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(54) **Slider for a slide fastener**

(57) A slider (1) for a slide fastener, comprising an openable bridge (14) suitable to remove or replace a pull tab, wherein a base (15) of the bridge is connected to the slider body (10) by connection means (17, 18) allowing a combination of linear displacement and pivoting relative to the slider body (10), a linear displacement of

the bridge causes the lock/unlock of the bridge to/from a retaining member (19) of the slider body, and a pivoting of the bridge causes the opening/closing of a front passage (33) for removal or insertion of a pull tab; in some embodiments the bridge portion comprises also a locking member (22) associated to the bridge.

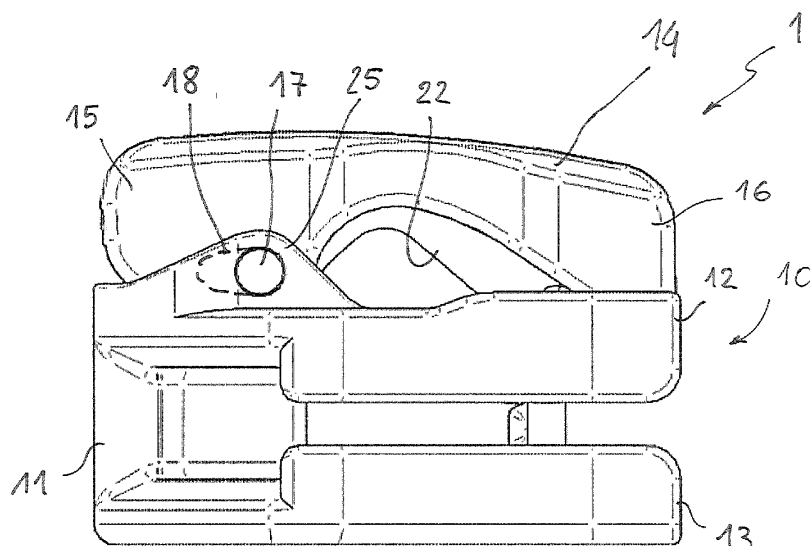


FIG. 1

Description

Field of application

[0001] The present invention refers to a slider for a slide fastener. More in detail, the invention relates to a slider with a bridge that can be shifted between a first position and a second position, for example to remove or replace a pull tab.

Prior Art

[0002] A slide fastener basically comprises a pair of tapes bearing respective rows of teeth, top and bottom stops, and a slider with a pull tab. The slider basically comprises an upper blade, a lower blade, a central portion between the upper and lower blade, which is called diamond, and a bridge extending over the upper blade. The pull tab is inserted between the bridge and the upper blade and is held in position by the bridge.

[0003] A technical problem encountered in the current technique of manufacturing slide fasteners is the need of a removable pull tab.

[0004] A removable pull tab may be desired for example to avoid damage of the pull tab caused by the manufacturing process of the slide fastener, or of the item (e.g. suit, bag, etc.) comprising the slide fastener. For example, it may be desirable to protect an expensive metal puller from manufacturing steps such as sewing and finishing. Especially in the field of luxury goods, the pull tab may be a delicate and expensive item. It should also be considered that a damage of the pull tab is likely to be visible and disappointing for the customer.

[0005] The above problem could be avoided by adding the pull tab at a final stage of the manufacturing process. However, it is often desirable to open and close the slide fastener during the process, which is much easier if the pull tab is mounted. In some embodiments of slide fasteners, the pull tab is indispensable to release a locking device and open the slide fastener. Another reason to provide a removable pull tab is customization of the slide fastener.

[0006] A known solution is the use of a disposable plastic pull tab during the manufacturing process, which however has some disadvantages including the need of an additional disposable pull tab and the step of cutting or breaking the plastic pull tab at the end of the process, for insertion of the true pull tab intended for the product.

[0007] EP 2 322 050 discloses a process for making a slide fastener wherein a protective cap is applied on the front portion of a resilient member of the slider. The protective cap allows easy insertion of a puller and, where appropriate, releases a locking device of the slider, thus allowing the opening and closing of the slider without the puller. This system is satisfactory but still has the drawback of requiring an additional item, that is the protective cap.

[0008] Other prior art solutions of sliders with inter-

changeable pull tab involve a complicated design of the slider body, including for example a slidable pull tab carrier, see e.g. EP 1 987 730.

Summary of the invention

[0009] The purpose of the invention is to avoid the above drawbacks of the prior art. The aims of the invention include the provision of a simple and cost-effective slider with a removable and interchangeable pull tab, as well as a releasable locking system.

[0010] The aims are reached with a slider for a slide fastener according to the independent claim 1. Preferred features are stated in the dependent claims. The slider body includes a diamond, an upper blade, a lower blade and a bridge. Said bridge is connected to the slider body by connection means allowing a combination of linear displacement and pivoting relative to the slider body between two end positions. Said two positions include: i) a first position wherein the bridge is engaged with a retaining member of the slider body, and ii) a second position wherein the bridge is disengaged from said retaining member and is rotated relative to the slider body.

