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(54) **SLIDER ELEMENT OF A ZIP FASTENER**

SCHIEBERELEMENT EINES REISSVERSCHLUSSES

ELEMENT COULISSANT D'UNE FERMETURE A GLISSIERE

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Description

[0001] The invention relates to a slider element of a zip fastener which comprises a body with a tunnel for the rows of coupling elements comprised in the zip fastener, a pull tag with a fastening and pivoting axis, and a spring that locks the fastening and pivoting axis of the pull tag to the body, the spring being equipped with opposite ends, between which the spring extends in the sliding direction of the slider element, one of the ends being formed as a fastening end having a gripping part attached to a formed counterpart of the body, and a slide-locking projection which is biased to the slide-locking position extending into the tunnel due to the spring effect of the spring, whereby, when the spring is loaded by the pull tag in direction transverse to the tunnel, yielding of the spring releases the slide-locking projection from its slide locking position.

[0002] Previously is known a three-part slider element of a zip fastener, where the body, pull tag and spring may be relatively easily assembled into a slider element which locks automatically due to the spring effect so as to become non-sliding, when the pull tag is not pulled ("3-piece auto-lock"). Pulling this pull tag bends the spring and pulls the slide-locking projection out of the tunnel of rows of coupling elements. This solution does not necessarily require complex assembling machinery because it is built up by means of its spring effect and the bevels in the body. A weakness of this solution is, however, the scraping effect of the edges of the spring member. In addition, the spikes of the spring member constitute a weak part that breaks when the slider element is stressed. Also the spring formed as the tail of the spring member is weak and susceptible to breakdowns. The solution functions only in metallic form, when the spring is tempered.

[0003] In addition is known a zip fastener slider element of the above-mentioned type (a so-called cam-lock solution), in which the spring effect affects the turning of the pull tag, that is, there is a cam on the pull tag, which bends the spring when the pull tag is turned and at the same time lifts the slide-locking projection connected to the spring up from the tunnel. In the spring are the lugs of the fastening and pivoting axis of the pull tag, and the spring for its part is fixed to the body with lugs that must be bent during assembly. This requires an assembling machine.

[0004] US-A-4,074,399 shows a slider for a slide fastener wherein the locking spring includes a locking prong extending through a slider body to engage the coupling elements of the slide fastener to lock the slider. Pulling on the pull tab in either direction cams the cross bar of the pull tab upward to release the lock and allow movements of the slider. The locking prong is formed of movable end of the locking spring, which is fastened to the body by retention arms formed midway along its sides.

[0005] US-A-4,662,036 shows a slider for a slide fastener, having a bendable spring tongue movable through a window in the spring plate which is fastened to the slider body. The end of the spring tongue forms the slide-locking projection.

[0006] EP-A-0,251,316 shows an automatic lock slider for a slide fastener. A locking spring has a spring-biased locking prong which protrudes into a y-shaped quide channel in a slider body. One end of the locking spring has been attached to the body, the other end being movable transversally to the sliding direction to allow the spring biased movement of the locking spring.

[0007] All these prior art solutions require a strong metallic locking spring to resist breakage in the case of excessive loading of the pull tag.

[0008] The aim of the invention is to provide a slider element of a zip fastener of the above type that is easy to assemble (even manually) and which is structurally strong, especially in such a way that the spring and pull tag are tightly locked to the body.

[0009] This aim is achieved by means of the invention, on the basis of the characteristics disclosed in claim 1.

[0010] A particular advantage of the solution according to the invention is that as the load increases, the curved spring fixed at both ends bites even more tightly into its notches. The slider element in the solution according to the invention (including the spring) may be of metal or plastic. The slider element according to the invention may be of the cam-lock or auto-lock type. The solution is cheap and simple and does not have the scraping surfaces of a spring member.

[0011] The dependent claims disclose preferred embodiments of the invention.

