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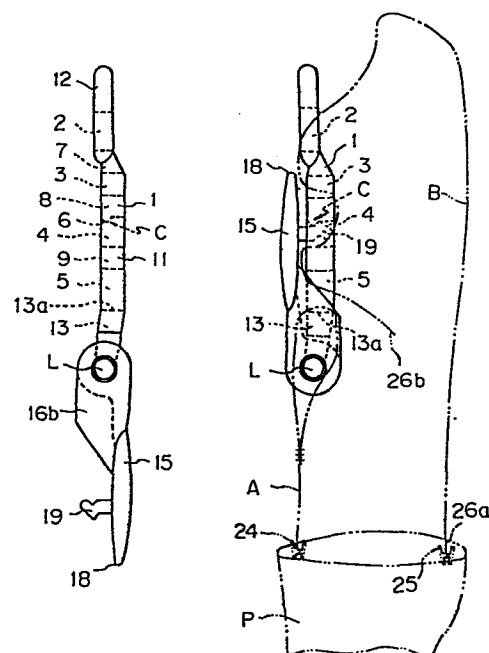
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(54)

Buckle.

(57)

Disclosed herein is a buckle comprising a buckle body (1) and a movable member (15). The movable member (15) is pivotally mounted on the buckle body (1) so that the movable member (15) can be rotated to a working position wherein it is folded on the buckle body. The movable member (15) has an engaging projection (19) which penetrates into an engaging opening (4) formed in the buckle body so that a belt (8) is clamped between the engaging projection and the buckle body when the movable member is in the working position. A locking device (19), (6) is provided on the movable member and the buckle body to hold the movable member in the working position.



EP 0 186 810 A1

BUCKLE

The present invention relates to a buckle attached to suspenders and the like, which are used when a person wears sporting trousers such as skiing pants and the like which hang from the shoulders.

5 A variety of conventional buckles are already on the market. These known buckles are constituted by a buckle body and the movable member, wherein a belt is inserted into the buckle body so that the belt may pass between the buckle body and the movable member, as well as in such a manner that the
10 belt is clamped between the buckle body and the movable member by a force caused by tension in the belt which is transmitted to the movable member. A typical example of a buckle of this type is disclosed in Japanese Utility Model Laid-Open No. 179,819/1979 and Japanese Utility Model Laid-Open No.
15 31,935/1984.

In a buckle of the above-mentioned type, an excessive clamping force is exerted on the belt, since there is an increase in the force by which the belt is clamped between the movable member and the buckle body due to an increase in the
20 tension exerted on the belt. The face of the movable member clamping the belt between itself and the buckle body is normally formed with a toothed or rough surface, and therefore this conventional type suffers from the problem that the belt is damaged due to the above-mentioned excessive clamping force.

25 Furthermore, in a buckle of the above-mentioned type, since the movable member is required to be disposed such that the belt can be clamped, and at the same time such that a force exerted toward the buckle body can be applied to the movable member through the belt, the degree of freedom permitted in
30 the setting of the relative position between the buckle body and the movable member is small. Accordingly, it has so far been impossible, even in the case where buckles are manufactured by a synthetic resin molding process, to form products in a single production process with the movable member attached
35 to the buckle body. Thus, each of these components is first formed as a separate part and subsequent assembling of them

is then necessary. For these reasons, there is a need to provide a buckle having such a construction as can be formed in a single production process.

5 It is an object of this invention to provide a buckle which is constructed in such a manner that no excessive clamping force is exerted on the belt.

 It is another object of this invention to provide a resin-made buckle having a construction whereby the buckle
10 body and the movable member attached thereto can be formed by one production process.

 The buckle according to this invention comprises a buckle body and a movable member capable of moving relative to the body. The movable member can move into a working
15 position wherein a belt is clamped between a portion of the movable member and the buckle body. In such a working position, the buckle is retained by a locking device provided on both the movable member and the buckle body, and the operation of this locking device is completely independent of the belt
20 tention.