[0011] The first position can be termed "closed" and the second position can be termed "open". The bridge in the second position may define a front passage suitable for insertion or removal of a pull tab. Said passage is closed when the slider is in the first position, thus holding the pull tab in place.

[0012] Said linear displacement is preferably in a longitudinal direction of the slider. Said term of longitudinal direction denotes a direction which is parallel to the sliding direction of the slider. In some embodiments, it is substantially parallel to the upper and lower blades.

[0013] Preferably, the bridge is connected to the slider body via a rotation pin inserted in at least one slot. Hence, the rotation pin provides the pivoting feature while the slot provides the linear displacement feature. In a preferred embodiment a rotation pin is fixed to the slider body and the bridge comprises one or more slot to engage said pin. A preferred embodiment has a fixed pin and sliding slot(s); alternative embodiments may be realized with a sliding pin.

[0014] Preferably, the slider comprises elastic means disposed to urge the bridge in the first position. More preferably, said elastic means are configured to oppose the linear displacement of the bridge relative to the slider body. In a preferred embodiment, said elastic means are housed in the bridge. The elastic means may be for example a coil spring. Preferably the elastic means are energized (for example a spring is slightly compressed) when the bridge is in the first position.

[0015] In some embodiments of the invention, the slider comprises also locking member to prevent undesired sliding.

[0016] The locking member, for example, may be configured to protrude through an opening of the upper blade, in such a way that when the slider is fitted on a slide

fastener, the locking member is able to engage the teeth in the region between the upper and lower blades, thus locking the slider itself.

[0017] One of the preferred aspects of the invention is the integration between the bridge and the locking member. Preferably, the locking member is engaged when the bridge is in the first position, and is released when the bridge is in the second position.

[0018] In a particularly preferred embodiment, said locking member is associated to the bridge, for example it is at least partially inserted in a recess of the bridge. Both the locking member and the bridge are pivotable together around a pin; the locking member however has only the degree of freedom of pivoting around said pin, while the bridge is also longitudinally slidable relative to said pin. More preferably, said elastic means act between the bridge and the locking member.

[0019] In a preferred embodiment, the locking member comprises a cam which copies a profile of the bridge, suitable to provide at least a partial disengagement of the locking member upon displacement of the bridge.

[0020] A pull-tab can be easily removed or replaced by opening and closing the bridge. Hence, for example, a temporary pull-tab can be inserted whenever necessary during the manufacturing process of the slide fastener, or of an item comprising the same. Then the temporary pull tab can be removed and a final pull tab inserted. Opening the bridge portion of the slider is easy but, at the same time, the closure is safe and reliable thanks to the combined pivoting and displacement.

[0021] Another advantage is the simple construction of the slider body. The invention eliminates the need of expensive design of the slider body, including moving parts such as slidable pull tab carrier and/or elastic members mounted directly in the slider body.

[0022] The bridge in the open position can be used as a puller, which means that the slide fastener can be operated (e.g. during the manufacturing of an item) even without a pull tab.

[0023] Another advantage of the invention is the full integration with a locking system when provided. Since the locking member is associated with the bridge, the locking of the slider is automatically released by opening the bridge, even without a pull tab.

[0024] These and further advantages of the invention will be more evident from the detailed description provided here below, given as indicative and not limiting example.

Brief description of the drawings

[0025]

Fig. 1 is a side view of a slider according to an embodiment of the invention, in a first closed/locked position.

Figs. 2 is a cross section of the slider of Fig. 1, ac-

cording to a median vertical plane.

Fig. 3 is a side view of the slider of Fig. 1 with the bridge in an intermediate unlocked position.

Fig. 4 is a cross section of the slider in the position of Fig. 3 according to a median vertical plane.

Fig. 5 is another cross section of the slider of Fig. 3, according to a vertical plane passing through one of the slots of the bridge.

Fig. 6 is a side view of the slider of Fig. 1 with the bridge in a second and open position.

Fig. 7 is a cross section of the slider of Fig. 6 according to a median vertical plane.

Fig. 8 is an exploded view of the slider of Figs. 1 to 7.

Fig. 9 shows the insertion or removal of a pull tab to/from a slider according to the invention.

Figs. 10 and 11 are sectional views of a slider according to another embodiment.

Detailed description of preferred embodiments

[0026] The figures show a slider 1 for a slide fastener, which basically includes a slider body 10 with a diamond 11, an upper blade 12, a lower blade 13 and a bridge 14.

[0027] The bridge 14 is shiftable between a first position of Fig. 1, and a second position of Fig. 6.

[0028] The second position of Fig. 6 is also termed open position, since the rotated bridge 14 defines a front passage 33, which is suitable for insertion or removal of a pull tab 40 (see also Fig. 9).

[0029] The first position of Fig. 1 is also termed closed position, since the front passage 33 is closed and a pull tab can be held in place between the bridge 14 and the upper blade 12.

[0030] In the first position, the bridge 14 is engaged with a retaining member 19 of the slider body 10 (Fig. 2). A spring 24 housed in a seat 30 of the bridge 14 serves to normally keep the bridge 14 in the first closed/locked position.

