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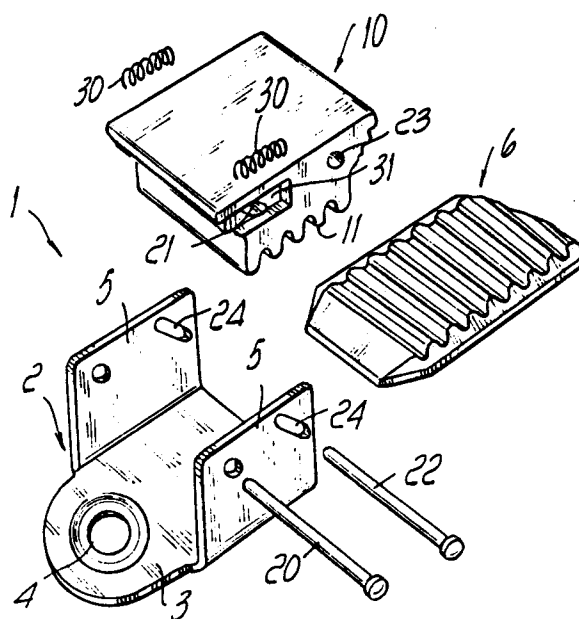
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54 **Ratchet fastener structure for the toothed strap of a closure lever, particularly for ski boots.**

57 The present invention relates to a ratchet fastener structure for the toothed band of a closure lever, particularly for ski boots, comprising a small base (2) which can be fixed to one of the flaps to be fastened together and provided with lateral sides (5) defining the engagement region of a toothed band (6) connected to a lever associable with the other of the flaps to be fastened together. To said small base (2) a movable dentated body (10) is connected and is removably engageable with the toothed band (6). The peculiarity of the invention lies in that it comprises a pair of pins (20, 22) spaced apart and slideably engageable with sliding surfaces (21, 24) mutually defined between the body (10) and said lateral sides (5); the sliding surfaces (21, 24) are substantially parallel to each other and inclined with respect to the direction of extension of the toothed band (6) to increase the locking action of the dentated body (10) on the band (6) upon a pulling action being exerted on said band (6) in the direction of unthreading from said small base (2), and to uncouple the dentated body (10) from the band (6) upon a pushing action being exerted on the dentated body (10) in the opposite direction with respect to the pulling action.



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RATCHET FASTENER STRUCTURE FOR THE TOOTHED BAND OF A CLOSURE
LEVER PARTICULARLY FOR SKI BOOTS

The present invention relates to a ratchet fastener structure for the toothed band of a closure lever, particularly for ski boots.

From previous research, closure levers are known to
5 which a flexible toothed band is articulated and engages with a closure block positioned on the other of the flaps to be fastened together.

The fastening block is substantially composed of a small base which, in a cross section, has a substantially C-
10 shaped configuration, with lateral sides which, at their free end, define tabs which extend towards each another and define an inclined guide for the sliding of a cursor which has lateral slots, which slideably engage with said tabs. The cursor has, on its lower face, a dentation which engages
15 to couple with the teeth of the toothed band which is slideably guided inside the small base.

As mentioned previously, the tabs are inclined towards the insertion end of the toothed band, so as to create a wedging of the cursor, the teeth whereof lock against the
20 toothed band.

A locking block is furthermore provided, supported by the lateral sides of the small base, in a region not affected by the tabs, against which a pusher spring acts which elastically pushes the slider to keep the teeth
25 mutually engaged.

With this structural embodiment, very high friction

develops between the tabs and the lateral slots, which make the opening of the block very troublesome, since the sliding of the cursor in the direction of uncoupling from the toothed band is not easily achieved.

5 Furthermore, with the described embodiment it is not infrequent for breakages to occur, since the stresses in practice are discharged between the tabs and the part of the cursor located below the lateral guides.

10 An aim of the invention is indeed to eliminate the above described disadvantages, by providing a ratchet fastener structure for the toothed band of a closure lever particularly for ski boots which allows the possibility of performing an increase in the locking action exerted on the toothed band as the traction force exerted on the toothed
15 band itself increases, without thereby having remarkable friction between the elements which compose the ratchet fastener.

