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(54) Toothed-belt fastening, in particular for chin-straps of helmets, protective headgear and the like

(57) A toothed-belt fastening, in particular for chin-straps of helmets, protective headgear and the like, comprises a base on which the toothed belt can be slidably engaged, a first and a second pawl which are mounted in an oscillating manner on the base and can in turn be engaged with a toothing of the belt. The first pawl forms a member for unidirectionally locking the toothed belt with respect to the base and is disengageable from the toothing so as to slacken the fastening, while the second pawl is engageable with the toothing so as to tension the fastening and is hinged on the base coaxially with the first pawl.

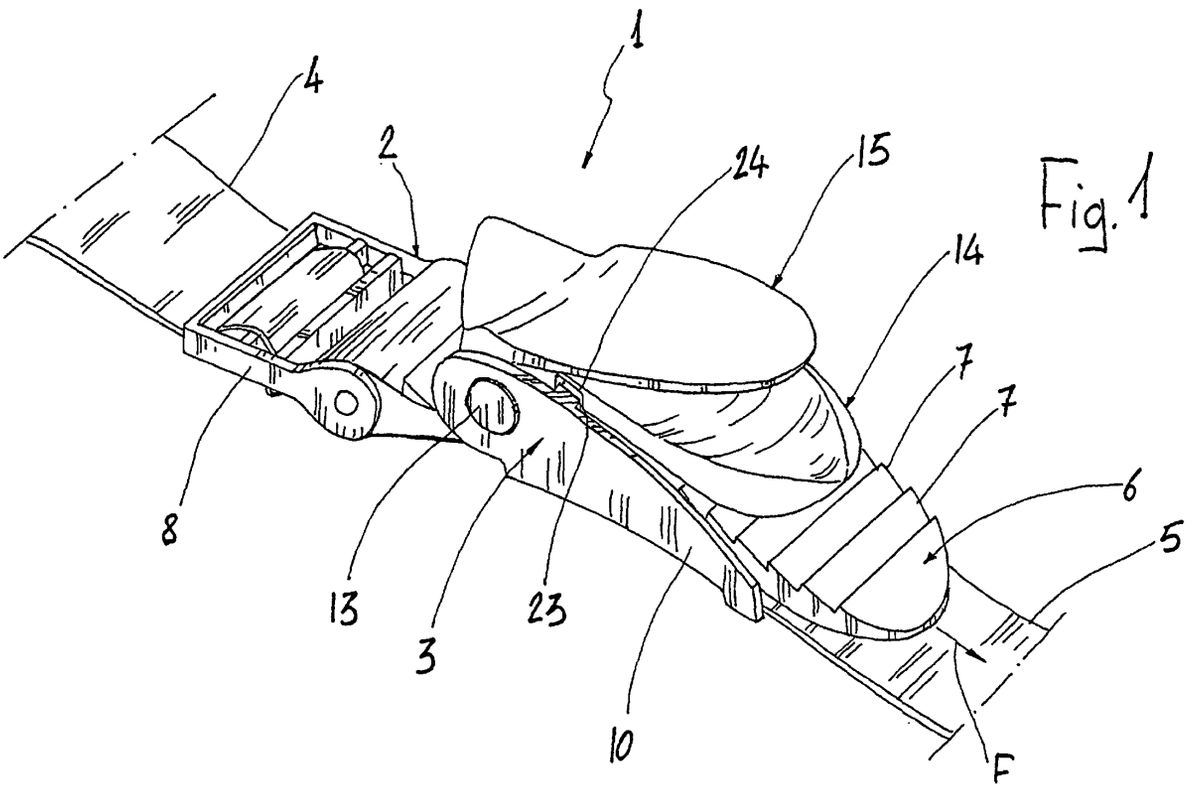

Fig. 1

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Description

[0001] The present invention relates to a toothed-belt fastening, in particular but not exclusively for tightening the belt which passes underneath the chin, otherwise known as chin-strap, in helmets, protective headgear and the like. Although the use described is the preferred use, this fastening is more generally intended for rapidly tightening and releasing two fastening elements and is therefore suitable for widely varying uses in sports equipment and accessories.

