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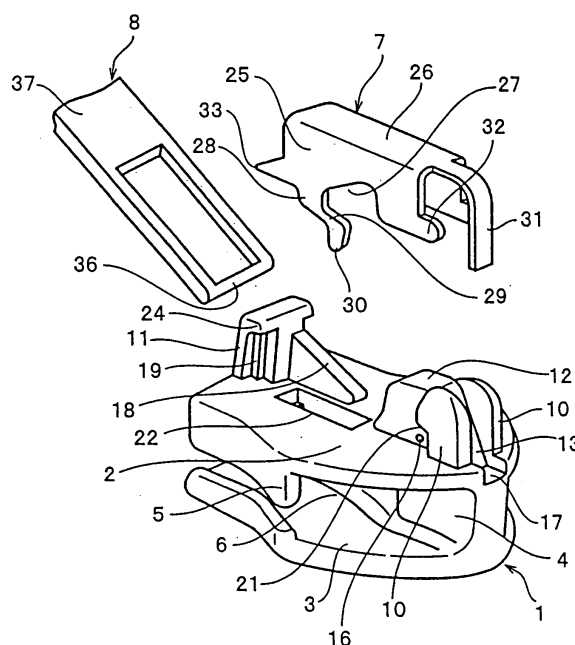
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(54) **Slide fastener slider with automatic locking device**

(57) The invention provides a slide fastener slider with an automatic locking device comprising: a pawl hole (22) in which a locking pawl (30) can be inserted is provided in a top surface of a body (1) of the slider; front attaching posts (10) and a rear attaching post (11) are provided in front of and in back of the pawl hole (22); a cover (7) comprises front engaged portions (32) which engage the front attaching posts (10) and rear engaged portions (33) which can move vertically within the rear attaching post (11); an elastic piece (31) having an elasticity is provided at a front end of a top wall (26) of the cover (7) such that it opposes the front attaching posts (10); opening portions (27), which allow a pivot shaft (36) of a pull-tab (8) to pass through, are provided in side walls (25) on both sides of the cover (7); a proximal portion (29) of the locking pawl (30) is arranged on a rear side of at least one of the opening portions (27); and the proximal portion (29) is bent so that a front end of the locking pawl (30) is located on a forward side, thereby attaching the cover (7) and allowing the locking pawl (30) provided on the cover (7) to be inserted easily into an excess gap between linear fastener elements without damaging sewing yarns or the like.

FIG. 1



Description

[0001] The present invention relates to a slide fastener slider with an automatic locking mechanism, and more particularly, to a slide fastener slider with an automatic locking device capable of exerting a locking function by pulling a pull-tab to actuate a cover having a locking pawl.

2. Description of the Related Art

[0002] Conventionally, the following slide fastener slider with an automatic locking device has been well known as described in US patent No. 2657445. In a cover 107 to be constructed between cover attaching posts erected at front and rear positions of its slider body, as shown in a development view of FIG. 11, an elastic piece 131 to be fixed to the front face of the front attaching post is provided projectingly, and engagement pieces 150 which can be attached to the front attaching post swingably are provided below a proximal portion of the elastic piece 131. Engagement pieces 150 to be attached to the rear attaching post swingably are provided on the other end, that is, at the rear end of the cover 107. Then, locking pawls 130 are provided on the right and left proximal portions of these engagement pieces 150 such that the locking pawls 130 are shifted to each other and projected outward. A pressing portion 153 capable of pressing the top surface of a fastener element is formed by forming the proximal portion of one locking pawl 130 wide, and the right and left locking pawls 130 are inserted into pawl holes provided in both sides of the attaching post provided at the rear position of the body. A concave shaft insertion portion 152 which allows a pivot shaft of a pull-tab to pass through is provided in the proximal portion of the locking pawl 130 and the pressing portion 153, and this material is bent as shown in FIG. 12 to form a cover 107 and the pivot shaft of the pull-tab is mounted therein. The rear end of the cover 107 is raised by pulling up the pull-tab to release the right and left locking pawls 130 from linear fastener elements arranged in front and back thereof, so that the slider can slide in the back and forth direction.

[0003] Another slide fastener slider with an automatic locking device has been well known as described in US patent No. 3267544. In the slider 251, as shown in FIG. 13, locking pawls 230 which can be inserted into between front and rear linear fastener elements are provided on right and left side walls of a cover 207 attached to a slider body swingably, and the locking pawls 230 are inserted into pawl holes 222 provided on the right and left sides of the body. Engagement pieces 250 provided on the front end of the cover 207 are inserted into and engaged with the right and left hook-shaped attaching posts 210 erected at the front position of the body. In addition, an elastic piece 231 provided projectingly in the center of a front end of the cover 207 is fixed to the front face of a supporting portion 212 between the attaching posts 210 to form the rear end of the cover 207 so as to be swingable

vertically. The engagement pieces 250 provided at the right and left portions at the rear end of the cover 207 are swingably attached to a hook-like attaching post 211 provided at the rear position of the body. A pivot shaft 236 of a pull-tab 208 is inserted into an opening portion 227 provided in a proximal portion of the locking pawl 230 of the cover 207. Consequently, the slider 251 can be slid in the back and forth direction by constructing the cover 207 to be capable of sliding freely by operating the pull-tab 208.

[0004] In the slide fastener slider with an automatic locking device shown in FIGS. 11 and 12 described above and most of other sliders with an automatic locking mechanism well known, the locking pawls are inserted into between leg portions of fastener elements in a state in which the engaging heads of right and left linear fastener elements engage each other in a guide groove for guiding the linear fastener elements installed in a slider body. That is, when the cover having the locking pawls is attached to the body, the locking pawls are inserted into pawl holes provided in an attaching post side at the rear position of the body. As a consequence, there exist problems that sewing yarns which sew the fastener elements to a fastener tape may be damaged, or a gap in which the locking pawl is inserted is so small that the locking function of the slider cannot be exerted sufficiently.

[0005] The present invention has been achieved in views of the above-described problems, and a main object of the present invention is to provide a slider with an automatic locking device comprising a locking pawl in its cover, in which the cover is attached on an attaching post at a front position of a body, and a locking pawl is arranged on an attaching post side at a front position, that is, on a shoulder mouth side of the body, so that the locking pawl can be inserted into a gap between linear fastener elements having an excess space, thereby exerting the locking function sufficiently without damaging sewing yarns, or to provide a slide fastener slider with an automatic locking device which can be assembled simply and easily without changing equipment for manufacturing a conventional slider body.

[0006] Further object of the invention is to provide a slide fastener slider with an automatic locking device in which the locking pawl is formed into a configuration which allows itself to be inserted easily and securely into between leg portions of linear fastener elements by specifying the configuration of the locking pawl formed continuously from the opening portion of the cover.