20 Within the scope of the above described aim, a particular object of the invention is to provide a ratchet fastener structure which has a remarkable simplicity of structure and in which the coupling between the movable dentated body and the small base can be effected on two spaced pins, thus allowing the possibility of obtaining movement of the movable dentated body in a direction
25 extending parallel to itself.

30 Still another object of the present invention is to provide a structure of a ratchet fastener which allows the possibility of obtaining a wide engagement surface between the dentation of the movable dentated body and the band itself, thus having the possibility of resisting even to

high traction forces without causing damage or wear of the teeth of the toothed band.

Not least object of the present invention is to provide a ratchet fastener which is simplified in production and can
5 be obtained with a small number of component elements, without having to recur to complicated or unusual structures.

The above described aim, as well as the objects mentioned and others which will become apparent hereinafter,
10 are achieved by a ratchet fastener structure for the toothed band of a closure lever particularly for ski boots, according to the invention, comprising a small base which can be fixed to one of the flaps to be fastened together and provided with lateral sides which define the engagement
15 region of a toothed band connected to a lever associable with the other of the flaps to be brought together, to said small base there being connected a movable dentated body removable engageable with said toothed band, characterized in that it comprises a pair of pins spaced apart and being
20 slideably engageable with sliding surfaces mutually defined between said body and said lateral sides, said sliding surfaces being substantially parallel to each other and inclined with respect to the direction of extension of said toothed band to increase the locking action of said dentated
25 body on said band, upon a pulling action being exerted on said band in the direction of unthreading of said small base, and to uncouple said dentated body from said band upon a pushing action being exerted on said dentated body in a direction opposite to said pulling action.

30 Further characteristics and advantages will become

apparent from the description of a preferred, but not exclusive, embodiment of a ratchet fastener structure for the toothed band of a closure lever particularly for ski boots, illustrated only by way of non-limitative example in
5 the accompanying drawings, where:

Fig.1 is a schematic perspective exploded view of the ratchet fastener structure, according to the invention;

Fig.2 is a view of the ratchet fastener applied to a closure lever;

10 Fig.3 is a cross section view of the ratchet fastener in closed position, applied to a dentellated band;

Fig. 4 is a view of the ratchet fastener during the uncoupling of the movable body from the toothed band;

15 Fig. 5 is a schematic cross section view of the ratchet fastener according to the invention during the insertion of the toothed band in the ratchet fastener.

With reference to the above figures, the ratchet fastener structure, which is generally indicated by the reference numeral 1, comprises a small base 2 which can be
20 fixed to one of the flaps to be fastened together. The small base 2 has a cross section configuration which is substantially U-shaped with a central portion 3 provided with a bore 4 for fixing to one of the flaps to be fastened together and with two lateral sides 5 opposite to each
25 other.

Said small base 2 acts as a guide element for engaging with a toothed band, indicated with the reference numeral 6 and connected to a closure lever generally indicated by the reference numeral 7.

30 A movable dentated body engages with the small base 2,

which dentated body is indicated generally with the reference numeral 10 and is provided, on its lower face, with a dentation 11 which couples with the teeth of the toothed band 6, which, preferably but not necessarily, has
5 an arrangement of teeth with a substantially sinusoidal configuration; naturally the dentation 11 has a complementary configuration in order to perform the fastening.

The peculiarity of the invention resides in the fact
10 that the coupling between the movable dentated body 10 and the small base 2 is performed by means of a pair of pins which engage with sliding surfaces which are mutually defined between the dentellated body and the lateral sides of the small base.

15 More in detail, a first pin 20 is provided, which is fixedly supported by the lateral sides 5 and engages with a first sliding surface composed of a first elongated slot 21 which is defined inside the body 10.

A second pin 22 is furthermore provided, which is
20 supported by a seat 23 defined inside the body 10 and is slideably guided by a second engagement surface, constituted by a second pair of inclined slots 24 defined on the lateral sides.

The slots 24 are substantially parallel with respect to
25 the elongated slot 21.

The inclination of the slots 24 and 21 is such that there is a movement of the body 10 towards and against the toothed band 6 when a pulling action or traction force is exerted on the same band.