[0031] The bridge 14 can pass from the first position of Fig. 1 to the second position of Fig. 6 by a linear displacement followed by a rotation around a pin 17. The linear displacement (Figs. 3 to 5) disengages the bridge 14 from the retaining member 19; the rotation around the pin 17 (Figs. 6, 7) opens the front passage 33.

[0032] Referring more in detail to the embodiments of the figures, the bridge 14 comprises a base 15 and a distal end 16 opposite to said base 15. The rotation pin 17 is fixed to the slider body 10 and is received in a pair of slots 18 of said base 15.

[0033] The slots 18 are formed on lower projections 31

of the base 15. Said slots are denoted by the slotted line of Fig. 1; one of the slots is visible in the cross section of Fig. 5 and the two slots are also visible in the exploded view of Fig. 8. The connection via pin 17 and slots 18 gives the bridge 14 the ability to linearly slide from the position of Fig. 1 to the position of Fig. 3, and to rotate to reach the open position of Fig. 6.

[0034] The distal end 16 is suitably configured to engage and disengage the retaining member 19 upon a linear shift of the bridge 14. For example the front of the distal end 16 has a suitable recess 20 for engagement with a projecting tooth 21 of said retaining member 19. The retaining member 19 is integral with the slider body 10 (Fig. 2).

[0035] The embodiments of the figures also comprise a locking member 22. According to a preferred embodiment, said locking member is fitted in the bridge 14.

[0036] Said locking member 22 has a protrusion 23 adapted to engage the teeth of a sliding fastener (not shown) operated by the slider 1, to prevent undesired opening of the slide fastener.

[0037] In the first position of Figs. 1 and 2, the protrusion 23 of the locking member 22 inserts into a passage 32 of the upper blade 12, thus reaching the teeth in the region between the two blades 12, 13. By abutting against the teeth, said protrusion 23 locks the slide fastener. Hence the position of Fig. 1 is also a locked position of the slider 1. On the other hand, the second position of Figs. 6 and 7 has the locking member 22 raised together with the bridge 14, which means that the lock is released and the slider 1 is free.

[0038] It should be appreciated that the locking member 22 can pivot together with the bridge 14 around the same pin 17. However, the locking member 22 can only rotate around the pin 17, while the bridge portion 14 has also the additional degree of freedom of a certain linear translation, thanks to the slots 18.

[0039] The assembly of bridge 14 and locking member 22, in accordance with the shown embodiment, can be fully appreciated looking at Fig. 8.

[0040] The pin 17 is inserted through and supported by projections 25 of the upper blade 12 of slider body 10. The locking member 22 is partially received in a seat 26 of the bridge portion 14, in such a way that a hole 27 of said locking member is aligned to holes 18 of said projections 25 and faces the slots 18. Hence, the pin 17 is inserted through the holes 28 of said projections 25, the hole 27 of the locking member 22, and the slots 18 of the bridge 14.

[0041] The hole 27 of the locking member 22 has substantially the same diameter of the pin 17, while the slots 18 are larger than said pin 17 in a direction of sliding of the bridge 14, which is the longitudinal direction in the figures as denoted by *d* in Fig. 3.

[0042] The coil spring 24 abuts against the bottom of the seat 30 and against a surface 29 of the locking member 22.

[0043] As already mentioned above, the locking mem-

ber 22 has only one degree of freedom and can only pivot around the pin 17, while the bridge 14 is also allowed to longitudinally slide by the displacement of the pin 17 in the slots 18.

[0044] Due to the elastic force of spring 24, the bridge 14 and the locking member 22 can rotate together around the pin 17, during the opening of the bridge 14, as if they were a rigid body. However, the bridge 14 can also slide in a linear fashion, relative to the locking member 22 and slider body 10, compressing or releasing the spring 24.

[0045] The locking member 22 comprises also a cam 34, on the opposite part of the locking protrusion 23 relative to the pin hole 27. Said cam 34 engages a respective profile 35 made in the base 15 of the bridge 14.

[0046] Another embodiment is illustrated by Fig. 10 (released) and Fig. 11 (locked). In this embodiment, a different accommodation of the coil spring 24 is provided. Instead of the seat 30, the locking member 22 has a step 37 forming a plane surface substantially parallel to the opposite surface of the bridge 14. Hence, the coil spring 24 can be received between the locking member 22 and bridge 14 without the need of making a deep hole in the bridge 14. This embodiment may be preferred to ensure even better and smooth operation of the coil spring. Another advantage of this embodiment is that the bridge 14, in particular the base 15, is simpler to manufacture.

[0047] The slider 1 operates in the following manner.

[0048] In the closed/locked position of Figs. 1-2, the coil spring 24 is slightly compressed. Due to its position and inclination, the spring 24 keeps the bridge 14 in the closed position, by urging the distal end 16 against the retaining member 19 (Fig. 2). At the same time, the spring 24 tends to rotate clockwise the locking member 22 around the pin 17, so that the locking member 22 is also urged in its locked position, against a step 36 of the slider body 10, as shown in Fig. 2. The protrusion 23 is fully extended in the passage 32, for engagement with the teeth of the fastener.

