 of the gauge guide 3 is formed into a rectangular and flat.

[0025] Further, the purpose of the guide front wall 32 is to position the sheet material S by abutting the brims thereof to the guide front wall 32. The guide front wall 32 has a standing end guiding groove 34 cut out from the bottom surface of the gauge guide 3. At the bottom of the standing end guiding groove 34, a concave portion 35, having a wider width than the standing end guiding groove 34, is provided in a continuous manner.

[0026] Still further, the shape of the standing end guiding groove 34 formed at the guide front wall 32 is approximately correspondent with the shape of the first standing end portion 23 of the side gauge main body 2. When the gauge guide 3 is shifted to the lowest position, the upper portion of the first standing end portion 23 will be abutted to the upper portion of the standing end guiding groove 34. See Fig. 6. The concave portion 35 will be also abutted to the upper surface of the projecting edges 20 of the side gauge main body 2 in case the gauge guide 3 is shifted to the lowest position. See also Fig. 6.

[0027] Each of the guide side walls 31 of the gauge guide 3 has a pair of the positioning holes 37 in a vertical position, with which the positioning projections 27 formed on the standing walls 25 of the side gauge main body 2 are engaged. At the guide intermediate wall 33 of the gauge guide 3, the restrained long hole 36 is formed so that the restrained projection 26 formed at the second standing end portion 24 of the side gauge main body 2 is engaged therewith. Here, although the embodiment of the present invention has a pair of the positioning holes 37, the present invention is not limited thereto; only one positioning hole 37 or three or more numbers of the positioning holes 37 may be provided. It is also possible to adjust the height of the gauge guide 3 according to the thickness of the sheet material S.

[0028] Further, the gauge guide 3 has an interior operation portion 38 formed behind the guide intermediate wall 33, that is, a space surrounded by the guide upper wall 30 and a pair of the guide side walls 31. In the interior operation portion 38, users can insert their fingers to elevate the gauge guide 3. Here, in an elevating method of the gauge guide 3 relative to the side gauge main body 2, there may be three options: a first option is that users insert their fingers into the interior operation portion 38 and elevate the gauge guide 3 by placing the fingers at the interior surface of the guide upper wall 30; a second option is that users hold both of the guide side walls 31 with their fingers and elevate the gauge guide 3; and a third option is that users hold both of the guide side walls 31 as well as the guide front wall 32 with their fingers and elevate the gauge guide 3.

[0029] Still further, in the condition that the gauge guide 3 is elevated, as shown in the Fig. 4A, height of the upper surface of the gauge guide 3, that is, the height of the upper surface of the guide upper wall 30, can be set as approximately equal to the projecting height of the first and the second sheet positioning members 14, 15.

[0030] Next, the function of the side gauge for punch according to the present invention will be explained.

[0031] First, a case using a regular sheet will be explained. According to the size of the sheet material S, the side gauge main body 2 is pulled out from the base 1 of punch (from the condition shown in Fig. 7 to the condition shown in Fig. 3). The projected piece 22 provided at the marginal portion 21 of the side gauge main body 2 is engaged with the engaged portion (not shown) provided inside of the side gauge mounting groove 16 of the base 1 so as to place at appropriate positions.

[0032] From the condition shown in Fig. 6 to the condition shown in Fig. 2, the gauge guide 3 is made elevated relative to the side gauge main body 2. Here, the gauge guide 3 can be elevated with any one of the following methods.

[0033] The first method is that users insert their fingers into the interior operation portion 38 under the condition shown

in Fig. 7B and elevate the gauge guide 3 by placing the fingers at the inner surface of the guide upper wall 30 to the condition shown in Fig. 3B.