30 The body 10 is elastically pushed against the toothed

band 6 by virtue of the presence of elastic means which interact between the small base 2 and the body 10 and which are composed of a pair of springs 30 accommodated in lateral recesses 31 defined on the body 10 and which engage, at one
5 end, against the first pin 20, and, at the other end, with the bottom of the recess 31, in such a manner as to generate a thrust component of the body 10 towards the toothed band.

The slant of the slots 21 and 24 is such that in the insertion of the toothed band inside the small base 2 a
10 component is generated which causes motion of the block 10 away from the band, so that the insertion of the band is possible with a ratcheting motion of the body 10 which moves parallel to itself.

The structural solution adopted is particularly
15 important, and in practice generates relatively small friction surfaces simply composed of the engagement of the pins 20 and 22 with the associated inclined surfaces, yet having a locking action at the same time which greatly increases as the pulling force on the band increases.

20 Furthermore, the configuration adopted allows to provide on the dentated body 10 a high number of dentations or teeth which in practice allows to make full use of the length of the small base to obtain a coupling region between the dentated body and the toothed band which is very wide
25 and, besides making the locking stable, does not cause any wear of the teeth.

Another important aspect resides in the fact that the structure adopted allows stresses to be distributed uniformly, since the same stresses act on the lateral sides
30 of the small base and on the dentated body, with an action

which does not lead to deformation or breakage of the block itself.

In practical operation, as illustrated in Fig. 3, with the lever in closed position, when a traction or pulling
5 action is exerted on the toothed band 6, the coupling between the pins 10 and the slots 21 and 24 causes a motion along the direction defined by the slots themselves towards the toothed band, consequently creating wedging of the dentated body which facilitates the locking.

10 In order to perform the uncoupling, it is sufficient to exert a pushing action on the dentated body 10, in opposition to the action of the springs 31, which causes the motion of the small block parallel to itself along the direction defined by the slots, with the consequent
15 uncoupling of the dentation 11 from the toothed band 6.

The uncoupling action is extremely easy, since the friction surfaces are reduced and are composed solely of the engagement regions of the ends of the pin 22 with the slots 24 defined on the lateral sides and of the coupling of the
20 first pin 20 with the inclined surface defined by the first slot provided inside the dentated body.

From what has been described, it can thus be seen that the invention achieves the intended aims and, more specifically, one should observe the extreme effectiveness
25 and reliability of the ratchet fastener described above, which adopts structural solutions which make it extremely practical and capable of withstanding even high stresses, without giving rise to difficulties in the uncoupling phase.

The invention thus conceived is susceptible to numerous
30 modifications and variations, all of which are within the

scope of the inventive concept.

Furthermore, all the details can be replaced by other technically equivalent elements.

In practice, the materials employed, as well as the
5 dimensions and the contingent shapes, may be any according to the requirements.

CLAIMS

1 1. Ratchet fastener structure for the toothed band of a
2 closing lever, particularly for ski boots, comprising a
3 small base (2) fixable to one of the flaps to be brought
4 together and provided with lateral sides (5) delimiting an
5 engagement region of a toothed band (6) connected to a lever
6 (7) associable to the other of the flaps to be fastened
7 together, to said small base (2) there being connected a
8 movable dentated body (10) removably engageable with said
9 toothed band (6), characterized in that it comprises a pair
10 of pins (20, 22) spaced apart and being slideably engageable
11 with sliding surfaces (21, 24) mutually defined between said
12 body (10) and said lateral sides (5), said sliding surfaces
13 (21, 24) being substantially parallel to each other and
14 inclined with respect to the direction of extension of said
15 toothed band (6) to increase the locking action of said
16 dentated body (10) on said band (6) upon a pulling action
17 exerted on said band (6) in the direction of unthreading
18 from said small base (2), and to uncouple said dentated body
19 (10) from said band (6) upon a pushing action being exerted
20 on said dentated body (10) in the opposite direction with
21 respect to said pulling action.