[0049] The locking member 22 can be released by a pull tab during the normal use, lifting the middle of the locking member around the pin 17 until the teeth are freed from the protrusion 23. The bridge 14 in this case will remain in its closed position, due to the engagement of front recess 20 and retainer 19, which is unaffected by the action on the pull tab.

[0050] Fig. 3 shows how to open the bridge 14. The bridge 14 is first pushed as denoted by *d*, relative to the slider body 10 and locking member 22, against the spring 24 which is further compressed. By doing so, the distal end 16 is progressively disengaged from the retaining member 19 as seen in the sectional view of Fig. 4.

[0051] The pin 17 slides from one end to another end of the slots 18, that is from left end to the right end in the figures. In the meantime, the locking member 22 is rotated around the pin 17 by the cam 34 copying the profile 35, thus starting to disengage the lock.

[0052] When fully released from the retaining member 19, the assembly of bridge 14 and locking member 22

(hold together by the action of the spring 24) is free to pivot around the pin 17, reaching the open position of Figs. 6 and 7.

[0053] The rotation of the bridge 14 opens the front passage 33 which allows insertion or removal of a pull tab. The locking member 22 is released as well, pivoting together with the bridge 14 and bringing the protrusion 23 away from the locking position in the passage 32.

[0054] The skilled person will realize that inserting or replacing the pull tab is quite easy, as shown by Fig. 9. Further to this, the same bridge 14, when in the open position of Fig. 6, could be used to manually open or close the slide fastener. In other words, when the bridge 14 is opened and the locking member 22 is also released, the bridge itself can be used as a sort of puller. This feature may be useful during a manufacturing process of the slide fastener or of an item comprising the same, because the slide fastener can be opened or closed even without a pull tab.

[0055] The closing of the bridge is as follows. Starting from the open position of Fig. 6, the bridge 14 is lowered until it is substantially horizontal, then it is shifted back to the position of Fig. 1, slightly compressing the spring 24. When the position of Fig. 1 is reached, the system is stable thanks to the spring 24 urging the end 16 against the retainer 19 and the locking member 22 against the step 36 of the body 10.

[0056] The figures show also the advantage of a simple construction, especially of the slider body. The slider body 10 has no moving parts and the spring 24 is fully received in the slider bridge 14. No hole or seat for a spring is to be provided in the body 10. Another advantage is that a single elastic element, such as the spring 24, keeps both the bridge 14 and the locking member 22 in the closed/locked position. The invention combines the functionality of an openable bridge, removable pull tab and releasable locking system, in an efficient and cost-effective manner.

Claims

1. A slider (1) for a slide fastener, comprising:

a slider body (10) including a diamond (11), an upper blade (12), a lower blade (13) and a bridge (14),

characterized in that:

said bridge (14) is connected to the slider body (10) by connection means (17, 18) allowing a combination of linear displacement and pivoting of said bridge (14) relative to the slider body (10), and
said linear displacement and pivoting of the bridge (14) takes place between: i) a first position wherein the bridge is engaged with a retaining member (19) of the slider body,

and ii) a second position wherein the bridge is disengaged from said retaining member and is rotated relative to the slider body.

2. A slider according to claim 1, **characterized in that:** said linear displacement of the bridge (14) relative to the slider body (10) causes the engagement or disengagement of said bridge to/from said retaining member (19).
3. A slider according to claim 1 or 2, **characterized in that:** the rotation of the bridge relative to the slider body causes the opening or closing of a front passage (33) between the bridge and the slider body, said front passage being suitable for insertion or removal of a pull tab (40).
4. A slider according to any of claims 1 to 3, **characterized in that:** said bridge (14) has a base (15) associated to the slider body by said connection means, and a distal end (16) opposite to said base, said distal end being engaged with the retaining member when the bridge is in the first position, and disengaged therefrom when the bridge is in the second position.
5. A slider according to claim 3 and 4, **characterized in that:** a linear displacement of the bridge relative to the slider body causes the lock/unlock of said distal end (16) to/from said retaining member (19), and a pivoting of the bridge portion causes the opening/closing of said front passage (33).
6. A slider according to any of claims 1 to 5, said connection means including a rotation pin (17) inserted in at least one slot (18).
7. A slider according to claim 6, said rotation pin (17) being fixed to said slider body (10), and said at least one slot (18) being formed in a portion (31) of the bridge (14).
8. A slider according to any of the previous claims, said linear displacement being in a substantially longitudinal direction of the slider (1).
9. A slider according to any of the previous claims, comprising elastic means (24) disposed to urge the bridge (14) in the first position.
10. A slider according to claim 9, said elastic means being housed in the bridge (14).
11. A slider according to any of the previous claims, also comprising a locking member (22) to prevent sliding, said locking member being in a locked condition when the bridge (14) is in the first position, and being in a released condition when the bridge is in the second position.

ond position.