 More particularly, in the buckle according to this invention, one end of the movable member is pivotally connected to one end of the buckle body in such a manner that the movable member is capable of moving rotatably to the working
25 position wherein the member is folded on the buckle body. The buckle body has an engaging opening through which the belt can pass while the movable member is provided with an elongated projection which can penetrate into the engaging opening. The locking device, which is provided on the buckle body and the
30 movable member, holds the movable member in the above-mentioned working position, wherein the belt is clamped between the elongated projection and the buckle body.

 In one specific example, the locking device comprises a projecting ridge provided on one of the walls of the engaging
35 opening and an engaging ridge formed on the elongated projection, and when the elongated projection is inserted into the engaging opening, the engaging ridge moves beyond the elongated projecting ridge due to elastic deformation.

In another specific example, the locking device comprises a groove provided in one of the walls of the engaging opening and an engaging ridge formed on the elongated projection to be fitted into the groove, and when the elongated projection
5 is inserted into the engaging opening, the elongated projection elastically deforms so as to permit the engaging ridge to fit in the groove.

In a case where the buckle according to this invention is to be manufactured by a synthetic resin molding process,
10 its construction permits the forming of an assembled buckle in a single production process.

Fig. 1 is a plan view of a buckle which is one embodiment of this invention, showing the state wherein the movable
15 member is maintained on substantially the same plane as the buckle after rotation;

Fig. 2 is a side view of the buckle in Fig. 1;

Fig. 3 is a side view showing the buckle in use together with a belt and a pair of pants;

20 Fig. 4a is an enlarged segmentary view showing a locking device and its periphery shown in Fig. 3;

Fig. 4b is a segmentary view showing one modification of the arrangement illustrated in Fig. 4a.

25 As the preferred embodiment of this invention, a synthetic resin-made buckle is presented in Fig. 1 wherein reference numeral 1 denotes a buckle body of suspenders etc. which is composed of a flat member which is thin and generally rectangular, but with a partially rounded edge. The buckle
30 body is provided with an upper inserting opening 2, an intermediate inserting opening 3, an engaging opening 4 and a lower inserting opening 5 which are horizontally elongated, respectively, and through which tapes such as suspenders pass sequentially from top to bottom. These respective openings
35 have approximately the same width and are arranged in series, but the height of each of these elongated openings differs slightly from the other ones: the upper inserting opening 2 is the highest of all, the lower inserting opening 5 being

the second highest, and the intermediate inserting opening 3 and the engaging opening 4 having a similar height which is approximately half that of the aforementioned two openings. Reference numeral 6 denotes an engaging projection C which is constituted by a projecting ridge provided protrusively over the full width of the engaging opening 4 near the upper edge of the upper inside wall 4a of the engaging opening 4, and which is formed in such a manner as to constitute a section of an isosceles triangle having an angle of approximately 90 degrees (see Fig. 4a). Reference numerals 7, 8 and 9 denote horizontal frame sections disposed between the upper inserting opening 2 and the intermediate inserting opening 3, between the intermediate inserting opening 3 and the engaging opening 4 and between the engaging opening 4 and the lower inserting opening, respectively. Reference numerals 10 and 11 denote right and left longitudinal frame sections which join the above horizontal frame sections 7, 8 and 9, respectively. Reference numeral 12 denotes an inverted U-shaped upper frame section which forms the upper inserting opening 2 which the horizontal frame section 7. Reference numeral 13 denotes a supporting frame section which is provided with pivoting bosses 14a and 14b, on the bottom end at both sides, which respectively engage with the pivoting holes 17a and 17b of a retainer described hereinafter. This supporting frame section is integrally joined to right and left longitudinal frame section 10 and 11, and the lower inserting opening 5 is formed by the side edges of both longitudinal frame sections 10 and 11, the upper edge 13a of the supporting frame section 13 and the lower edge of the horizontal frame section 9. Referring now to the bottom of Figs. 1 and 2, reference numeral 15 denotes a movable member having pivoting holes 17a and 17b provided in the end portion of the supporting pieces 16a and 16b on the bottom end of both sides. The pivoting bosses 14a and 14b of the body 1 engage with these pivoting holes 17a and 17b such as to form a pivot portion L on which the movable member is rotatably connected in relation to the body 1. The movable member 15 is shaped into the thin and flat member which has a laterally elongated generally rectan-