[0012] An embodiment of the invention is described in greater detail in the following, with reference to the accompanying drawings, in which

Figure 1	shows a slider element of a zip fastener according to the invention, as seen from the side,
Figure 2	shows the same slider element when the spring is detached, and
Figures 3-6	show the spring from the side, from above, as a section V-V and when spread out. In this case, the spring is a tempered steel spring. If the spring is made of plastic, it is completed into its final form, and there is no spread-out form as shown in Figure 6.

[0013] In the body 1 of the slider element is a tunnel 1.1 for the rows of coupling elements of the zip fastener. The top and bottom parts of the body are joined together by means of a core part 1.2, which divides one end of the tunnel 1.1 into two tunnel branches, in which the rows of coupling elements separated by the core part 1.2 slide when the zip fastener is being opened or dosed. Since the body 1 causes the rows of coupling elements to open and dose, the body 1 is also called a lock. The slider

element also comprises a pull tag 2 and a spring 3, which locks the pull tag 2 to the body In a manner described in greater detail below. The spring 3 is provided with a slide-locking projection 3.3, which returns to the slide-locking position extending into the tunnel 1.1 due to the spring effect of the spring 3.

[0014] At opposite ends of the spring 3 are formed gripping parts 3.1, by means of which the detached, curved spring 3 can be attached to the formed counterparts 1.5. These formed counterparts 1.5 are located at opposite ends of the lugs 1.3 on top of the body. The ends of the lugs 1.3 are formed into guiding arcs that distance the formed gripping parts 3.1 of the spring 3 against the spring force, that is, straighten the curvature of the spring 3 when the spring 3 is pressed into place in the body between the lugs 1.3 from above, until the formed gripping parts 3.1 snap into the formed counterparts 1.5 due to the spring effect of the spring 3. In the case described, the formed gripping parts 3.1 are pins or similar projections at opposite ends of the spring 3, and the formed counterparts 1.5 are notches opening in opposite directions into which the pins 3.1 snap In place. When a spring 3 in position is loaded by pulling it upwards, the gripping pins 3.1 bite even more tightly into the notches 1.5.

[0015] In the lugs 1.3 of the body is an upwards open notch 1.6 which is connected a notch 1.4 open on one side which receives the fastening and a pivoting axis 2.1 of the pull tag 2. The open side of the notch 1.4 is closed by a branch 3.2 projecting from the spring 3. In the case shown, the slide-locking projection 3.3 is an extension of the branch 3.2 of the spring. The branch 3.2 of the spring thus locks the fastening and a pivoting axis of the pull tag into place by closing the notch 1.4 and by thus preventing the movement of the fastening and pivoting axis 2.1 in the longitudinal direction of the tunnel 1.1 with respect to the body 1. When the shaft 2.1 is locked into place In this manner, there must be a cam 2.2 in connection with the pull tag 2 shaft 2.1, which arches the spring 3 between its fastening ends 3.1 when the pull tag 2 is turned. When the pull tag 2 points in the direction of movement of the slider element 1 for opening the zip fastener, the cam 2.2 allows the spring 3 to return to the rest position, in which the projection 3.3 extends into the tunnel 1.1 through the hole 1.7. When the pull tag 2 is turned into the position shown by the line of dots and dashes in Figure 1, the cam 2.2 will bend the spring 3 by reducing the curvature of the spring arches. The same projection 3.3 also rises up from the tunnel 1.1, whereby the slider element is able to slide to open or dose the zip fastener. On the top surface, that is the cover, of the body 1 is a recess 1.8 which receives the cam 2.2. The hole 1.7 Is at the bottom of the recess 1.8.

[0016] In the case described, the spring 3 is designed in such a way that adjacent to both its fastening ends 3.1 are arches in one direction, and between these arches there is curvature in the spring In the opposite direction. The last-mentioned curvature is at the branch 3.2 and at the projection 3.3. The cam 2.2 bends the spring 3 by reducing the curvature of these arches, that is, three separate arches form what is closer to one large uniform arch. The spring is, therefore, subjected simultaneously to bending stress and tensile stress when the pull tag is pulled or when the pull tag is turned. Simultaneous bending and tensile stress provide many advantages. The tension fixes the formed gripping parts 3.1 even more tightly into place. Materials - even plastic material - withstand tension well. This solution offers for the first time the possibility of making the spring 3 of plasitic.