[0007] Further object of the invention is to provide a slide fastener slider with an automatic locking device which enables long term use of a cover having the locking pawl, an excellent locking function to be exerted and a smooth operation of the pull-tab by specifying the configuration of the rear attaching post of the slider and the configuration of the locking pawl formed on the side wall of the cover.

[0008] Further object of the invention is to provide a

slide fastener slider with an automatic locking device which can exert its locking function sufficiently even if the locking pawl is provided on only the side wall on a single side of the cover, the slider having excellent performance and being free of frequent troubles, and prevents foreign matter such as yarn waste from invading through the pawl hole in the body so as to secure a smooth sliding operation.

[0009] Further object of the invention is to provide a slide fastener slider with an automatic locking device which allows the cover having the locking pawl to be attached on the body easily, so that the cover can be attached to the front attaching post of the body and assembled very easily.

[0010] To achieve the above-described object, according to a main aspect of the present invention, there is provided a slide fastener slider with an automatic locking device, being characterized in that a pawl hole in which a locking pawl can be inserted is provided in a top surface of a slider body; as regards front and rear sides of the pawl hole, a shoulder mouth side is called a front side and a rear mouth side is called a rear side; attaching posts are erected in front of and in back of the pawl hole; a cover has front engaged portions which engage the front attaching posts, and rear engaged portions which move within the rear attaching post; an elastic piece opposing the front attaching posts is provided on a front end of a top wall; opening portions, which allow a pivot shaft of a pull-tab to pass through, are provided in side walls; a proximal portion of a locking pawl is provided on a rear side of at least one of the opening portions; and a front end of the locking pawl is formed so as to be located on a forward side by bending the proximal portion such that the front end thereof opposes the pawl hole.

[0011] In the slider of slide fastener with automatic locking mechanism comprising the locking pawl in its cover, particularly, the locking pawl provided on the side wall of the cover is inserted into between fastener elements having a gap on the shoulder mouth side just before right and left fastener elements engage each other within the body of the slider so as to stop sliding of the slider. Consequently, the locking pawl can be inserted into a gap having an excess space without damaging the sewing yarns of the fastener stringer. Additionally, the slider body can be manufactured easily and effectively using conventional manufacturing equipment.

[0012] Preferably, the locking pawl is formed continuously from a rear side portion of the opening portion, and the front end of the locking pawl formed by bending the proximal portion is located below the opening portion.

[0013] Consequently, the locking pawl can be arranged easily in the gap portion just before right and left linear fastener elements engage each other, so that the elements can be inserted accurately and effectively.

[0014] Preferably, a pull-tab guide portion whose thickness decreases gradually as the pull-tab guide portion goes forward from the rear attaching post is formed on an inside of the rear attaching post, and when the cover

is moved upward, a top surface of the pull-tab guide portion is located above an upper side of the locking pawl.

[0015] Consequently, the pivot shaft of the pull-tab passing through the opening portion in the cover slides on the top surface of the pull-tab guide portion and at this time, the pivot shaft never makes contact with the upper side of the locking pawl. For this reason, the locking pawl provided on the cover can maintain an effective locking function which allows a long period use thereof.

[0016] Preferably, the pawl hole is provided in a position shifted to a single side of an upper blade plate of the body; the locking pawl provided on one of the side walls of the cover is inserted into the pawl hole; and a step portion is formed on a bottom portion of the pawl hole provided in the upper blade plate such that the step portion is shifted with respect to the locking pawl.

[0017] Consequently, even if the locking pawl is provided on only the side wall on a single side of the cover, the locking function can be exerted sufficiently. In addition, no foreign matter such as yarn wastes invades through the pawl hole, whereby executing trouble-free and smooth sliding operation.

[0018] Preferably, tapered surfaces are formed on outer faces at a top of the front attaching posts, and slopes are formed in bottom edges of the front engaged portions of the cover.

[0019] Consequently, the cover having the locking pawl can be attached to the front portion of the body accurately and easily. Accordingly, the advantages which the present invention attains are worthy of attention.

FIG. 1 is an exploded perspective view of a slide fastener slider with an automatic locking device;
FIG. 2 is a perspective view of a slider after assembling of the slider;
FIG. 3 is a partially broken front view of the slider;
FIG. 4 is a partially broken front view showing an operating state of the slider;
FIG. 5 is an enlarged sectional view of the slider taken along the line V-V of FIG. 3;
FIG. 6 is an enlarged view of major portions showing the operation of the slider;
FIG. 7 is a sectional view of a fastener chain of the slider taken along the line VII-VII in FIG. 3;
FIG. 8 is a sectional view showing a state just before a cover is mounted on the slider;
FIG. 9 is a sectional view taken along the line IX-IX in FIG. 3, showing a state after the cover is mounted on the slider;
FIG. 10 is a sectional view of the slider taken along the line X-X in FIG. 3;
FIG. 11 is a development view of a cover material of a well known slider;
FIG. 12 is a perspective view of the cover; and
FIG. 13 is an exploded perspective view of other known slider.

[0020] A slide fastener slider with an automatic locking device of the present invention is a slider comprising a locking pawl as a lock mechanism in its cover. The slider comprises a body 1, a cover 7 and a pull-tab 8 as shown in FIGS. 1 and 2. The body 1 and pull-tab 8 are molded by die-casting molding means, and the cover 7 is formed by pressing a metal.

[0021] In the body 1 of the slider, an upper blade plate 2 and a lower blade plate 3 are connected with a diamond 4, and a guide groove 6 for guiding linear fastener elements 40 is provided by bending flanges 5 on both sides of the upper blade plate 2. A pawl hole 22 is provided in a position shifted to a single side in the longitudinal direction in the center of the upper blade plate 2. A low step portion 23 is provided projectingly on the bottom portion of this pawl hole 22, that is, at a portion opposing the guide groove 6 such that the step portion is directed from backward to forward. A front attaching post 10 and a rear attaching post 11 are erected in front of and in the back of the pawl hole 22 on the upper blade plate 2.

[0022] In the front attaching posts 10, a trapezoidal supporting portion 12 is provided in their center in the longitudinal direction and an inclined guide face 13, to which the elastic piece 31 of the cover 7 can be fitted, is formed on the front face of the supporting portion 12. A small protrusion 16 is provided projectingly on each of side faces on both sides of the supporting portion 12 so that it makes contact with a front engaged portion 32 on the cover 7. In addition, the front attaching posts 10 having hook portions 21 whose inside faces are hook-shaped are provided integrally with both sides of the supporting portion 12. The rear attaching post 11 comprises guide portions 19 projected convexly on the lateral sides of the both sides of the inner face thereof so that the rear engaged portions 33 of the cover 7 can move vertically. A pull-tab guide portion 18 for guiding a pivot shaft 36 of the pull-tab 8 is provided projectingly at a position shifted to a single side on the inside face of the rear attaching post 11 such that it is tilted forward.