12. A slider according to claim 11, said locking member (22) being associated to the bridge (14), both the locking member and the bridge being pivotable together around a same pin (17) fixed to the slider body (10). 5
13. A slider according to claim 12, the locking member (22) having only one degree of freedom of pivoting around said pin (17), while the bridge (14) is also slidable relative to said pin. 10
14. A slider according to any of claims 11 to 13, comprising an elastic means (24) disposed to urge the bridge (14) in the first position, and said elastic means (24) acting between a surface of the bridge and a surface (29) of the locking member, and said bridge and said locking member being urged one against the other by said elastic means, so that they form a substantially rigid assembly when rotating around said pin (17). 15 20
15. A slide fastener, comprising a slider (1) according to any of the previous claims. 25

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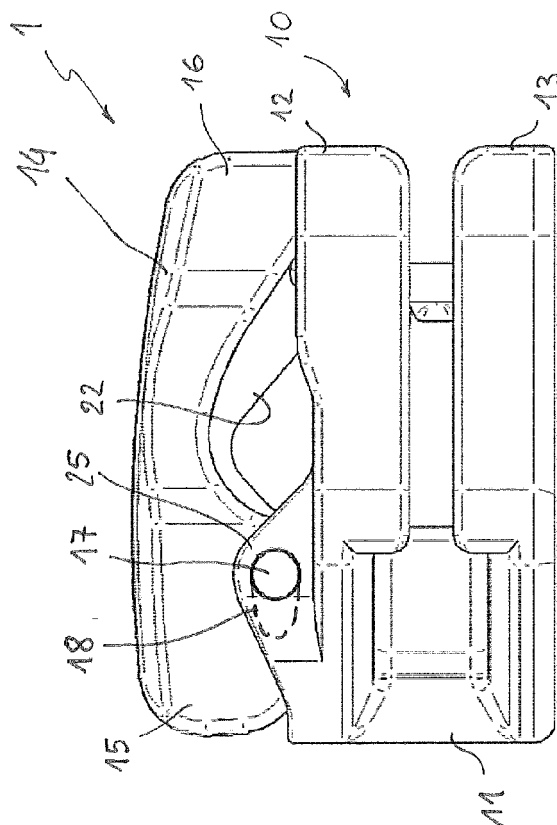