[0017] The embodiment described above is thus of the cam-lock type. An auto-lock type solution is realised in such a way that the fastening and pivoting axis 2.1 is not locked into place but is able to move in the notches of the lugs 1.3 against the spring 3, whereby when the pull tag 2 is pulled, the spring 3 bends and is subjected, with its part between the formed gripping parts 3.1, to the bending and tensile stress in the same way as when lifted by the cam 2.2. In this embodiment, the tensile stress of the spring 3 has the additional significance that it receives excessive loads directed at the pull tag and thus substantially reduces the risk of damage.

Claims

1. A slider element of a zip fastener which comprises a body (1) with a tunnel (1.1) for the rows of coupling elements comprised in the zip fastener, a pull tag (2) with a fastening and pivoting axis (2.1), and a spring (3) that locks the fastening and pivoting axis of the pull tag to the body, the spring being equipped with opposite ends, between which the spring (3) extends in the sliding direction of the slider element, one of the ends being formed as a fastening end having a gripping part (3.1) attached to a formed counterpart (1.5) of the body, and a slide-locking projection (3.3) which is biased to the slide-locking position extending into the tunnel (1.1) due to the spring effect of the spring, whereby, when the spring (3) or the locking projection (3.3) is loaded by the pull tag (2) in direction transverse to the tunnel (1.1), the slide-locking projection (3.3) is released from its slide locking position, **characterised in that** the both opposite ends of the spring (3) are formed as fastening ends which have gripping parts (3.1), which are attached to the formed counterparts (1.5) of the body (1) such that the both fastening ends remain in fixed relation to the body when the spring (3) or the locking projection (3.3) is loaded by the pull tag (2) in said loading direction so that the slide-locking projection (3.3) is released from its slide-locking position.

2. A slider element of a zip fastener as claimed in claim 1, **characterised in that** the body (1) is provided with fastening lugs (1.3) and the formed counterparts (1.5) of the body (1) are located at opposite ends of the fastening lugs (1.3), and that the ends of the fas-

tening lugs (1.3) are formed into guiding arcs that distance the formed gripping parts (3.1) of the spring (3) against the spring force when the spring (3) is pressed into place in the body between the fastening lugs (1.3) from above, until the formed gripping parts (3.1) snap into the formed counterparts (1.5) due to the spring effect of the spring (3).

3. A slider element of a zip fastener as claimed in claim 2, **characterised in that** the formed gripping parts (3.1) are pins or similar projections at opposite ends of the spring (3), and the formed counterparts (1.5) are notches opening in opposite directions in the sliding direction of the slider element.

4. A slider element of a zip fastener as claimed in any of the claims 1 to 3, **characterised in that** at the opposite ends of the spring (3), adjacent to the formed gripping parts (3.1), there are arches in the spring (3) in one direction, and between these arches there is curvature in the spring in the opposite direction, and that pulling the pull tag or turning the pull tag which has a cam (2.2) in connection with its fastening and pivoting shaft (2.1), bends the spring (3) by reducing the curvature of these arches.

5. A slider element of a zip fastener as claimed in any of the claims 1 to 4, **characterised in that** there is a cam (2.2) on the fastening and pivoting axis (2.1) of the pull tag, which bends the spring (3) between its fastening ends (3.1) when the pull tag is turned.

6. A slider element of a zip fastener as claimed in any of the claims 2 to 5, **characterised in that** in the lugs (1.3) of the body there is an upwards open first notch (1.6) and that there is a second notch (1.4) open on one side to the first notch (1.6) the second notch (1.4) receiving a fastening and a pivoting axis (2.1) of the pull tag (2), the open side of the second notch (1.4) being closed by a branch (3.2) projecting from the spring towards the tunnel (1.1).