[0023] The cover 7 has side walls 25 and a top wall 26 provided by bending, and the elastic piece 31 which makes an elastic contact with the front face of the supporting portion 12 is provided at the front end of the top wall 26 so as to be extended. The side walls 25 on both sides have opening portions 27 in which the pivot shaft 36 of the pull-tab 8 is inserted. A pawl piece 28 is provided projectingly downward such that a locking pawl 30 is formed continuously from a rear end of one opening portion 27. A proximal portion 29 of the pawl piece 28 is bent forward, and further its front end is projected downward so as to form the locking pawl 30 to be located below the opening portion 27. A front engaged portion 32 and a rear engaged portion 33, which respectively project outward, are provided in the back and forth position of the bottom end of the side wall 25, so that they can engage the hook portion 21 of the front attaching post 10 and the guide portion 19 of the rear attaching post 11, respectively.

[0024] Upon assembling of the slider, the pivot shaft 36 of the pull-tab 8 is inserted into the opening portion 27 in the cover 7, and the rear engaged portions 33 are inserted into the guide portions 19 in the rear attaching post 11. With the locking pawl 30 opposing the pawl hole 22, the elastic piece 31 is brought into an elastic contact with the guide face 13 of the supporting portion 12. Then, the front engaged portions 32 are pushed in from above using tapered surfaces 20 of the front attaching post 10, so that they engage the hook portions 21 such that the cover 7 can rotate around the small protrusion 16.

[0025] As for an operation of the slider with the pull-tab 8, when the pull-tab 8 is pulled upward by gripping a grip portion 37, the pivot shaft 36 slides along the pull-tab guide portion 18, so that the rear engaged portion 33 of the cover 7 is raised up to the movable upper limit of the guide portion 19 of the rear attaching post 11. At the same time, the locking pawl 30 projecting from the pawl hole 22 is moved backward and retracted from the guide groove 6, thereby allowing the slider to slide. At this time, the pivot shaft 36 of the pull-tab 8 makes contact with the pull-tab guide portion 18 provided on the rear attaching post 11 as shown in FIG. 5, and the opening portion 27 in the cover 7 brings up the pivot shaft 36 by embracing it. By constructing the top surface of the pull-tab guide portion 18 so that it is located above the top side of the locking pawl 30, the pivot shaft 36 is formed so that it never makes contact with the pawl piece 28. The locking pawl 30 is inserted into between fastener elements 40 having a gap just before the right and left linear fastener elements 40 engage each other within the guide groove 6 of the body 1 so as to stop the slider as shown in Fig. 6.

(First embodiment)

[0026] In a slide fastener slider with an automatic locking device according to a first embodiment shown in FIGS. 1 to 9, a body 1 and a pull-tab 8 are molded of metal such as zinc alloy, aluminum alloy by die-casting molding means, and a cover 7 is formed by pressing a steel sheet. The slider with automatic locking mechanism comprises three members, that is, the body 1, the cover 7 and the pull-tab 8. The cover 7 is provided with the locking pawl 30 as a lock mechanism, and the locking pawl 30 can be inserted into between the right and left linear fastener elements 40 by operating the pull-tab 8. The pull-tab 8 prepared by a user can be used as the pull-tab 8 used here. Consequently, the slider having automatic locking device can be assembled easily by the hands.

[0027] In the slider body 1, as shown in FIG. 1, an upper blade plate 2 and a lower blade plate 3 are connected with a diamond, and flanges 5 are formed on both side edges of the upper blade 2. The flanges 5 can guide the fastener elements 40 on the side edges of the fastener tape 39, in which a core thread 45 is sewed with sewing yarns 44 such that the core thread passes through the elements 40, thereby forming a guide groove 6 be-

tween the upper blade 2 and the lower blade 3. A pawl hole 22 is provided in a position shifted to a single side in the longitudinal direction in the center of the upper blade plate 2, for example, a shifted position as shown in FIGS. 1 and 10. From backward to forward of the pawl hole 22A, a low step portion 23 is provided projectingly at a portion opposing the guide groove 6 of the bottom portion of the pawl hole 22 so that the step portion 23 opposes a pawl piece 28. A front attaching post 10 and a rear attaching post 11 are erected on the top surface of the upper blade plate 2 in front of and in the back of the pawl hole 22.

[0028] The front attaching posts 10 erected on the upper blade plate 2 are provided with a trapezoidal supporting portion 12 directed in the longitudinal direction in the center of the upper blade plate 2. A tilted guide face 13 with which an elastic piece 31 provided on the cover 7 can make an elastic contact is formed on the front face of this supporting portion 12. The projecting front attaching posts 10 are provided integrally on both sides of the guide face 13, and the attaching posts 10 form a front engaging portion with a hook portion 21 having a hook shaped configuration directed backward. A small protrusion 16 is provided projectingly on the side face of the supporting portion 12 facing the hook portion 21, so that the protrusion makes contact with and engages a front engaged portion 32 provided on the cover 7. In the meantime, a concave portion 17 is formed in the upper blade plate 2, so that the elastic piece 31 of the cover 7 can be fixed therein in a stable state.

[0029] The rear attaching post 11 erected on the upper blade plate 2 is provided on the rear mouth side of the upper blade plate 2. A pull-tab guide portion 18 tilted so as to extend forward along the pawl hole 22 is provided on the inside of the rear attaching post 11, so that as shown in FIG. 6, a pivot shaft 36 of the pull-tab 8 is guided. Guide portions 19 which allow the rear engaged portions 33 formed on the cover 7 projecting outward to move vertically are provided in both inner faces of the rear attaching post 11 as shown in Fig. 5, and a locking portion 24 for stopping the upward motion of the cover 7 is formed at the top end of the rear attaching post 11. In the meantime, the pull-tab guide portion 18 formed on the inside of the rear attaching post 11 is provided at a position shifted to a single side as shown in FIG. 10.

[0030] The cover 7 is formed by pressing a single steel sheet such that side walls 25 and a top wall 26 are provided and an elastic piece 31 is projected from the front of the top wall 26. Triangular opening portions 27 are provided in the side walls 25 on both sides, and a pawl piece 28 for forming the locking pawl 30 is provided to be directed downward from the rear end of one opening portion 27. A proximal portion 29 of this pawl piece 28 is bent forward, and then its front end is extended downward to form the locking pawl 30 such that it is located below the opening portion 27, and is formed into a substantially C-like shape which embraces the pivot shaft 36 of the pull-tab 8 inserted through the opening portions

27. The front engaged portion 32 capable of engaging the hook portion 21 formed in the front attaching post 10 and the rear engaged portion 33 capable of moving within the guide portion 19 in the rear attaching post 11 are provided projectingly at the front and rear ends of the side walls 25. In the meantime, the locking pawl 30 is deformed slightly inward as shown in FIG. 10. Also, the front end of the pull-tab guide portion 18 is located in front of the rear end side of the opening portion 27 and in front of the proximal portion 29.