[0002] Within the specific technical sector it is known to use rapid-release and rapid-engagement fastenings which allow the fastening to be operated rapidly in all circumstances. However, there is a need to supplement these known fastenings with the possibility of tightening the chin-strap as required in order to improve the effectiveness of the helmet which, as is known, may be impaired - even to a significant degree - if the chin-strap were not properly tightened.

[0003] The fastenings known hitherto, which are operationally designed to perform both the functions indicated above, have however undesirably large dimensions such that their use is unsuitable for fastening chin-straps of helmets. Moreover, in most cases, they have projecting parts which are likely to cause discomfort for the user around the chin or throat.

[0004] The problem underlying the present invention is that of providing a novel fastening which is structurally and functionally designed so as to satisfy the particular requirements related to its use in helmets and protective headgear, avoiding at the same time the drawbacks mentioned with reference to the cited prior art.

[0005] This problem is solved by the invention by means of a fastening which is provided in accordance with the claims below.

[0006] The characteristic features and advantages of the invention will emerge more clearly from the detailed description of a preferred example of embodiment thereof illustrated by way of a non-limiting example with reference to the accompanying drawings, in which:

- Figure 1 is a perspective view of a toothed-belt fastening provided in accordance with the invention;
- Figure 2 is an exploded view of the fastening according to Figure 1;
- Figures 3 and 4 are side elevation and partially sectioned views of the fastening according to Figure 1 in two different operating conditions.

[0007] In the Figures, 1 denotes overall a fastening including a first and second fastening element 2, 3 which can be fixed to the respective ends 4, 5 of a chin-strap of a helmet or other article which requires adjustable closing.

[0008] The first fastening element 2 comprises a toothed belt 6 with sawtooth toothing 7 having, pivotably mounted at one end, a buckle 8 with which the end 4 of the chin-strap can be adjustably engaged in a manner known per se.

[0009] The second fastening element 3 comprises a base 10 with two parallel spaced flanges 11a,b and with a bridge-piece 12 around which the second end 5 of the chin-strap is closed in a loop and stitched.

[0010] A single pin 13 is mounted between the flanges 11a,b and a first and a second pawl 14, 15 are hinged thereon. The first pawl 14 acts as a member for unidirectionally locking the toothed belt with respect to the base so as to allow it to slide in the direction of the arrow F, but oppose displacement thereof in the opposite direction. It comprises a lever-type operating lug 16 which is hinged on the pin 13 by means of two parallel spaced tines 17a,b which have through-holes 18 passing through them. At least one tooth 19 (preferably two teeth 19) is formed in the vicinity of the hinging end, next to the tines 17a,b. The pawl is resiliently biased by a helical spring 20 which is constrained on the one hand inside a recess 21 of the lever 16 and on the other hand by a contact surface 22 of the base 10, with the teeth 19 engaged in the toothing 7 of the belt 6, and can be disengaged from the toothing so as to slacken the fastening, by operating the end of the lever 16 and oscillating it relative to the base 10. The aforementioned oscillating movement is limited by the bearing contact between two lugs 123 projecting from the top of the flanges 11a,b and the bottom of two corresponding recesses 24 formed in the opposite sidewalls of the lever 16. The limiting action is such that, when the first pawl 14 is completely raised from the base 10, the second pawl 15 is not yet engaged in the toothing 7 of the belt 6 (see Figure 3).

[0011] The second pawl 15 acts a member for moving the toothed belt 6 with respect to the base 10 in the direction of the arrow F, in order to tension the fastening 1. It comprises a lever-type operating lug 26 which is hinged on the pin 13 by means of its through-hole 28 with an elliptical cross-section. At least one tooth 29 (preferably two teeth 29) is formed in the vicinity of the hinging end and, like the first pawl 14, it is resiliently biased by a helical spring 30 which is constrained on the one hand inside a blind hole 31 of the lever 16 and on the other hand by a groove 32 in the lever 26, next to the teeth 29.