7. A slider element of a zip fastener as claimed in claim 6, **characterised in that** the slide-locking projection (3.3) is an extension of the spring branch (3.2) that locks the fastening and a pivoting axis (2.1) of the pull tag into place by closing the open side of the second notch (1.4) and by thus preventing the movement of the fastening and pivoting axis (2.1) in the longitudinal direction of the tunnel (1.1) with respect to the body (1).

8. A slider element of a zip fastener as claimed in any of the claims 1 to 7, **characterised in that** when the spring (3) is loaded by means of the pull tag (2), the spring (3) is subjected simultaneously to bending stress and tensile stress between its fastening ends.

Patentansprüche

1. Schieberelement eines Reißverschlusses, das ein Gehäuse (1) mit einem Tunnel (1.1) für die Reihen der in dem Reißverschluss vorhandenen Kupplungselemente aufweist, ein Zugstück (2) mit einer Befestigungs- und Drehachse (2.1) und eine Feder (3), die die Befestigungs- und Drehachse des Zugstücks an das Gehäuse hält, wobei die Feder mit zwei gegenüberliegenden Enden ausgestattet ist, zwischen denen die Feder (3) in Gleitrichtung des Schieberelements verläuft, eines der Enden als Befestigungsende ausgebildet ist, das ein an das geformte Gegenstück (1.5) des Gehäuses befestigtes Eingreifteil (3.1) aufweist, und einen in den Tunnel (1.1) verlaufenden Gleitblockiervorsprung (3.3), der aufgrund der Federwirkung der Feder gegen die Gleitblockierposition gerichtet ist, wobei, wenn die Feder (3) oder der Blockiervorsprung (3.3) durch das Zugstück (2) in einer Richtung quer zum Tunnel (1.1) gedrückt wird, der Gleitblockiervorsprung (3.3) aus seiner Gleitblokkierposition gelöst wird, **dadurch gekennzeichnet, dass** die beiden gegenüberliegenden Enden der Feder (3) als Befestigungsenden ausgebildet sind, die Eingreifteile (3.1) aufweisen, die an die ausgebildeten Gegenstücke (1.5) des Gehäuses (1) so befestigt sind, dass die beiden Befestigungsenden in einer fixierten Verbindung zum Gehäuse bleiben, wenn die Feder (3) oder der Blockiervorsprung (3.3) durch das Zugstück (2) in diese Belastungsrichtung so gedrückt wird, dass der Gleitblockiervorsprung (3.3) aus seiner Gleitblockierposition gelöst wird.

2. Schieberelement eines Reißverschlusses nach Anspruch 1, **dadurch gekennzeichnet, dass** das Gehäuse (1) mit Befestigungslaschen (1.3) versehen ist, und die geformten Gegenstücke (1.5) des Gehäuses (1) sich an gegenüberliegenden Enden der Befestigungslaschen (1.3) befinden, und dass die Enden der Befestigungslaschen (1.3) in Führungsbögen geformt sind, die die geformten Eingreifteile (3.1) der Feder (3) gegen die Federkraft beabstandet halten, wenn die Feder (3) in das Gehäuse zwischen den Befestigungslaschen (1.3) von oben gedrückt wird, bis die geformten Eingreifteile (1.3) aufgrund der Federwirkung der Feder (3) in die geformten Gegenstücke (1.5) einschnappen.

3. Schieberelement eines Reißverschlusses nach Anspruch 2, **dadurch gekennzeichnet, dass** die geformten Eingreifteile (3.1) Stifte oder ähnliche Vorsprünge an gegenüberliegenden Enden der Feder (3) sind, und die geformten Gegenstücke (1.5) Kerben sind, die sich in entgegengesetzte Richtungen in der Gleitrichtung des Schieberelements öffnen.