[0031] Upon assembling of the slider, the rear engaged portion 33 is inserted into the rear attaching post 11 with the pivot shaft 36 of the pull-tab 8 embraced by the opening portions 27 in the cover 7. In addition, as shown in FIG. 8, slope portions 34 formed on a bottom edge of the front engaged portions 32 of the cover 7 are pushed in from above by using the tapered surfaces 20 formed outside the top ends of the front attaching post 10 while the locking pawl 30 opposing the pawl hole 22. Then, the front engaged portions 32 are brought into contact with and engaged with the small protrusions 16 formed within the hook portions 21 as shown in FIG. 9. As a consequence, the rear end of the cover 7 can move within the rear attaching post 11 around the small protrusions 16.

[0032] The operation of the assembled slider will be described. When the pull-tab 8 is pulled obliquely upward along the pull-tab guide portion 18 as shown in FIG. 6, the rear engaged portion 33 of the cover 7 is moved within the guide portion 19 of the rear attaching post 11, and the locking pawl 30 can be retreated from the guide groove 6 so as to slide the slider backward. At this time, the pivot shaft 36 makes contact with the pull-tab guide portion 18 as indicated in the figure, and moves the cover 7, the pull-tab guide portion 18 being formed so that its thickness decreases gradually as the pull-tab guide portion 18 goes forward from the rear attaching post 11, while since the top surface of the pull-tab guide portion 18 is located above the upper side of the locking pawl 30, the pivot shaft 36 makes no contact with the locking pawl 30. When the pull-tab 8 is pulled forward, the cover 7 is brought up along the edge of the opening portions 27. Then, the rear engaged portion 33 moves within the guide portion 19 in the rear attaching post 11 so as to retreat the locking pawl 30 from the guide groove 6, thereby sliding the slider forward. If the pull-tab 8 is released in order to stop the slider, as shown in Fig. 7, the locking pawl 30 is inserted into between the fastener elements having a gap just before the engaging heads 41 of the right and left fastener elements 40 attached to the fastener tape 39 engage each other, whereby stopping the slider.

[0033] The slider with an automatic locking device of the present invention can be assembled easily without use of any tools if the user wants to assemble the slider using a pull-tab desired by the user. The slider can be provided on a fastener chain using the linear fastener chain and the fastener chain can be used widely in various fields.

Claims

1. A slide fastener slider with an automatic locking device, being **characterized in that** a pawl hole (22) is provided in a body (1); attaching posts (10, 11) are erected in front of and in back of the pawl hole (22); a cover (7) has front engaged portions (32) which engage the front attaching posts (10), and rear engaged portions (33) which move within the rear attaching post (11); an elastic piece (31) opposing the front attaching posts (10) is provided on a front end of a top wall (26); opening portions (27), which allow a pivot shaft (36) of a pull-tab (8) to pass through, are provided in side walls (25); a proximal portion (29) of a locking pawl (30) is provided on a rear side of at least one of the opening portions (27); and a front end of the locking pawl (30) is formed so as to be located on a forward side by bending the proximal portion (29) such that the front end thereof opposes the pawl hole (22).

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2. The slide fastener slider with the automatic locking device according to claim 1, being **characterized in that** the locking pawl (30) is formed continuously from a rear side portion of the opening portion (27), and the front end of the locking pawl (30) formed by bending the proximal portion (29) is located below the opening portion (27).

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3. The slide fastener slider with the automatic locking device according to claim 1, being **characterized in that** a pull-tab guide portion (18) whose thickness decreases gradually as the pull-tab guide portion (18) goes forward from the rear attaching post (11) is formed on an inside of the rear attaching post (11), and when the cover (7) is moved upward, a top surface of the pull-tab guide portion (18) is located above an upper side of the locking pawl (30).

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4. The slide fastener slider with the automatic locking device according to claim 1, being **characterized in that** the pawl hole (22) is provided in a position shifted to a single side of an upper blade plate (2) of the body (1); the locking pawl (30) provided on one of the side walls (25) of the cover (7) is inserted into the pawl hole (22); and a step portion (23) is formed on a bottom portion of the pawl hole (22) provided in the upper blade plate (2) such that the step portion (23) is shifted with respect to the locking pawl (30).

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5. The slide fastener slider with the automatic locking device according to claim 1, being **characterized in that** tapered surfaces (20) are formed on outer faces at a top of the front attaching posts (10), and slopes (34) are formed in bottom edges of the front engaged portions (32) of the cover (7).