[0012] The function of the spring 30 is that of keeping the lever 26 in a non-operative position, adjacent to and partially superimposed on the lever 16, with the teeth 29 disengaged from the toothing 7 of the belt 6. The pawl 15 can be engaged in the toothing 7 so as to tension the fastening by operating the end of the lever 26 and causing it to oscillate relative to the base 10. The elliptical form of the hole 28 allows displacement of the pawl 15 so as to allow adjustment of its axis of rotation depending on the angle of oscillation thereof and so as to allow its return movement biased by the spring 30 without the teeth 29 interfering with the toothing 7.

[0013] It should be noted that the resilient properties of the spring 30 are chosen so that the latter imparts a

reactive force opposing its oscillation about the pin 13 which is smaller than that imparted by the spring 20 of the first pawl such that, when the second pawl 15 is oscillated, no corresponding (appreciable) oscillation of the first pawl 14 occurs (see Figure 4).

[0014] With the structural arrangements of the present invention it is therefore possible to provide a lever-type fastening which is composed of only two single-piece pawls both hinged on a same pin, reducing to a minimum the number of components of the fastening which can therefore easily be assembled at a low cost.

[0015] The fastening thus obtained is advantageously compact and can be manufactured with particularly small dimensions, as is required for use on helmets and protective headgear, without dispensing with easy operation of the pawls.

Claims

1. Toothed-belt fastening, in particular for chin-straps of helmets, protective headgear and the like, comprising a base with which said toothed belt can be slidably engaged, a first and a second pawl which are mounted in an oscillating manner on the base and can in turn be engaged with a toothing of said belt, said first pawl forming a member for unidirectionally locking the toothed belt with respect to the base and being disengageable from the toothing so as to slacken said fastening, said second pawl being engageable with the toothing so as to tension said fastening, **characterized in that** said pawls are hinged coaxially on said base.

2. Fastening according to Claim 1, in which both said pawls are pivotably mounted on the same pin.

3. Fastening according to Claim 2, in which both said pawls have operating lugs co-extending on the same side with respect to said pin.

4. Fastening according to Claim 2 or 3, in which said first pawl has a pair of spaced tines by means of which it is hinged with said pin, said second pawl being hinged with said pin between said tines.

5. Fastening according to one or more of the preceding claims, in which both said pawls and associated operating lugs have a unitary structure.

6. Fastening according to Claim 5, in which said operating lugs of said pawls are normally arranged superimposed on each other.

7. Fastening according to one or more of the preceding claims, in which said first pawl is resiliently biased into engagement with said toothing by first resilient means active between the latter and said base, said second pawl being biased into disengagement from said toothing by second resilient means active between the latter and said first pawl.

8. Fastening according to Claim 7, in which said second resilient means have a constant elasticity smaller than that of said first resilient means.

9. Fastening according to one or more of the preceding claims, in which said first pawl can be oscillated in a limited manner with respect to said base such that, within the oscillation limits of said first pawl, said second pawl is disengaged from said toothing.

10. Fastening according to one or more of Claims 2 to 9, in which said second pawl is hinged in a displaceable manner on said pin.