4. Schieberelement eines Reißverschlusses nach ei-

nem der Ansprüche 1 bis 3, **dadurch gekennzeichnet, dass** sich an den gegenüberliegenden Enden der Feder (3) benachbart zu den geformten Eingreifteilen (3.1) Bögen in der Feder (3) in einer Richtung befinden, und zwischen diesen Bögen eine Krümmung in der Feder in entgegengesetzter Richtung ist, und dass Ziehen des Zugstücks oder das Wenden des Zugstücks, das eine Nocke (2.2) in Verbindung mit seinem Befestigungs- und Drehschaft (2.1) aufweist, die Feder (3) durch Verringern der Krümmung dieser Bögen biegt.

5. Schieberelement eines Reißverschlusses nach einem der Ansprüche 1 bis 4, **dadurch gekennzeichnet, dass** an der Befestigungs- und Drehachse (2.1) des Zugstücks eine Nocke (2.2) vorhanden ist, die die Feder (3) zwischen ihren Befestigungsenden (3.1) biegt, wenn das Zugstück gewendet wird.

6. Schieberelement eines Reißverschlusses nach einem der Ansprüche 2 bis 5, **dadurch gekennzeichnet, dass** sich in den Laschen (1.3) des Gehäuses eine nach oben offene erste Nocke (1.6) befindet, und dass eine an einer Seite der ersten Nocke (1.6) offene zweite Nocke (1.4) vorhanden ist, wobei die zweite Nocke (1.4) eine Befestigungs- und Drehachse (2.1) des Zugstücks (2) aufnimmt, und die offene Seite der zweiten Nocke (1.4) durch eine Abzweigung (3.2) geschlossen wird, die von der Feder gegen den Tunnel (1.1) verläuft.

7. Schieberelement eines Reißverschlusses nach Anspruch 6, **dadurch gekennzeichnet, dass** der Gleitblockiervorsprung (3.3) eine Verlängerung der Federabzweigung (3.2) ist, die durch Schließen der offenen Seite der zweiten Nocke (1.4) die Befestigungs- und Drehachse (2.1) des Zugstücks arretiert, und dadurch die Bewegung der Befestigungs- und Drehachse (2.1) in Längsrichtung des Tunnels (1.2) in Bezug auf das Gehäuse (1) verhindert.

8. Schieberelement eines Reißverschlusses nach einem der Ansprüche 1 bis 7, **dadurch gekennzeichnet, dass**, wenn die Feder (3) mittels des Zugstücks (2) belastet wird, die Feder (3) gleichzeitig einer Biegebelastung und Zugbelastung zwischen ihren Befestigungsenden unterworfen wird.

Revendications

1. Elément coulissant d'une fermeture à glissière, qui comprend un corps (1) ayant un tunnel (1.1) pour les rangées d'éléments de couplage incluses dans la fermeture à glissière, une tirette (2) ayant un axe de fixation et de pivotement (2.1), et un ressort (3) qui verrouille l'axe de fixation et de pivotement de la tirette sur le corps, le ressort étant pourvu d'extrémités opposées, entre lesquelles le ressort (3) s'étend dans la direction de coulissement de l'élément coulissant, l'une des extrémités étant formée comme une extrémité de fixation ayant une partie d'accrochage (3.1) attachée à une contrepartie formée (1.5) du corps, et une saillie de verrouillage en coulissement (3.3) qui est poussée vers la position de verrouillage en coulissement s'étendant dans le tunnel (1.1) par l'effet de sollicitation du ressort, moyennant quoi, lorsque le ressort (3) ou la saillie de verrouillage (3.3) est soumis à une charge par la tirette (2), dans une direction transversale au tunnel (1.1), la saillie de verrouillage en coulissement (3.3) est libérée de sa position de verrouillage en coulissement, **caractérisé en ce que** les deux extrémités opposées du ressort (3) sont formées comme des extrémités de fixation qui ont des parties d'accrochage (3.1), qui sont attachées aux contreparties formées (1.5) du corps (1), de telle sorte que les deux extrémités de fixation restent en relation fixe par rapport au corps lorsque le ressort (3) ou la saillie de verrouillage (3.3) est soumis à une charge par la tirette (2), dans ladite direction d'application de charge, de telle sorte que la saillie de verrouillage en coulissement (3.3) soit libérée de sa position de verrouillage en coulissement.