FIG. 1

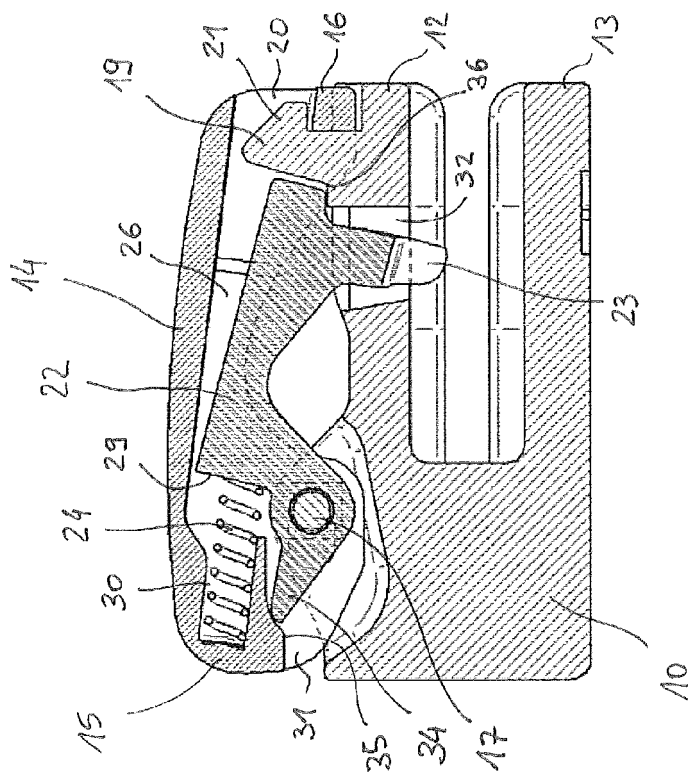


FIG. 2

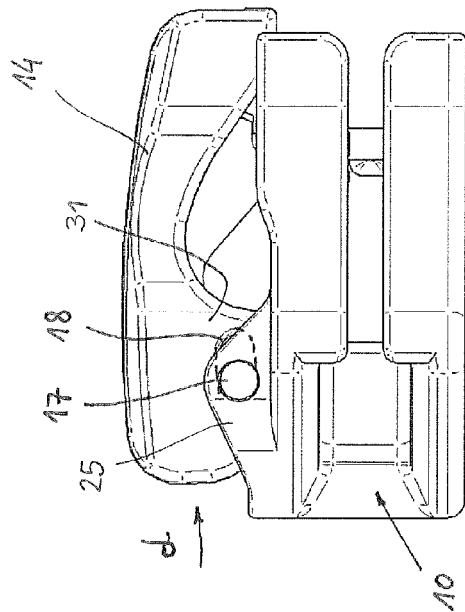


Fig. 3

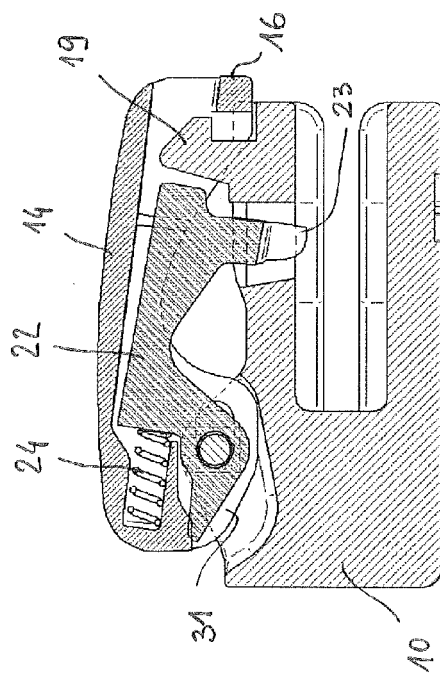


Fig. 4

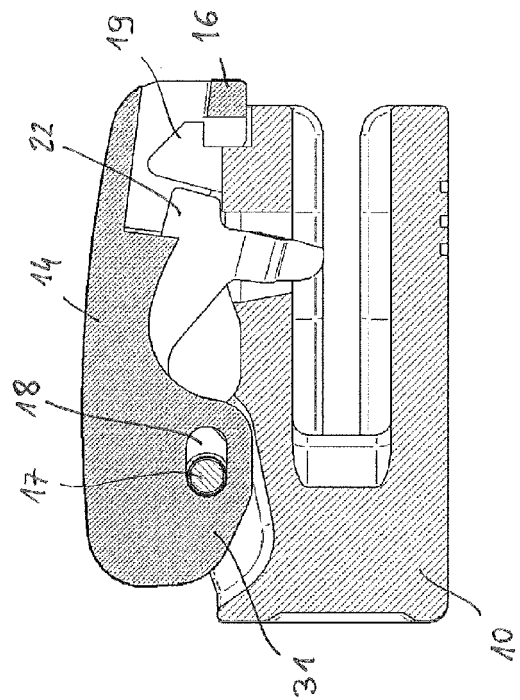