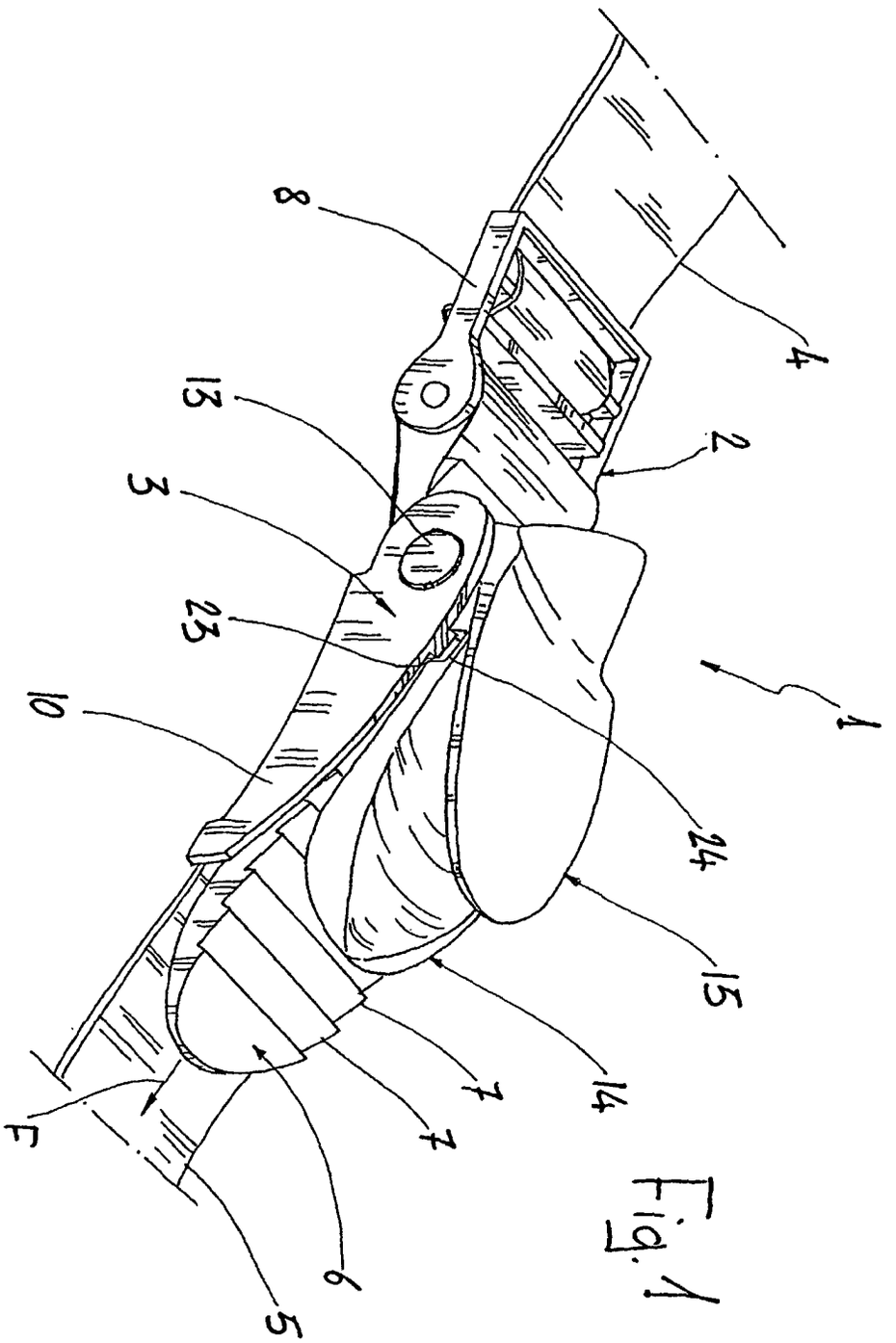
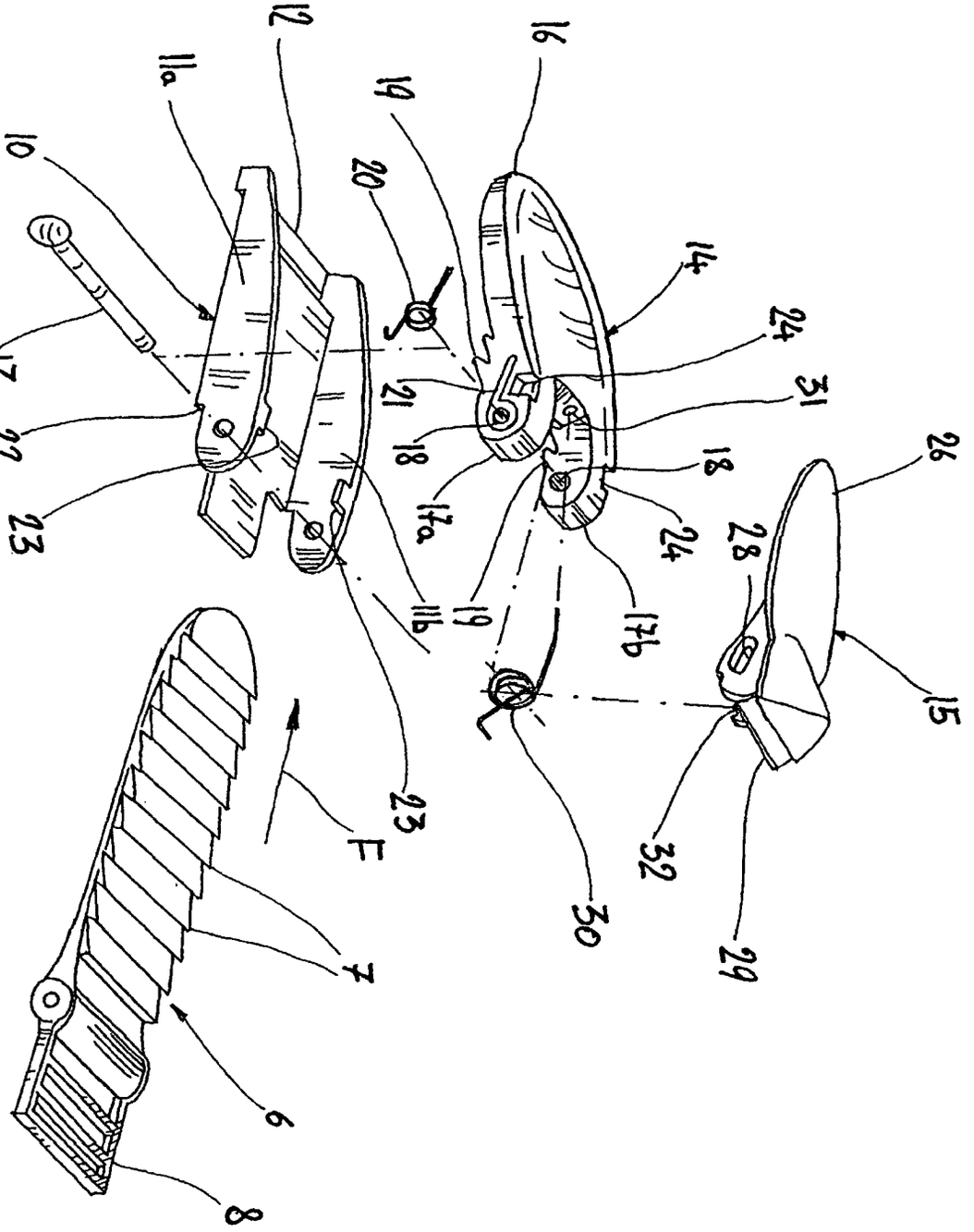