2. Elément coulissant d'une fermeture à glissière selon la revendication 1, **caractérisé en ce que** le corps (1) est pourvu de pattes de fixation (1.3) et les contreparties formées (1.5) du corps (1) sont situées aux extrémités opposées des pattes de fixation (1.3), et **en ce que** les extrémités des pattes de fixation (1.3) sont formées en arcs de guidage qui écartent les parties d'accrochage formées (3.1) du ressort (3), en opposition à la force du ressort, lors de la mise en place du ressort (3) dans le corps, entre les pattes de fixation (1.3), par une pression par le dessus, jusqu'à ce que les parties d'accrochage formées (3.1) s'encliquètent dans les contreparties formées (1.5) en raison de l'effet de sollicitation du ressort (3).

3. Elément coulissant d'une fermeture à glissière selon la revendication 2, **caractérisé en ce que** les parties d'accrochage formées (3.1) sont des broches ou des saillies similaires aux extrémités opposées du ressort (3), et les contreparties formées (1.5) sont des encoches s'ouvrant dans des directions opposées, dans la direction de coulissement de l'élément coulissant.

4. Elément coulissant d'une fermeture à glissière selon l'une quelconque des revendications 1 à 3, **caractérisé en ce que**, au niveau des extrémités opposées du ressort (3), en contiguïté des parties d'accrochage formées (3.1), le ressort (3) présente des arcs dans une direction, et, entre ces arcs, il présente une courbure dans la direction opposée, et **en ce**

que le fait de tirer sur la tirette ou de tourner la tirette, qui a une came (2.2) connectée à son arbre de fixation et de pivotement (2.1), fait plier le ressort (3) par réduction de la courbure de ces arcs.

5. Elément coulissant d'une fermeture à glissière selon l'une quelconque des revendications 1 à 4, **caractérisé en ce qu'**il y a une came (2.2) sur l'axe de fixation et de pivotement (2.1) de la tirette, qui fait plier le ressort (3) entre ses extrémités de fixation (3.1) lorsque la tirette est tournée.

6. Elément coulissant d'une fermeture à glissière selon l'une quelconque des revendications 2 à 5, **caractérisé en ce que**, dans les pattes (1.3) du corps sont formées une première encoche (1.6) s'ouvrant vers le haut et une deuxième encoche (1.4) s'ouvrant sur un côté de la première encoche (1.6), la deuxième encoche (1.4) recevant un axe de fixation et de pivotement (2.1) de la tirette (2), et le côté ouvert de la deuxième encoche (1.4) étant fermé par une branche (3.2) faisant saillie du ressort en direction du tunnel (1.1).

7. Elément coulissant d'une fermeture à glissière selon la revendication 6, **caractérisé en ce que** la saillie de verrouillage en coulissement (3.3) est une extension de la branche (3.2) du ressort qui verrouille l'axe de fixation et de pivotement (2.1) de la tirette en place en fermant le côté ouvert de la deuxième encoche (1.4) et en empêchant donc le déplacement de l'axe de fixation et de pivotement (2.1) dans la direction longitudinale du tunnel (1.1) par rapport au corps (1).

8. Elément coulissant d'une fermeture à glissière selon l'une quelconque des revendications 1 à 7, **caractérisé en ce que**, lorsque le ressort (3) est soumis à une charge par la tirette (2), le ressort (3) est soumis simultanément à des contraintes de flexion et à des contraintes de traction entre ses extrémités de fixation.