gular configuration, and its dimensions are so designed that the movable member may cover the intermediate inserting opening 3, the engaging opening 4 and the lower inserting opening 5 upon achievement of the clamping operation. Reference numeral 18 denotes the upper edge of the movable member 15 and when users of suspenders put on or take off their pants etc., they place their finger on the upper edge 18 to move the movable member either upward to engage the buckle or downward to release it. Referring to the bottom of Fig. 2 and Fig. 4a, reference numeral 19 denotes a retaining projection which is provided integrally with one of the side surfaces of the movable member and extends across almost the full width of the engaging opening 4 of the body 1. Its upper side M (as shown in Fig. 4a) forms an engaging ridge 20 having a guide slope 23a and an engaging slope 23b which mutually constitute an angle of approximately 90 degrees while its lower side N has a groove 21 defined by two side walls which also constitute an angle of approximately 90 degrees mutually, and the lower nose of the retaining projection 19 constitutes a nose edge 22 which is shaped such as to have an angle of approximately 90 degrees. The guide slope 23a is a face which serves as a cam so that the slope may abut on the projecting ridge 6 of the body 1 to permit the engaging ridge 20 to take an engaging position. The above body 1 and the movable member 15 are integrally and simultaneously formed by means of such molding processes as injection molding of organic synthetic resin materials including polyamide, polyacetal, etc. In other words, both the body and the movable member can be opened in a flat state such that a pivot portion L is the axis of rotation. This flat configuration makes it possible to produce the buckle by a single injection molding process. In the injection molding the pivot portion L can also be formed simultaneously, thus eliminating the need to separately form the body 1 and the movable member 15 by injection molding etc., as in the conventional process, and thereafter assembling the buckle by combining both of them at the pivot portion by hand. This advantage significantly reduces the number of processes and saves the time taken in

assembly. Furthermore, the body 1 and the movable member 15 formed by means of the above described particular material and molding process are characterised by the strength of the material having a slight elasticity capable of sufficiently
5 withstanding repeated engagement and release over a long period as occurs for a buckle used with sporting suspenders and the like.

Referring now to the operation of the embodiment of the present invention having the above-mentioned structure,
10 assuming the buckle is attached to the suspenders of a pair of trousers P for such sportswear as skiing pants or the like, the lower belt A of the front suspenders as shown in Fig. 3 is inserted into the lower inserting opening 5 of the body 1, and hung downward by bending it in the shape of a U over the
15 upper edge 13a of the supporting frame 13. At this time, the front and back belt portions are sewn while they are superposed under the supporting frame 13, and the end of the back belt portion is cut while the front belt portion is adjusted to a desired length and is either sewn on the upper
20 end of the front side of the trousers P or fixed to the front suspending means 24 of the suspenders. Thus, the length of this lower belt A cannot in itself be adjusted thereafter. In the meantime, an upper belt B which is to be threaded through the buckle body 1 is either sewn at one end 26a
25 thereof on the upper edge of the back portion of the trousers P or fixed to a back suspending means 25 while the other end 26b is first passed through the upper inserting opening 2 from the back side of the body 1, through the intermediate inserting opening 3 from the front side of the body 1 to the
30 back side, further through the engaging opening 4 from the back side of the body 1 to the front side thereof, and finally through the lower inserting opening 5 so that it is drawn to the back side. In the meantime, the movable member 15 has been turned downward about the pivot portion L and in
35 such a manner that the pivoting holes 17a and 17b define the axis of rotation, and thereby the member is kept in a position wherein the member does not constitute an obstacle to the