[0034] Here, during the elevation of the gauge guide 3, each of the positioning projections 27 formed at each standing wall 25 of the side gauge main body 2 is shifted from the condition shown in Fig. 8B (the positioning projections 27 are engaged with the upper positioning hole 37 formed on each guide side wall 31 of the gauge guide 3) to the condition shown in Fig. 4B (the positioning projections 27 are engaged with the lower positioning holes 37). Because the cutout grooves 28, 29 are formed at both sides of each standing wall 25, each standing wall 25 may be displaced inward relative to each guide side wall 31, thereby achieving a smooth elevation of the gauge guide 3.

[0035] Further, while the gauge guide 3 is elevated, the restrained projection 26 formed at the second standing end portion 24 of the side gauge main body 2 does not interact with the restrained long hole 36 formed at the guide intermediate wall 33 of the gauge guide 3. But, when each positioning projection 27 is engaged with the lower positioning hole 37, as shown in Fig. 3B, the restrained projection 26 will be abutted to the lower end of the restrained long hole 36 whereby the gauge guide 3 can be protected from being slipped away from the side gauge main body 2.

[0036] The second method is that users hold both guide side walls 31 of the gauge guide 3 with their fingers and elevate the gauge guide 3.

[0037] The third method is that users hold both guide side walls 31 as well as the guide front wall 32 of the gauge guide 3 with their fingers and elevate the gauge guide 3.

[0038] With respect to the second and third methods, in the process wherein the gauge guide 3 is elevated, the same process with the first method can be applied to the engaging operation between the restrained projection 26 and the restrained long hole 36, and the engaging operation between the positioning projection 27 and the positioning hole 37.

[0039] As described hereinabove, since users can select from at least three operational methods of elevating the gauge guide 3 relative to the side gauge main body 2, users can enjoy further operational efficiency of the gauge guide 3.

[0040] While elevating the gauge guide 3 relative to the side gauge main body 2, users abut brims of the regular sheet material S to the guide front wall 32 of the gauge guide 3. Because users can perform perforation after positioning the sheet material S in appropriate positions, they can also enjoy more comfortable operation when conducting perforation.

[0041] Next, a case in which the sheet material S is a non-regular size or shape will be discussed.

[0042] In case that users conduct perforation to the non-regular sheet material S, it is not required to pull out the side gauge main body 2 from the base 1 of punch. As shown in Figs. 5 to 8, the side gauge main body 2 is housed inside of the base 1, and in the condition that the gauge guide 3 is lowered relative to the side gauge main body 2, users can simply conduct perforation.

[0043] When the gauge guide 3 is placed at the lowest position relative to the side gauge main body 2, the upper surface of the guide upper wall 30 of the gauge guide 3 will have a correspondent height with the upper surface of the sheet placing surface 17 of the base 1. Accordingly, because users can occupy more area to place the sheet material S, they can enjoy more comfortable and stable perforation conditions regardless of the size or shape of the sheet material S.

Claims

1. A side gauge for punch, the punch comprising:

a base (1) having a side gauge mounting groove (16) formed at a bottom surface thereof;
a side gauge main body (2) having a marginal portion (21) at one end side, and a first standing end portion (23), a second standing end portion (24) and a standing wall (25) at another end side, wherein the marginal portion (21) is engaged with the side gauge mounting groove (16), and the side gauge main body (2), approximately whole part of which is housed inside of the side gauge mounting groove (16), is slidable relative to the side gauge mounting groove (16) in a longitudinal direction; and
a gauge guide (3) making brims of a sheet material (S) abutted thereto for positioning the sheet material (S),
characterized in that

the gauge guide (3) has a guide upper wall (30) having height approximately equal to height of a sheet placing surface (17) of the base (1), and the gauge guide (3) is moved in a vertical direction while covering the first standing end portion (23), the second standing end portion (24) and the standing wall (25).

2. A side gauge for punch according to claim 1, wherein the gauge guide (3) has a guide upper wall (30) which is flat, and has interior operation portions (38) at a pair of guide side walls (31, 32).