1 2. Ratchet fastener structure, according to the
2 preceding claim, characterized in that one of said sliding
3 surfaces (24) is defined by the lateral sides (5) of said
4 small base (2) and the other of said sliding surfaces (21)
5 is defined by said movable dentated body (10).

1 3. Ratchet fastener structure, according to one or more
2 of the preceding claims, characterized in that it comprises
3 a first pin (20) supported by said lateral sides (5) and

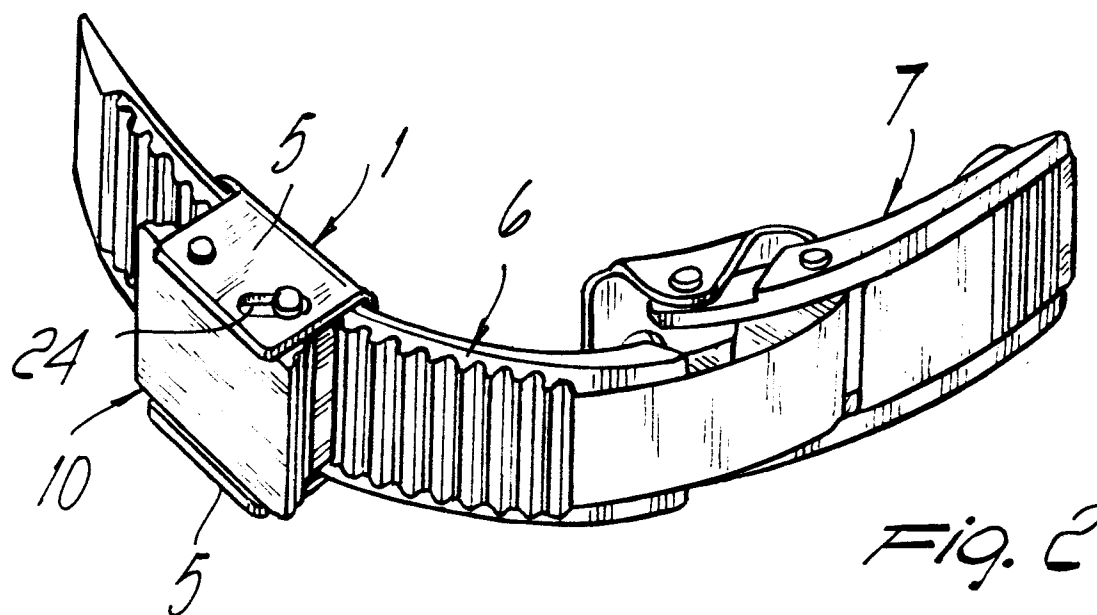
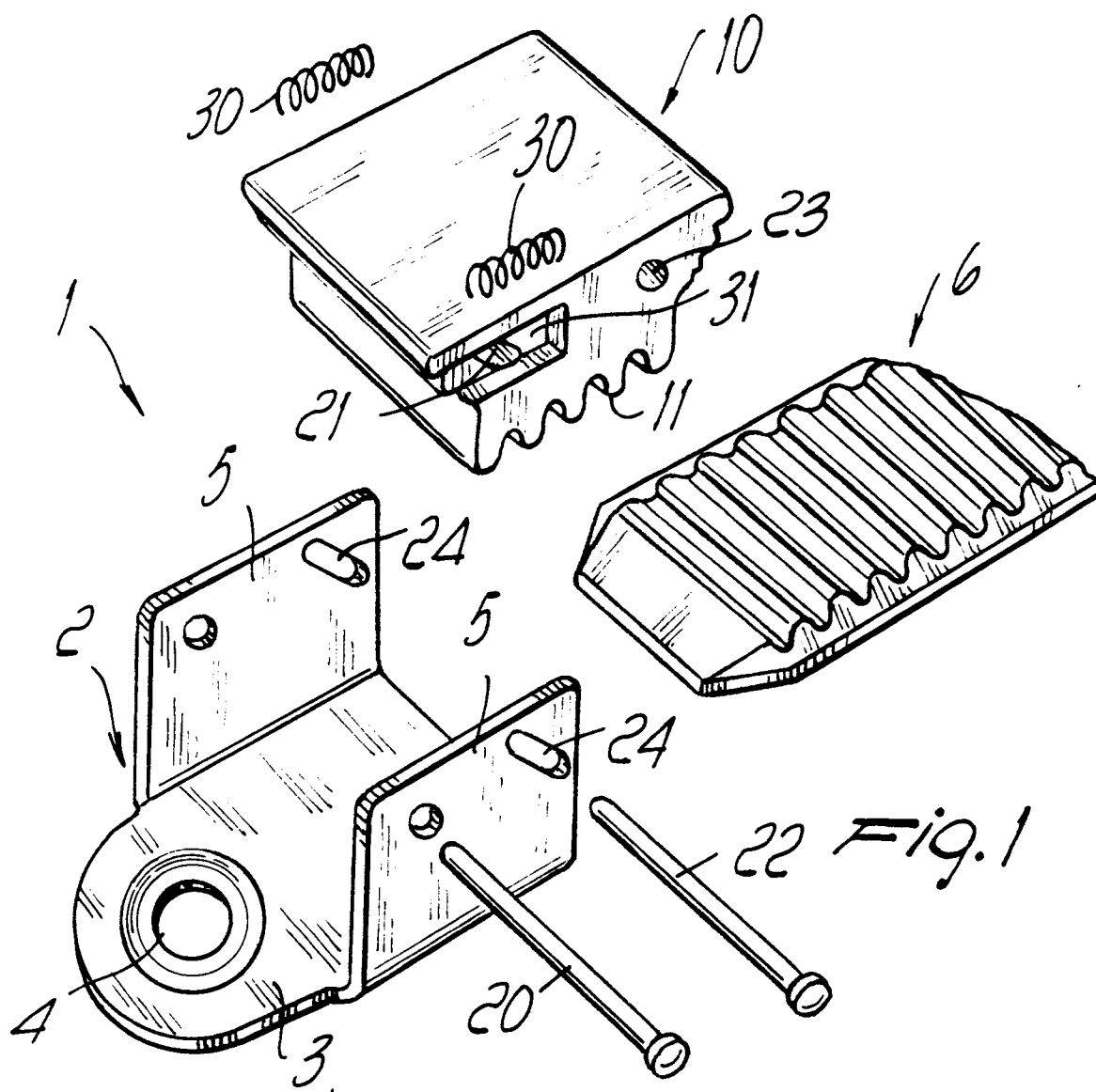
4 engaging with a first slot (21) defined by said dentated
5 body (10), and a second pin (22) engaging in a seat (23)
6 defined by said dentated body (10) and slideably
7 accommodated in a pair of second slots (24) defined on said
8 lateral sides (5), said second slots (24) extending
9 substantially parallel to said elongated slot (21).