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FIG. 1

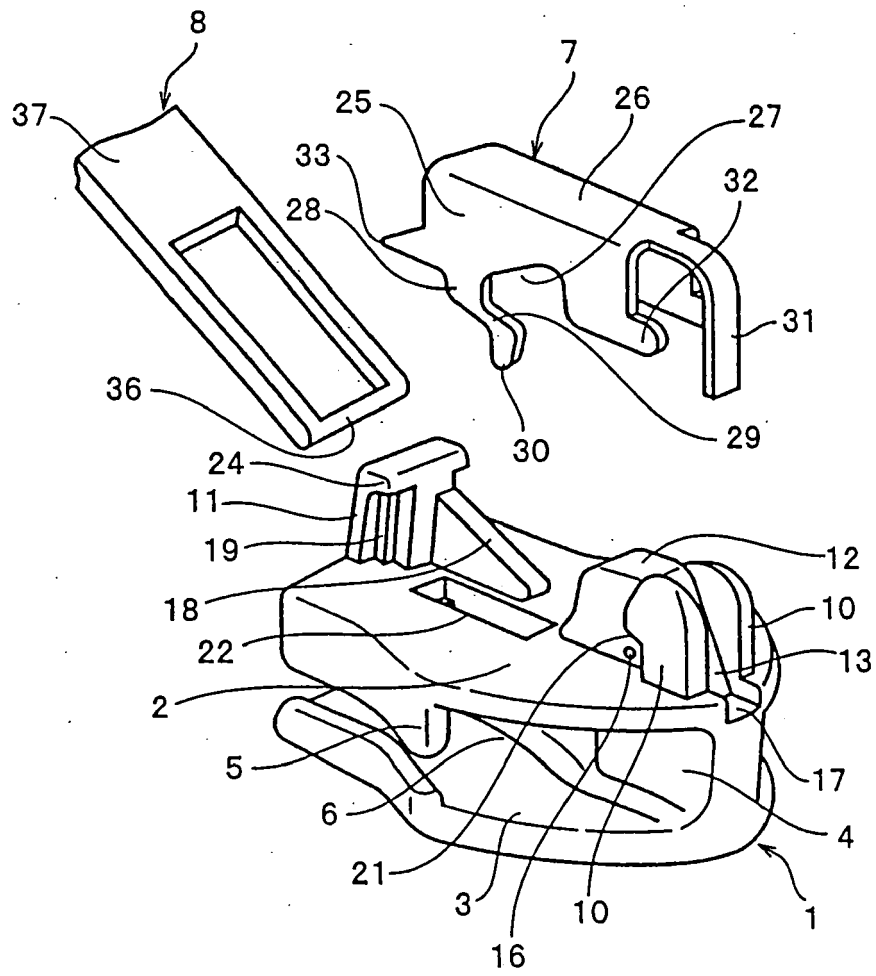


FIG. 2

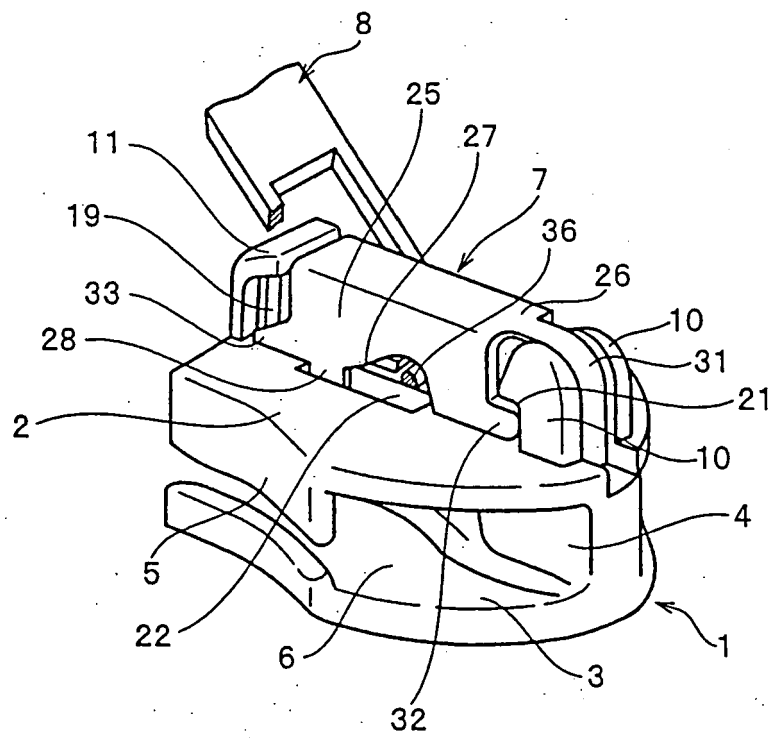


FIG. 3

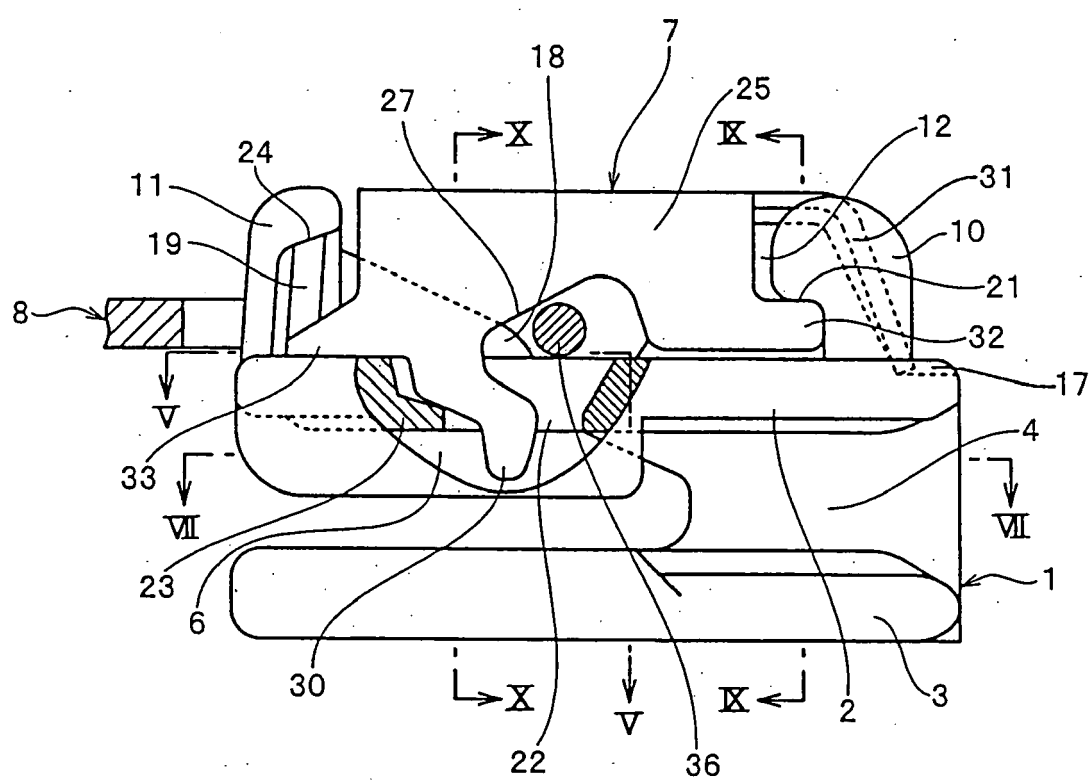


FIG. 4

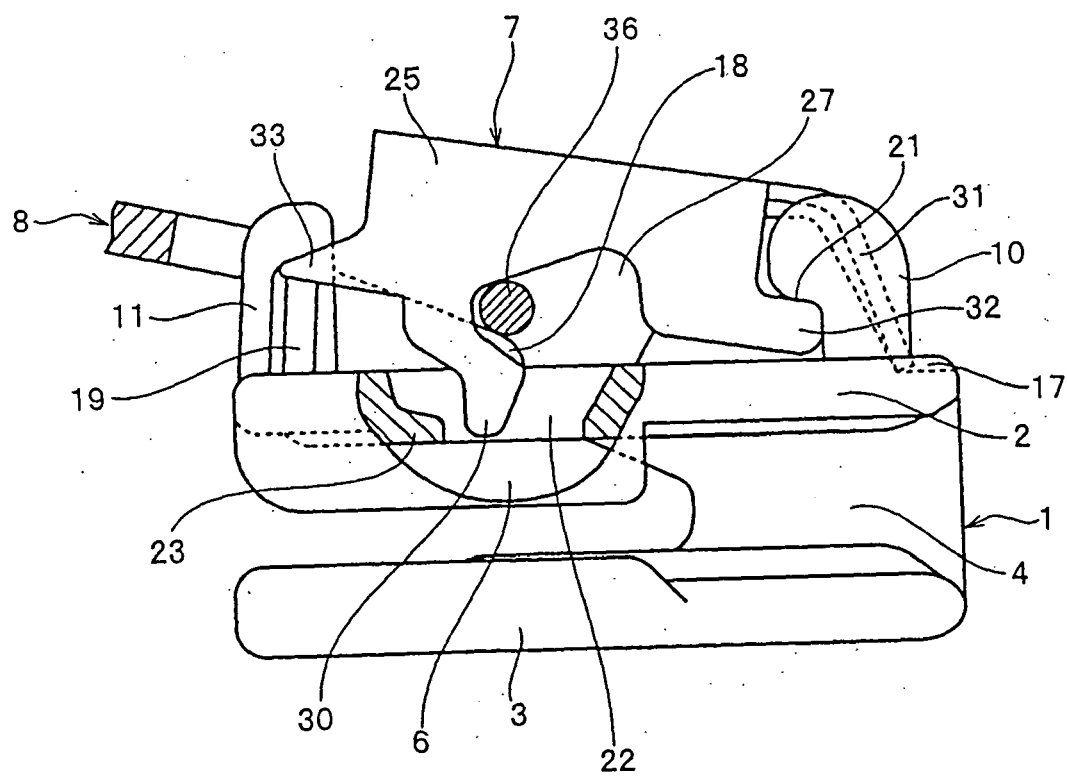


FIG. 5