FIG. 1

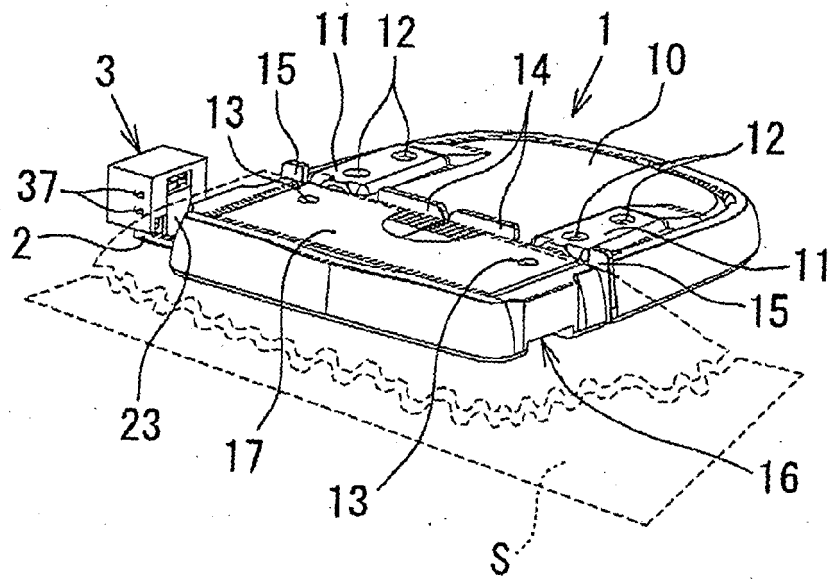


FIG. 2

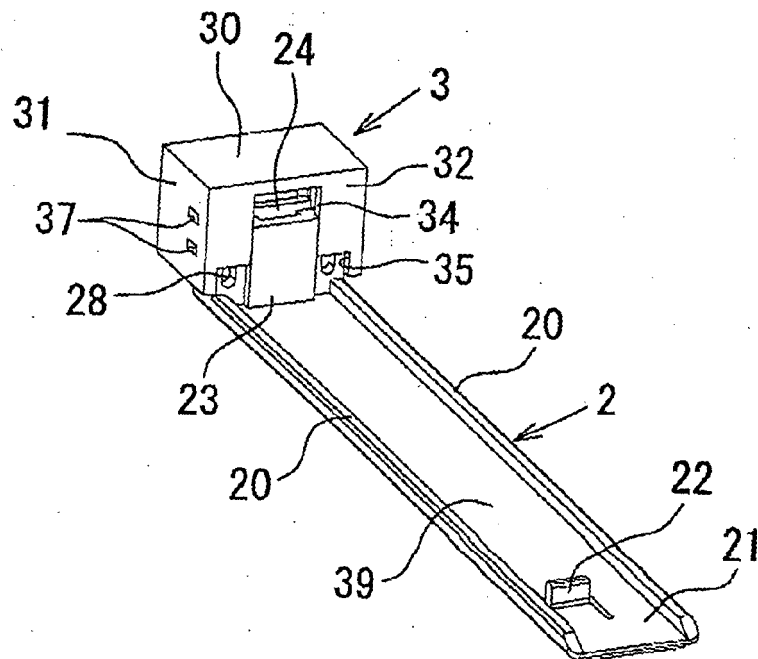


FIG. 3A

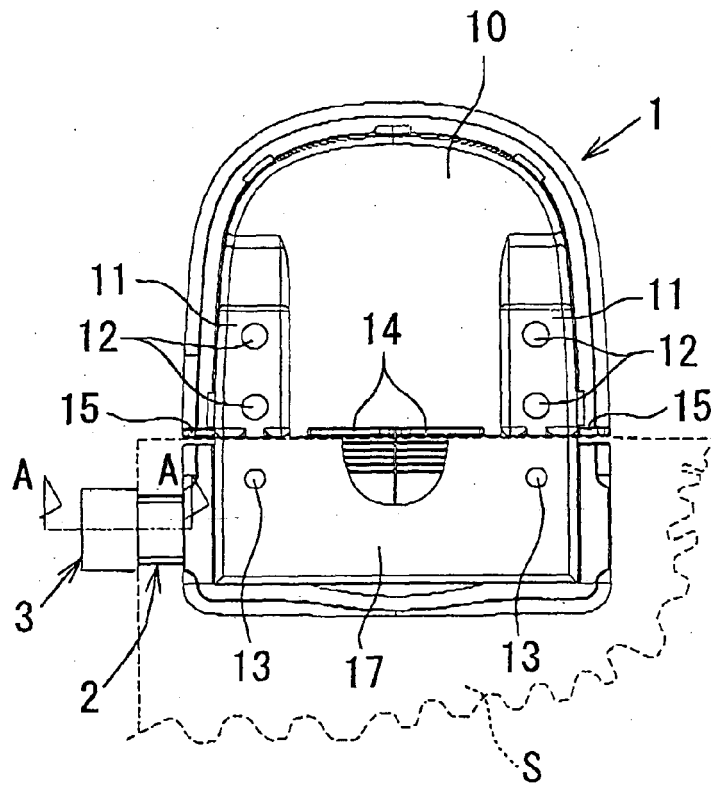


FIG. 3B

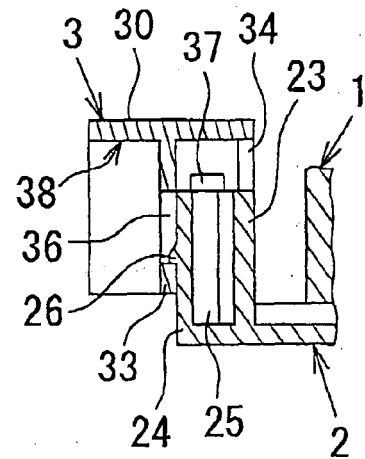


FIG. 4A

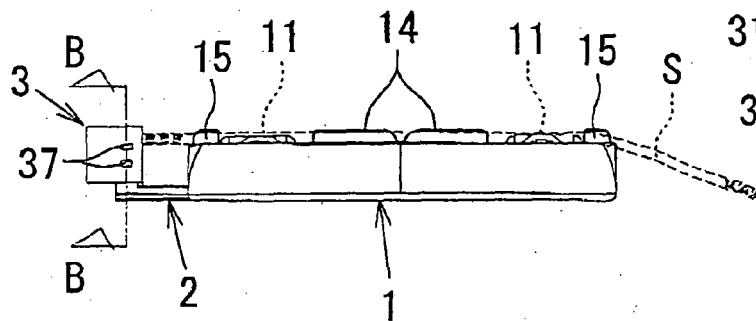


FIG. 4B

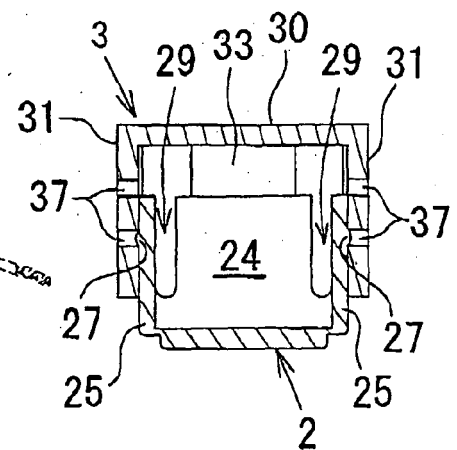


FIG. 5

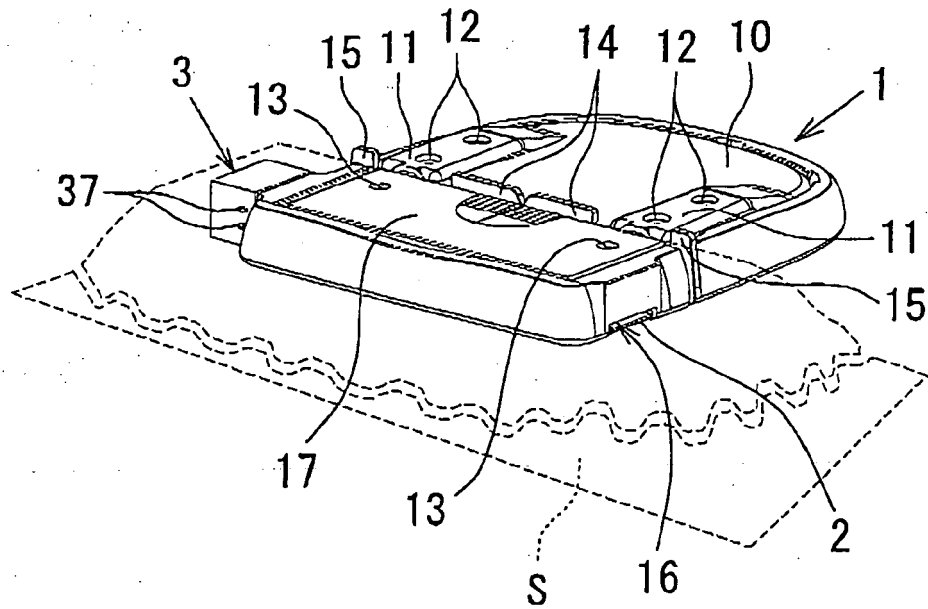


FIG. 6

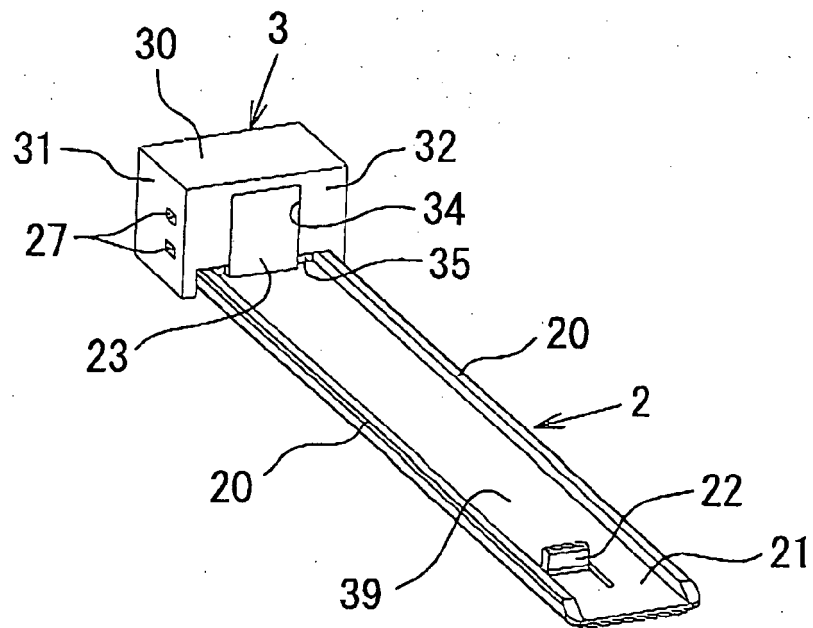