passing of the upper belt B through the respective openings of the body 1. Persons wearing trousers pass the middle portion of the upper belt B over the shoulders, adjusting the position of the belt end 26b in relation to the buckle body 1 to adjust the suspension of the trousers P. When the suspension thereof is optimized, the movable member 15 is pulled up and further pressed against the body 1. By this operation, the guide slope 23a of the engaging ridge 20 on the retaining projection 19 of the movable member 15 first abuts the engaging projection C constituted by the projecting ridge 6, and the neck portion 19a of the retaining projection is tilted slightly downward due to the camming effect of the guide slope 23a and the elasticity of the engaging ridge 19. After that, the retaining projection passes beyond the projecting ridge 6 into the engaging opening 4 and the engaging slope 23b of the engaging ridge 19 engages strongly with the inclined face of the projecting ridge 6, thereby completing the integral engagement between the body 1 and the movable member 15. As shown in the side view of Fig. 3, both are integrally combined in a flat state by pivoting the bosses 14a and 14b in the pivoting holes 17a and 17b. In this state, a portion of the belt B which exists in the engaging opening 4 of the body 1 is strongly clamped over the width of the belt between the nose edge 22 of the retaining projection 19 and the upper edge of the horizontal frame section 9 of the body 1, that is, the lower inside wall 4b of the engaging opening 4, so that the belt is firmly prevented from becoming loose. In the present invention as described above, since the point of engagement of the movable member 15 with the body 1 is separate from the point where the belt B is clamped between the movable member 15 and the body 1, engagement and clamping do not affect each other and handling is easy. Also, by achieving the above steps in the reverse order, the movable member 15 is opened downward from the body 1 by placing a finger on the upper end of the movable member 15 and both are opened in a flat state about the axis of the pivot portion L as illustrated in Fig. 1. By this operation, the belt B is released and becomes movable in relation to the body 1. When

the belt B is pulled upward in this state, the belt B slips up through the upper and lower inserting openings 2 and 5, the intermediate inserting opening 3 and the engaging opening 4 of the body 1. Consequently the suspension of the trousers becomes loose, so that the belts can be removed from the shoulders.

Fig. 4b shows a modification of the retaining projection 19 and the engaging projection C in the above described embodiment. In the modified example of Fig. 4b, the engaging projection comprises a groove 30 which is constituted by two walls which mutually constitute 90 degrees. An engaging ridge 32 which is formed on the upper side of a retaining projection 31 is shaped in such a manner that the ridge can be fitted into the groove 30. The lower portion of the engaging projection 31 is provided with a second clamping portion 33 which is roughened by having its surface formed unevenly. When the buckle is locked, the belt B is clamped between the upper side of the horizontal frame section 9 and the second clamping portion together with a nose edge 34 acting as a first clamping portion.

Claims:

1. A buckle comprising a buckle body and a movable member which can move relative to said buckle body so that a belt is clamped between the movable member and the buckle body,
5 characterized in that:
said movable member is at one end thereof pivotally mounted to one end of said buckle body in such a manner as to be capable of rotating to a working position wherein said member is folded on said buckle body;
10 said buckle body has an engaging opening through which a belt can pass;
said movable member has an elongated projection which can penetrate into said engaging opening; and
a locking device is provided on said buckle body and
15 said movable member so that it holds said movable member in said working position wherein the belt is clamped between said elongated projection and said buckle body.
2. A buckle according to Claim 1, wherein said locking device comprises a projecting ridge provided on one of the
20 walls of said engaging opening and an engaging ridge formed on said elongated projection which can move beyond said projecting ridge due to elastic deformation which occurs when said elongated projection is inserted into said engaging opening.
- 25 3. A buckle according to Claim 1, wherein said locking device comprises a groove provided in one of the walls of said engaging opening and an engaging ridge to be fitted into said groove which engaging ridge can be fitted into said groove due to the elastic deformation which occurs when said
30 elongated projection is inserted into said engaging opening.
4. A buckle according to any one of Claims 1 to 3, wherein said buckle is a molded product of a synthetic resin.