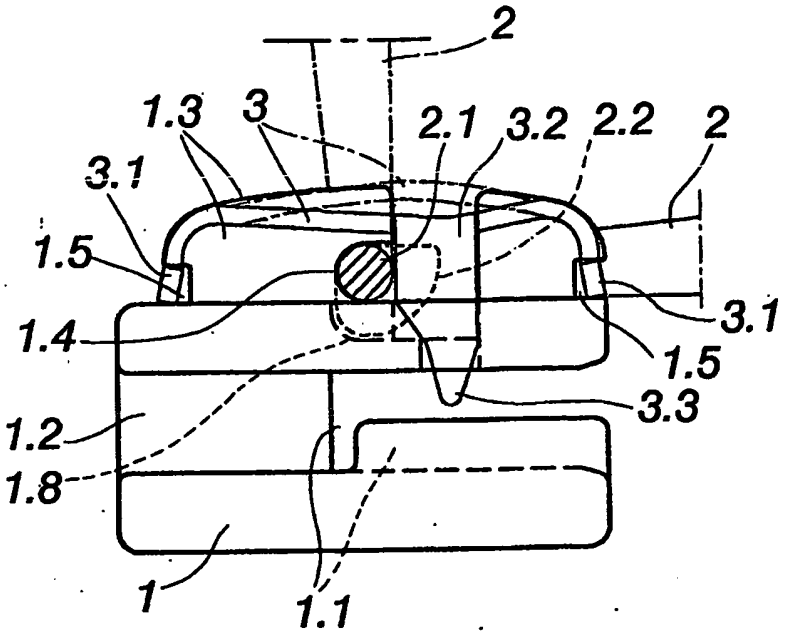

2
1.3
3
2.1
3.2
2.2
2
3.1
1.5
3.1
1.4
1.5
3.3
1.2
1.8
1
1.1

Fig. 1

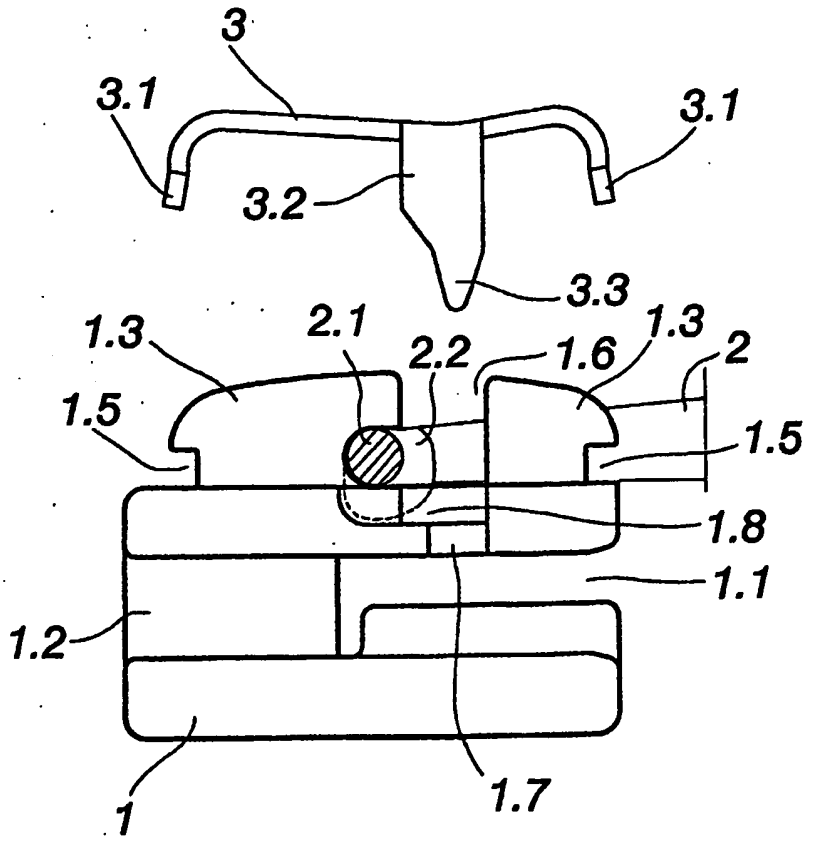

3
3.1
3.1
3.2
3.3
1.3
2.1
2.2
1.6
1.3
2
1.5
1.5
1.8
1.1
1.2
1
1.7

Fig. 2

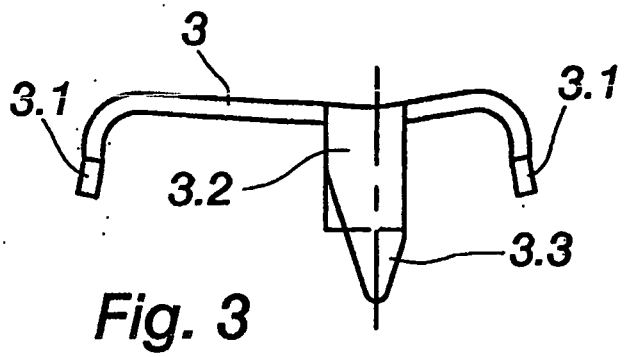


Fig. 3