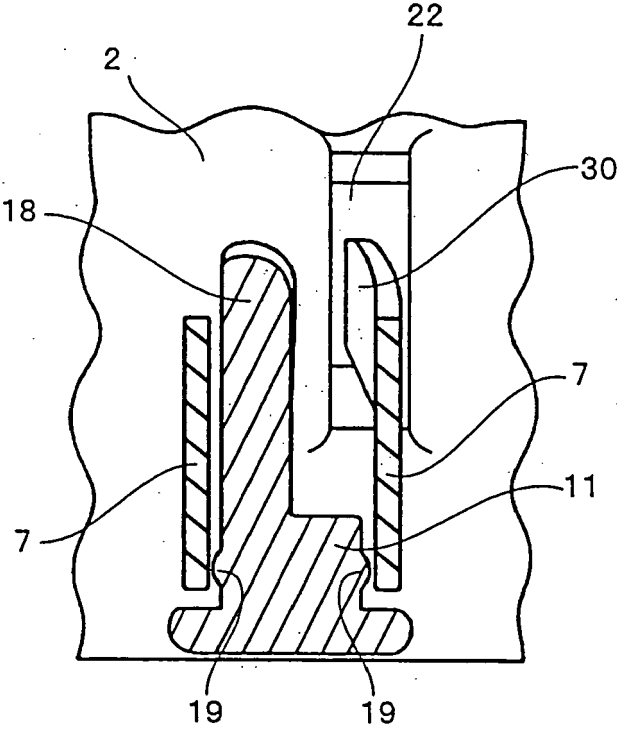


FIG. 6

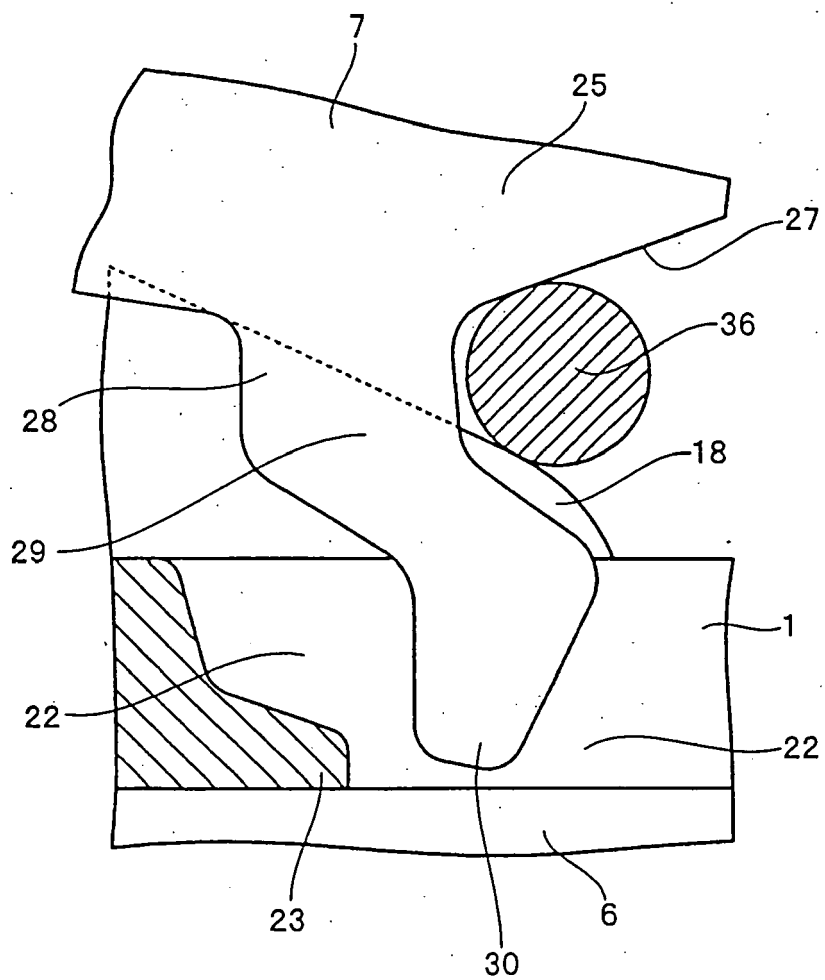


FIG. 7

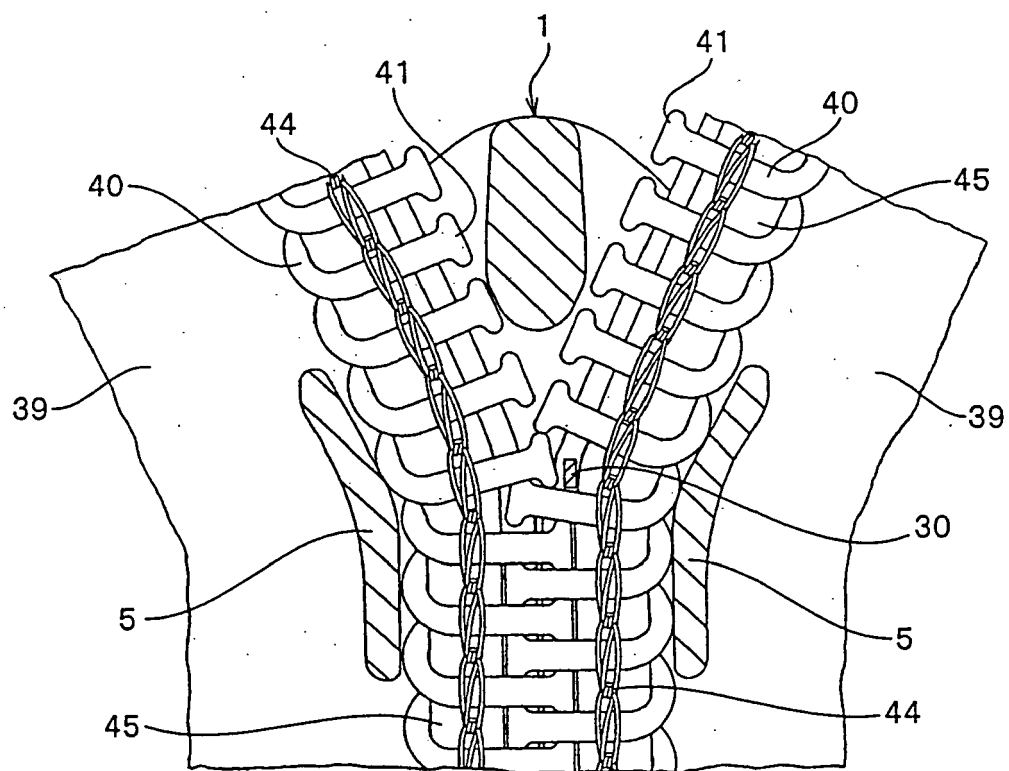


FIG. 8

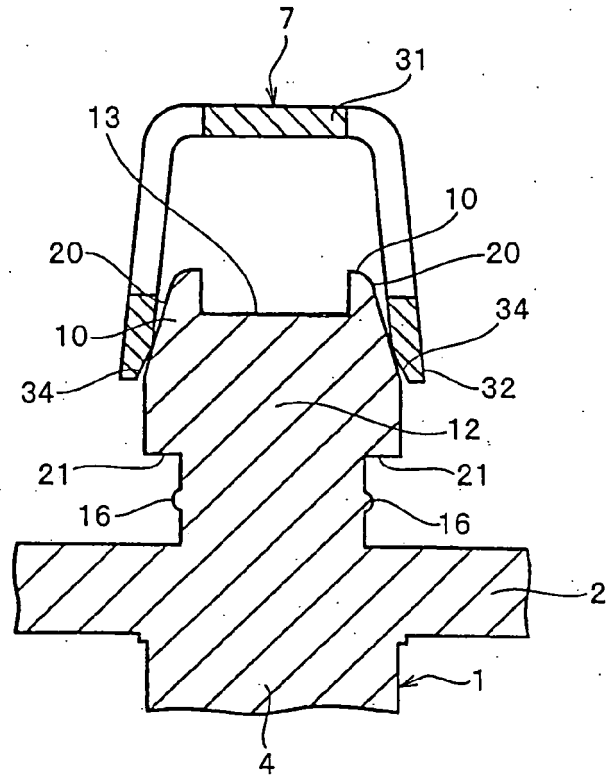


FIG. 9

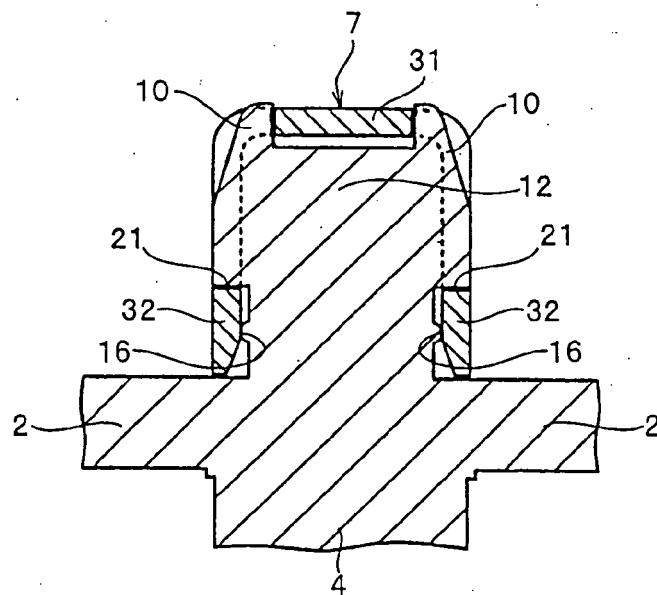


FIG. 10

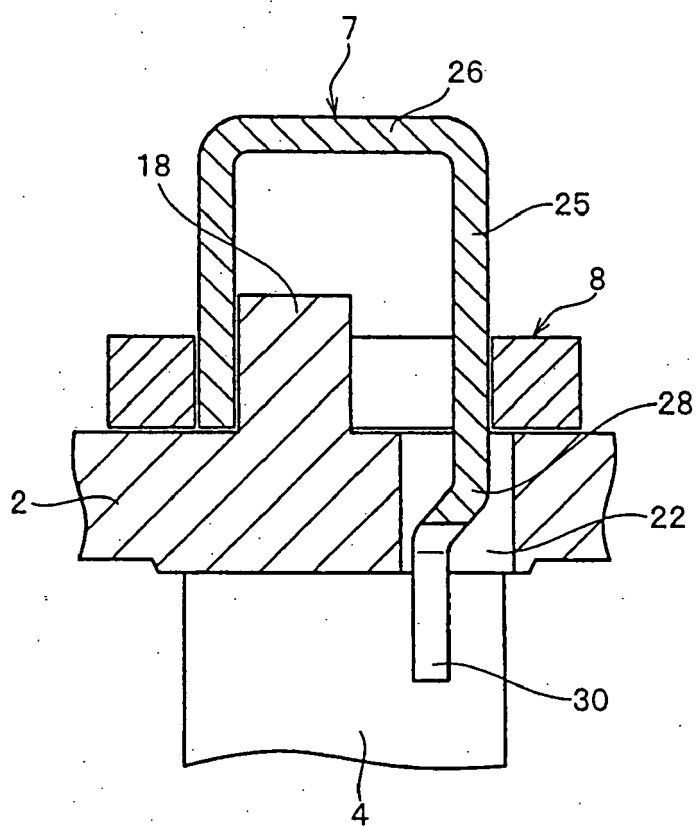