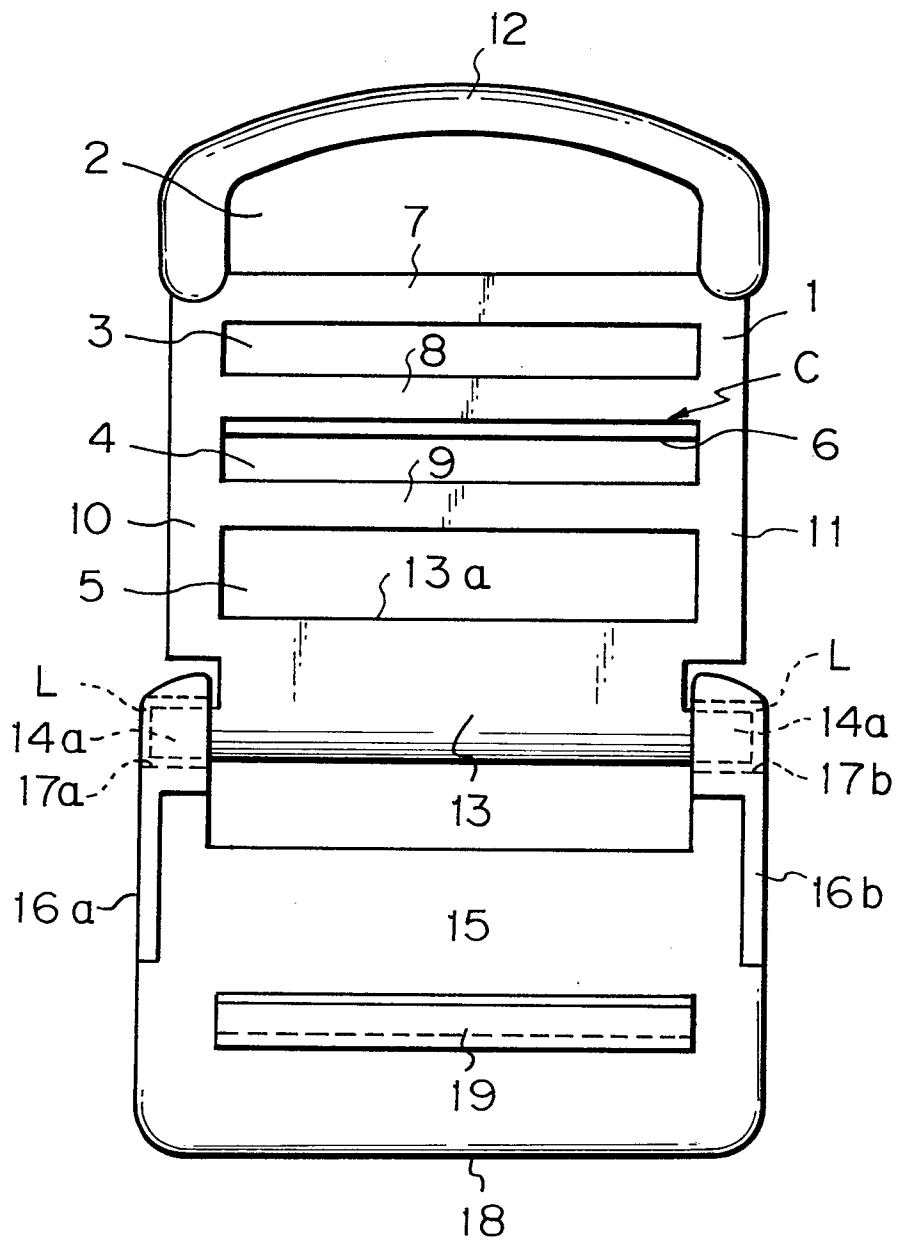
Fig. 1

Fig. 2

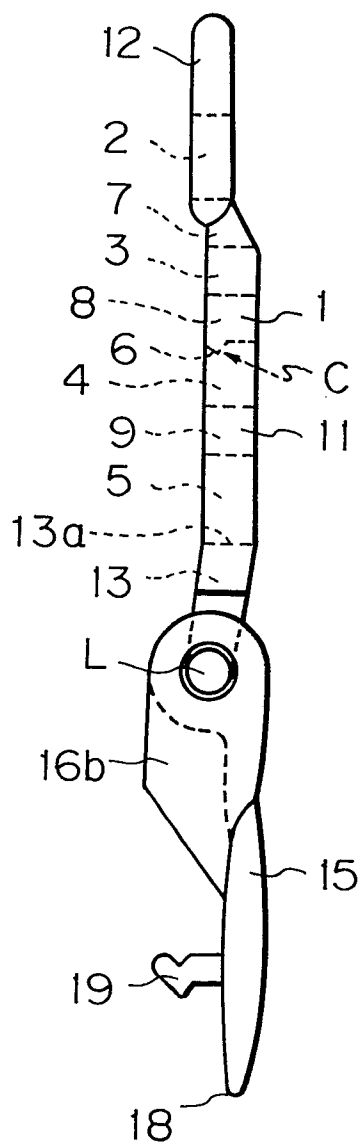


Fig. 3

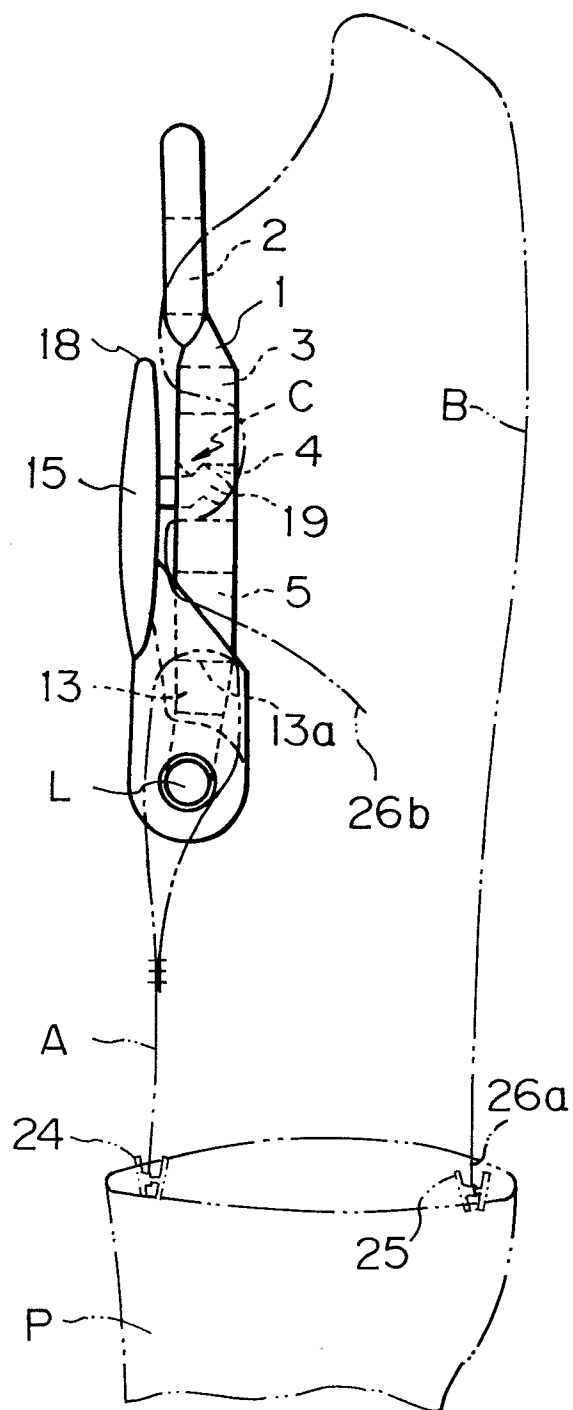
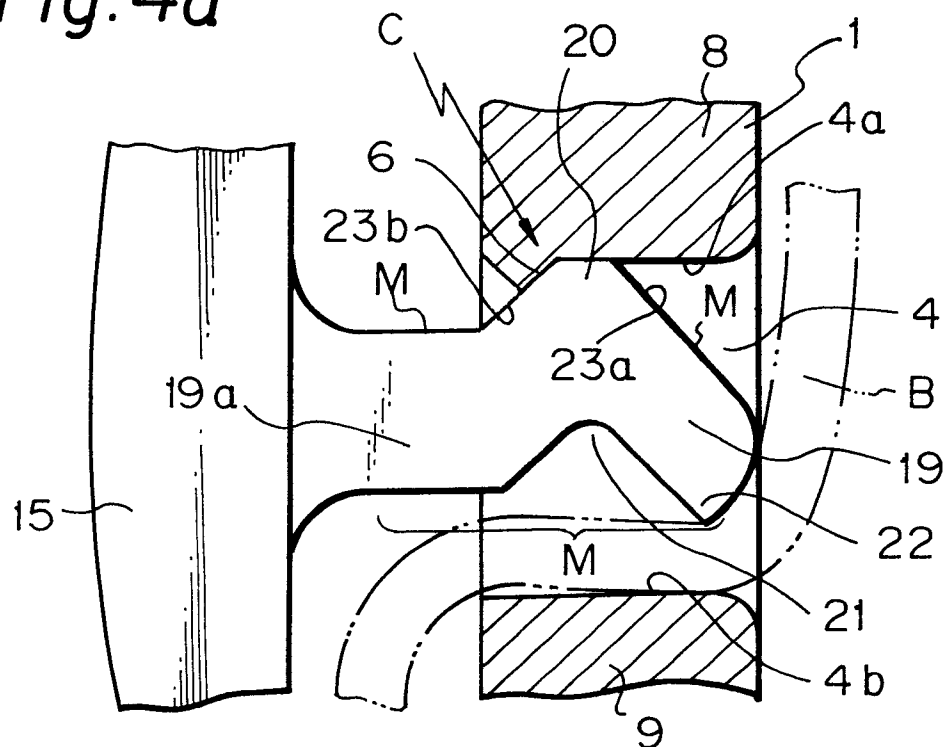
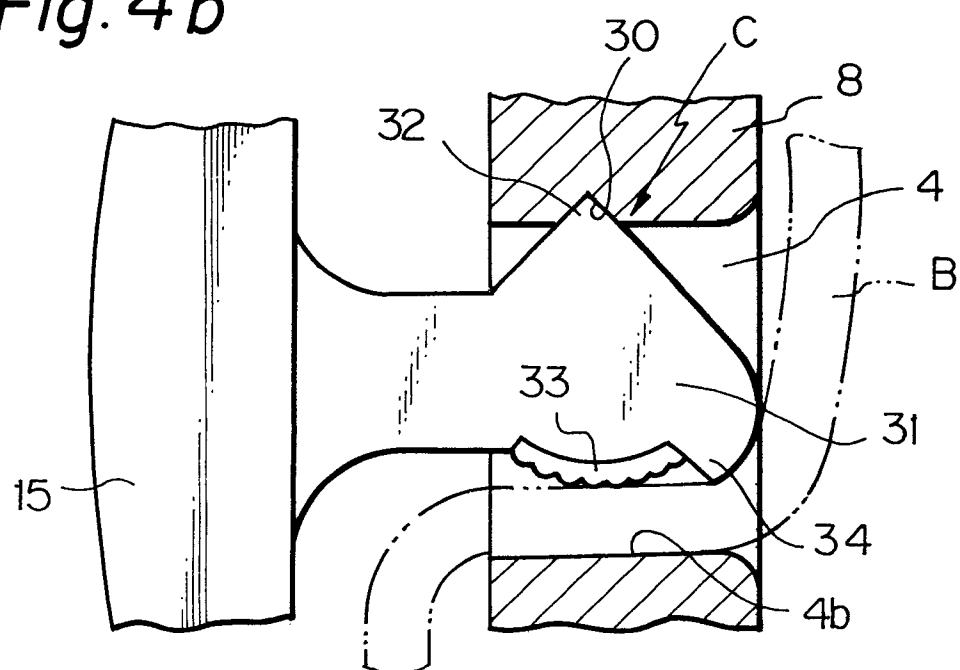


Fig. 4a*Fig. 4b*



European Patent
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EUROPEAN SEARCH REPORT

0186810

Application number

EP 85 11 5574

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.4)
X	US-A-2 520 583 (J.C. ULMER) * Column 1, last paragraph; column 2; column 3, first paragraph *	1	A 44 B 11/12
A	---	2	
Y	US-A-2 036 242 (W.R. TELLER) * Page 1, column 1, line 51; column 2, lines 1-24; figures *	1	
Y	EP-A-0 079 479 (SCHAEFFER-HOMBERG GmbH) * Page 4, paragraph 1; page 5, last paragraph; page 6; claims; figures *	1	
A	-----	2-4	TECHNICAL FIELDS SEARCHED (Int. Cl.4) A 44 B A 41 F
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 14-03-1986	Examiner GARNIER F.M.A.C.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			