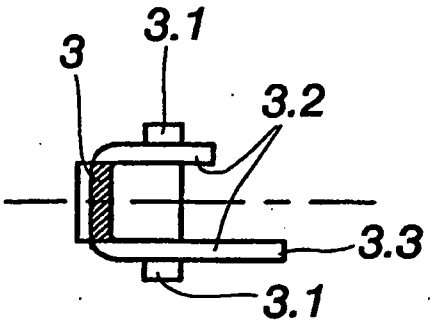


Fig. 5

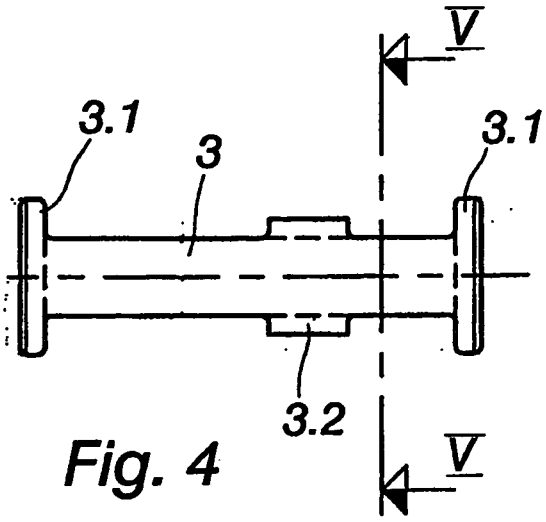


Fig. 4

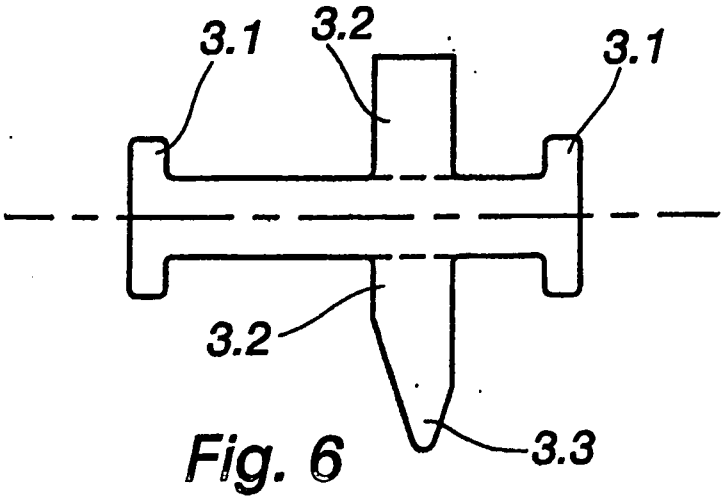


Fig. 6

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 4074399 A **[0004]**
- US 4662036 A **[0005]**
- EP 0251316 A **[0006]**