FIG. 7A

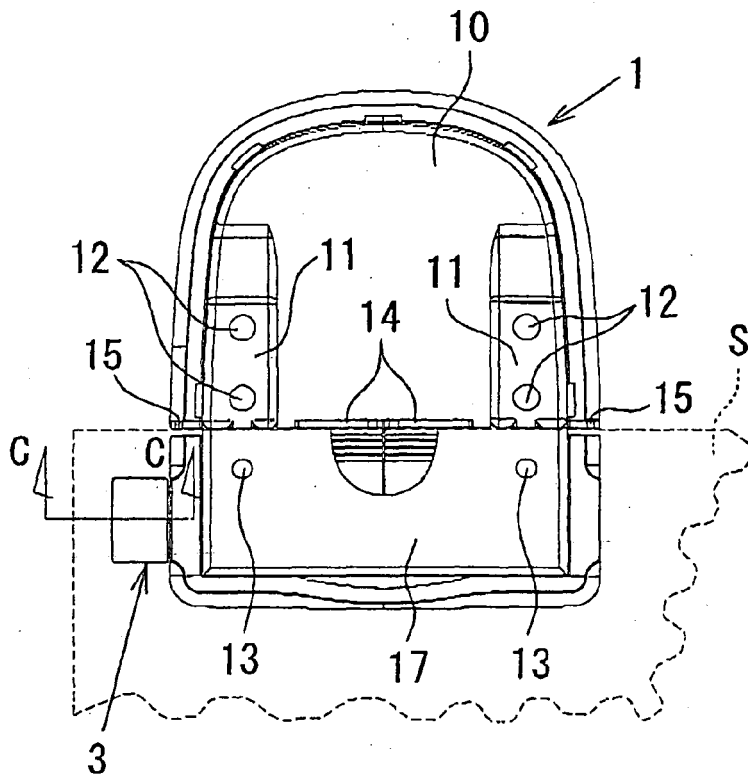


FIG. 7B

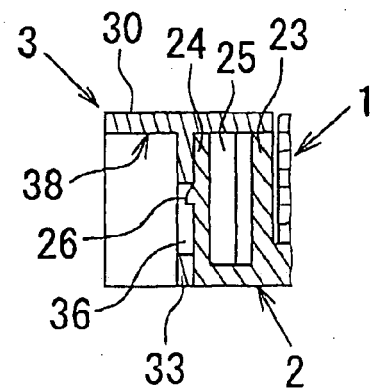


FIG. 8A

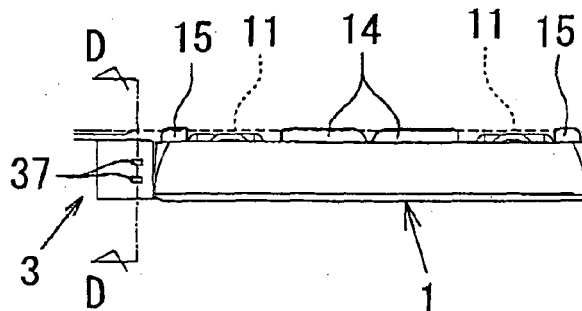
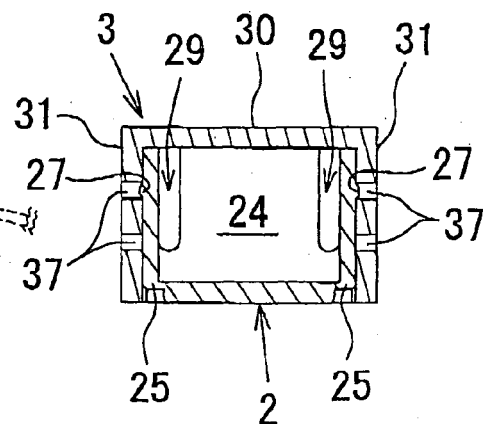


FIG. 8B





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 00 5545

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 1 332 846 A (ACCO UK LIMITED) 6 August 2003 (2003-08-06) * the whole document *	1,2	INV. B26D7/01
A	US 2 676 659 A (EMMER CHARLES EDWARD) 27 April 1954 (1954-04-27) * the whole document *	1,2	ADD. B26F1/36
A	US 2 316 971 A (OVERACKER FRANK SYLVESTER ET AL) 20 April 1943 (1943-04-20) * the whole document *	1,2	
			TECHNICAL FIELDS SEARCHED (IPC)
			B26D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 28 April 2006	Examiner Wimmer, M
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 06 00 5545

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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28-04-2006

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1332846	A	06-08-2003	GB 2384737 A	06-08-2003
US 2676659	A	27-04-1954	NONE	
US 2316971	A	20-04-1943	NONE	

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP H6226692 A [0002]
- JP 2004009234 A [0003]