FIG. 11

PRIOR ART

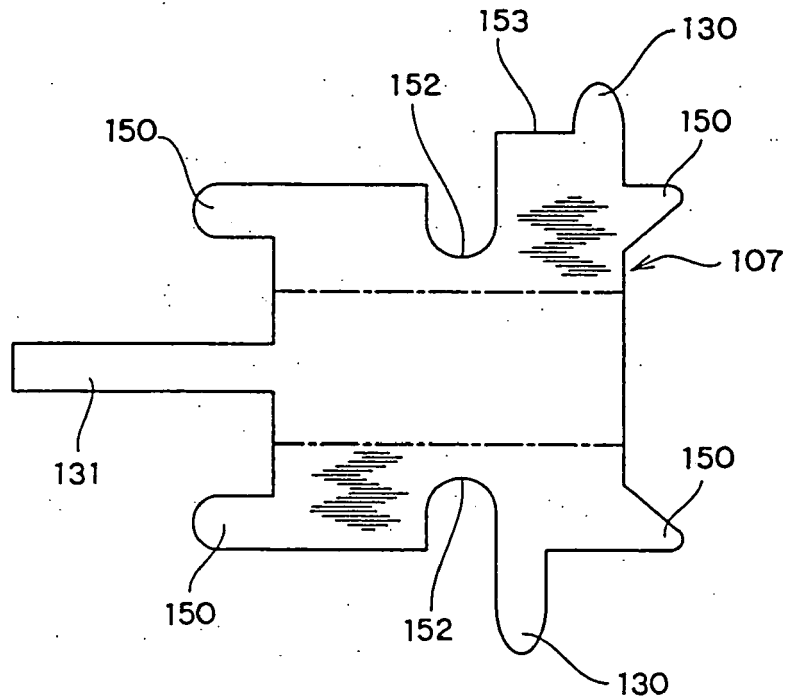


FIG. 12

PRIOR ART

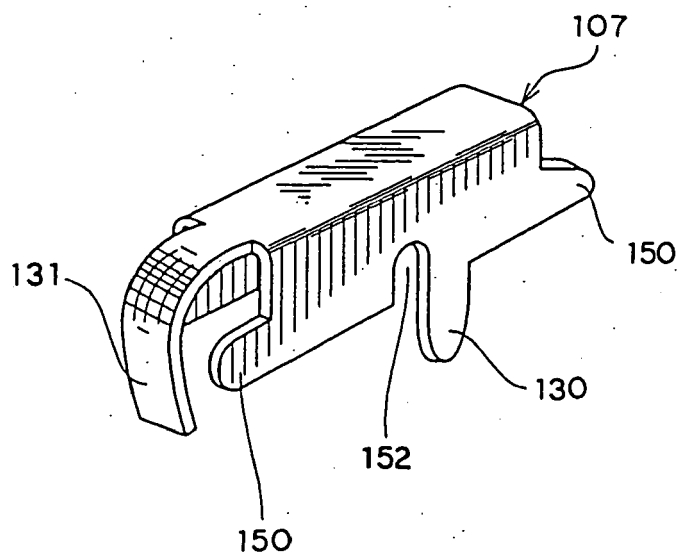
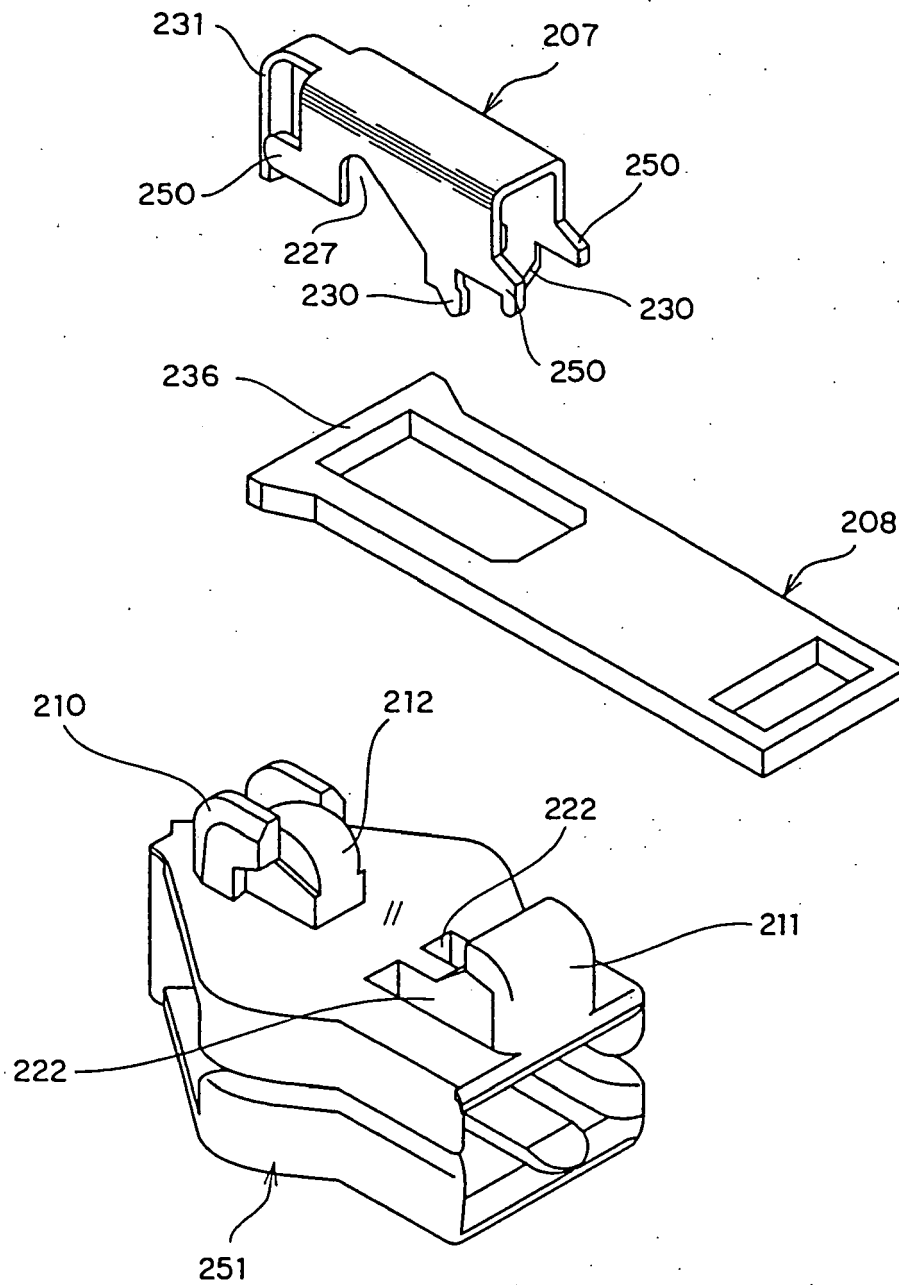


FIG. 13
PRIOR ART





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 01 8211

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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			TECHNICAL FIELDS SEARCHED (IPC)
			A44B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 20 November 2006	Examiner Horubala, Tomasz
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