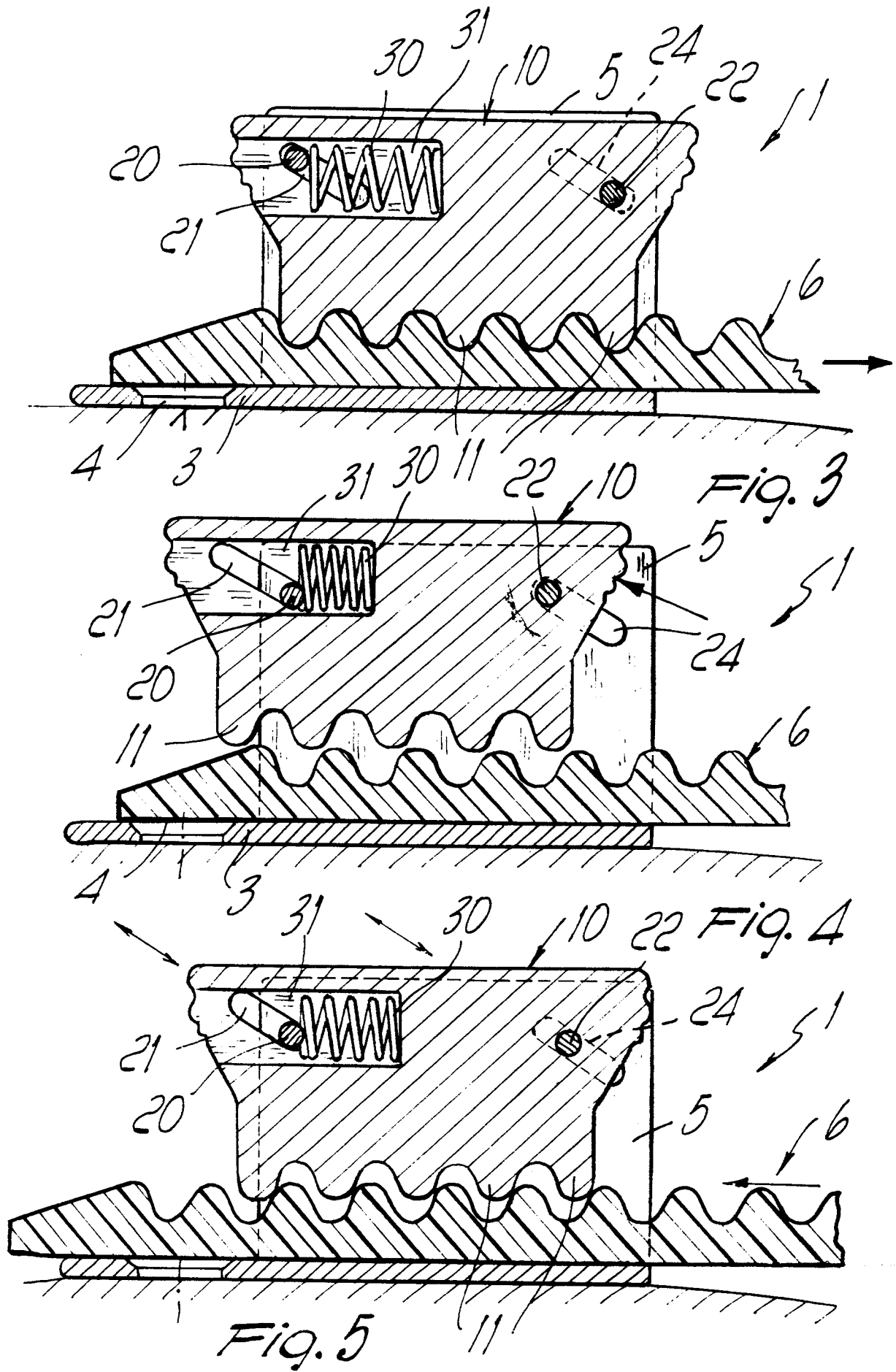
1 4. Ratchet fastener structure, according to one or more
2 of the preceding claims, characterized in that it comprises
3 elastic means (30) interacting between said small base (2)
4 and said dentated body (10) to elastically push said
5 dentated body (10) against said toothed band (6).