Fig. 1

Fig.2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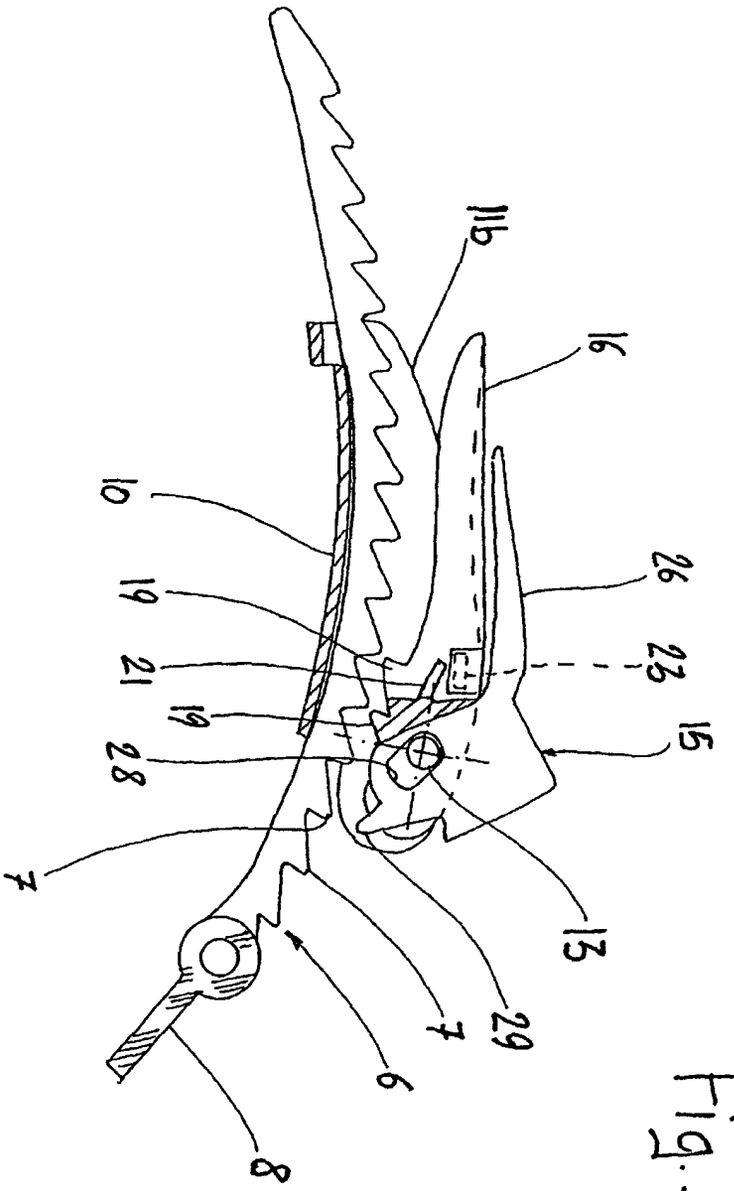