Fig. 5

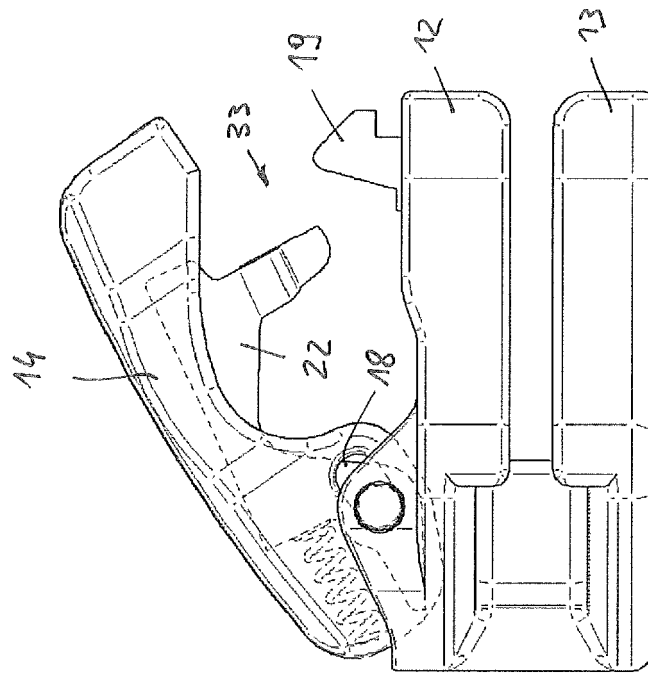


FIG. 6

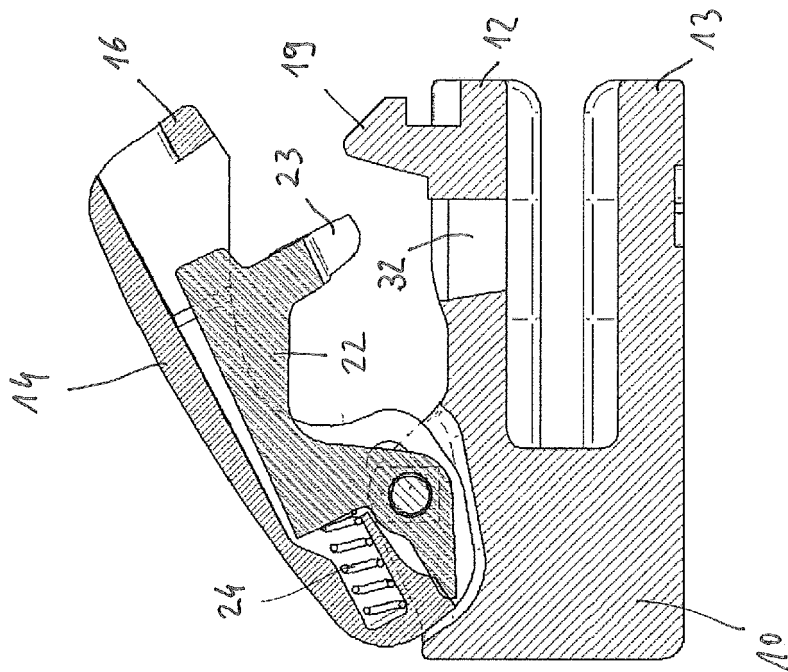


FIG. 7

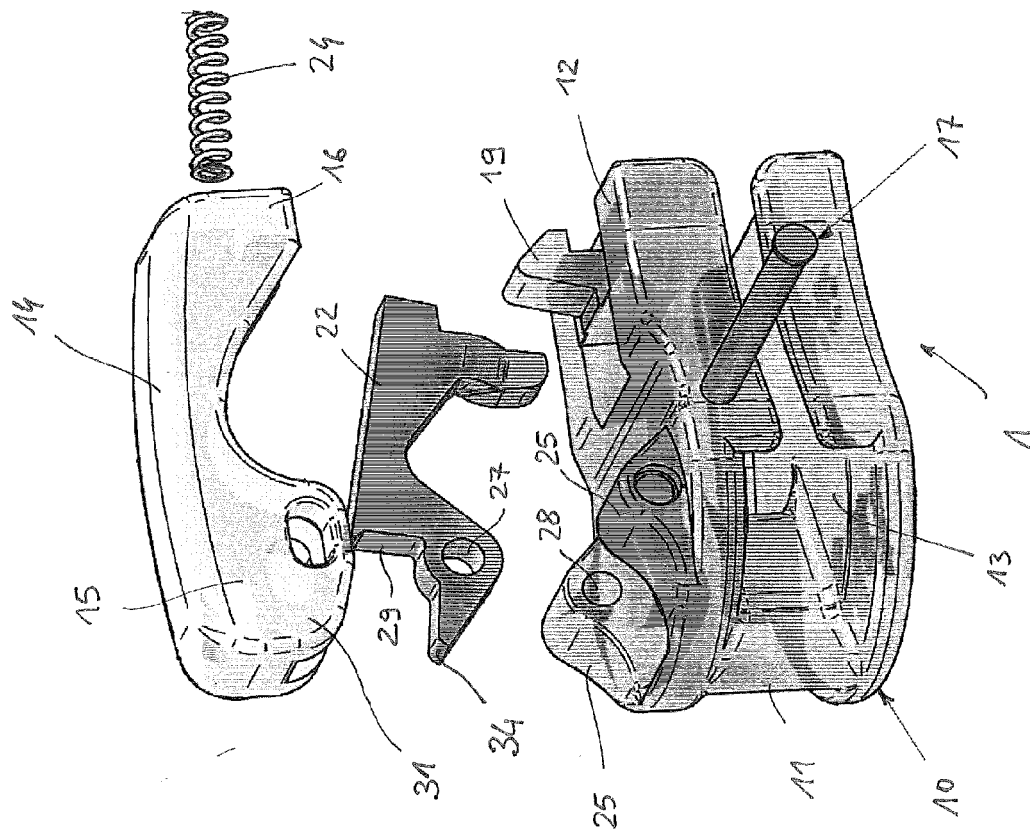
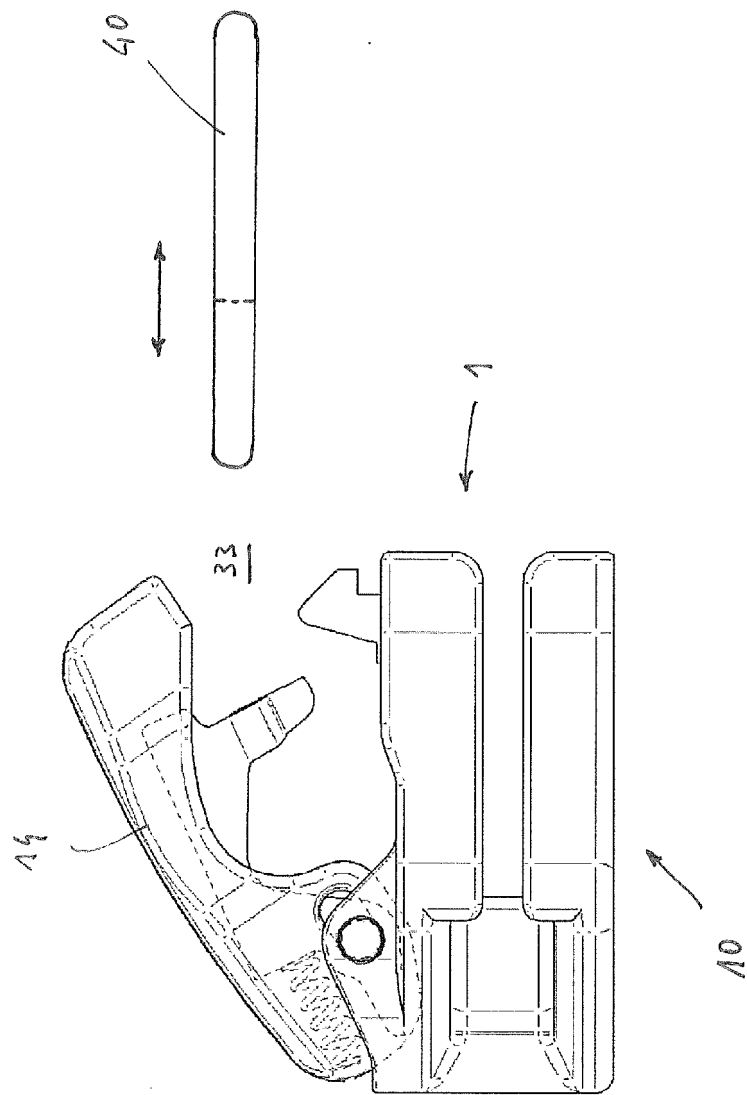