1 5. Ratchet fastener structure, according to one or more
2 of the preceding claims, characterized in that said elastic
3 means are composed of a pair of springs (30) accommodated in
4 recesses (31) defined laterally by said dentated body (10)
5 and acting between the bottom of said recesses (31) and said
6 first pin (20).

1 6. Ratchet fastener structure, according to one or more
2 of the preceding claims, characterized in that said movable
3 dentated body (10) defines on its lower face a dentation
4 (11) substantially affecting the entire surface of the lower
5 face of said movable dentated body (10).

1 7. Structure of a ratcheting buckle, according to one
2 or more of the preceding claims, characterized in that said
3 movable dentellated body (10) is guided to shift parallel to
4 itself.







European Patent
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EUROPEAN SEARCH REPORT

0220784

Application number

EP 86 20 1881

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
D,A	FR-A-2 180 250 (I.J.ALLSOP) * Claim 1; figures 1-11 *	1	A 43 C 11/14
A	FR-A-2 063 379 (STARPOOL) * Claim 1; figures 1-7 *	1	
P,A	EP-A-0 161 441 (TECNOSKI) * Abstract; figures 1-4 *	1	
P,A	FR-A-2 563 978 (C.VALSECCHI et al.) * Abstract; pages 1-4 *	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			A 43 C
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		20-01-1987	MALIC K.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			