Fig. 3

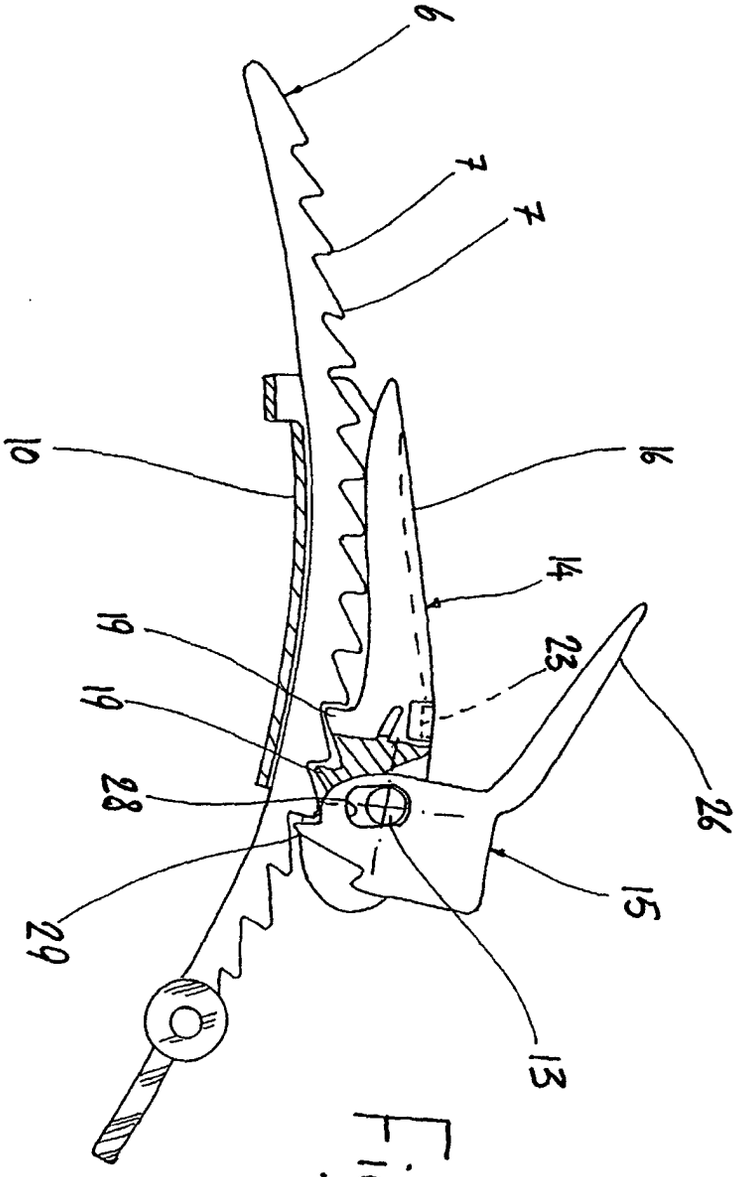

Fig. 4