FIG. 8



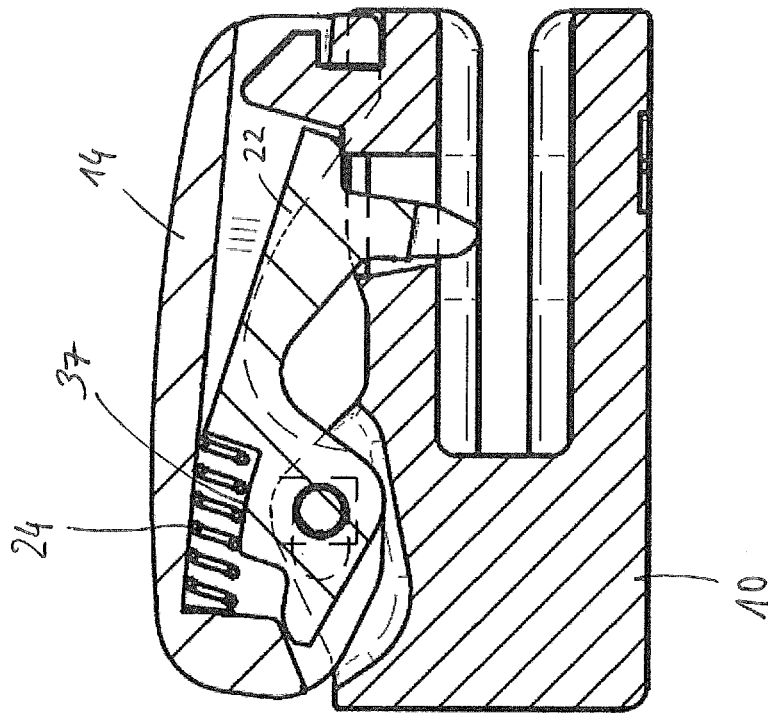


FIG. 11

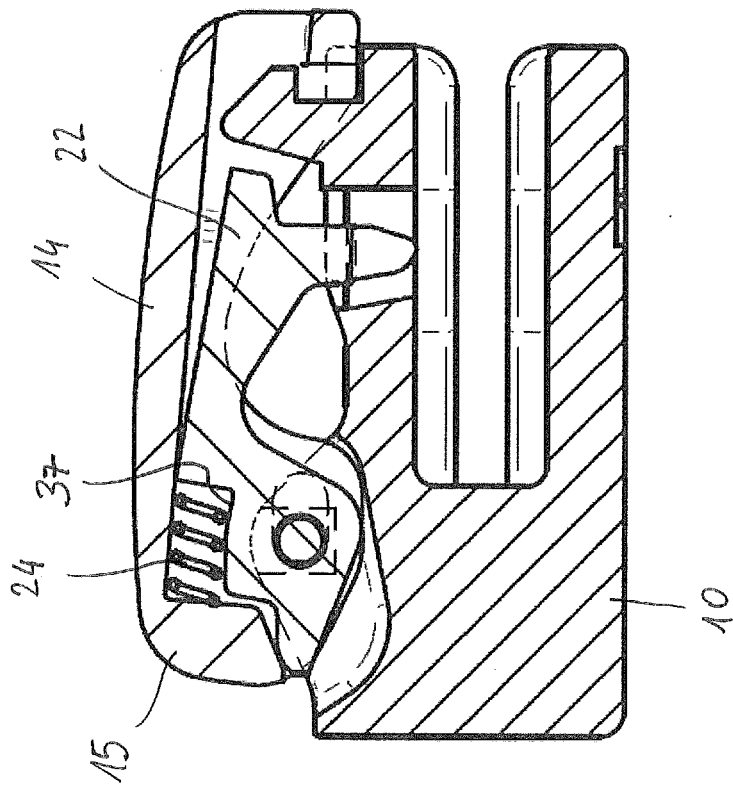


FIG. 10



EUROPEAN SEARCH REPORT

Application Number
EP 14 17 1059

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 1 December 2014	Examiner van Voorst, Frank
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 14 17 1059

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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