(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 220 784**
B1

(12) # EUROPEAN PATENT SPECIFICATION

(45) Date of publication of patent specification: **18.04.90**

(51) Int. Cl.[5]: **A 43 C 11/14**

(21) Application number: **86201881.9**

(22) Date of filing: **27.10.86**

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

(30) Priority: **28.10.85 IT 5193185 u**

(43) Date of publication of application:
06.05.87 Bulletin 87/19

(45) Publication of the grant of the patent:
18.04.90 Bulletin 90/16

(84) Designated Contracting States:
AT CH DE FR IT LI

(56) References cited:
EP-A-0 161 441
FR-A-2 063 379
FR-A-2 180 250
FR-A-2 563 978

(73) Proprietor: **TECNOSKI S.r.l.**
Via al Confine 7 - Fr. Curcio
I-22050 COLICO (province of Como) (IT)

(72) Inventor: **Bianchi Bazzi, Giuseppe**
Via Campione
I-22050 Colico (Como) (IT)

(74) Representative: **Modiano, Guido et al**
MODIANO, JOSIF, PISANTY & STAUB Modiano & Associati Via Meravigli, 16
I-20123 Milano (IT)

EP 0 220 784 B1

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European patent convention).

Courier Press, Leamington Spa, England.

Description

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 which a flexible toothed band is articulated and engages with a closure block positioned on the other of the flaps to be fastened together, as described in IT-198209.

The fastening block is substantially composed of a small base which, in a cross section, has a substantially C-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 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 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 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.

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.

In an attempt to eliminate these disadvantages, the EP—A— EP—A1—0,161,441, teaches a ratchet pawl device which comprises a base attached to one of the flaps to be brought together and having lateral sides, delimiting an area of engagement for a serrated strap connected to a lever associable with the other of the flaps to be brought together. Also provided being an oscillable body hinged at a middle portion thereof to the lateral sides and having a first toothed end engageable with the serrated strap and a second end actuatable for disengaging the first toothed end from the serrated strap. Lugs project laterally from the oscillable body and are engageable in seats formed in the lateral sides to prevent undesired oscillation of the oscillable body. This arrangement affords the possibility of obtaining an increase in the locking action as the pulling force increases.

Known from the applicant's copending European patent application No. 86201879.3 (Publication number EP—A—0224288) is a ratchet fastener of the toothed band of a closure lever, particularly for ski boots, comprising a base having lateral sides and being fixable to one of the flaps to be fastened together, a toothed band slideable between said lateral sides, a movable dentated body connected to said base by a pair of spaced-apart pins and being releasably engageable with said toothed band, and spring means against which said body can be pushed by hand for uncoupling said dentated body from said band. The toothed band is connected to a separate lever (40) fixable to the other of the flaps to be fastened together, and said ratchet fastener further comprises one sliding surface associated with said body and other sliding surfaces associated with said lateral sides. A peculiarity of the device resides in the fact that said pins slideably engage said sliding surfaces and rotatably connect said dentated body to said base, whereby the locking action of said dentated body on said band is increased upon a pulling action being exerted on said band in a direction of unthreading from said base.

Also known from FR—A—2,180,250 is a ratchet-type fastener as defined in the precharacterizing clause of Claim 1.

Accordingly, 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 band itself increases, without thereby having remarkable friction between the elements which compose the ratchet fastener.

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 extending parallel to itself.

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 .pa 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 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, are achieved by a ratchet fastener structure for the toothed band of a closure lever particularly for ski boots, as defined in Claim 1.

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 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;

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;

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 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 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.

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 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 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.

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 21 defined by a first elongated slot formed in the body 10.

A second pin 22 is furthermore provided, which is 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 sliding surfaces 24 defined by slots formed on the lateral sides.

The sliding surfaces 24 are substantially parallel with respect to the sliding surface 21.

The inclination of the sliding surfaces 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.

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 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 sliding surfaces 21 and 24 is such that in the insertion of the toothed band inside the small base 2 a 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 important, and in practice generates rlatively small friction surfaces simply composed of the engagement of the pins 20 and 22 with the associated inclined sliding surfaces, yet having a locking action at the same time which greatly increases as the pulling force on the band increases.

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 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 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 action is exerted on the toothed band 6, the coupling between the pins 10 and the sliding surfaces 21 and 24 causes a motion along the direction defined by the sliding surfaces themselves towards the toothed band, consequently creating wedging of the dentated body which facilitates the locking.

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 sliding surfaces, with the consequent 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 sliding surfaces 24 defined on the lateral sides and of the coupling of the 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 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.

Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Ratchet fastener structure for the toothed band of a closing lever, particularly for ski boots, comprising a base (2) fixable to one of the flaps to be brought together and provided with lateral sides (5) delimiting an engagement region of a toothed band (6), a movable dentated body (10) being connected to said small base (2) by a pair of spaced-apart pins (20, 22) and releasably engageable with said toothed band (6), and spring means (30) against which said body (10) can be pushed by hand for uncoupling said dentated body (10) from said band (6), characterized in that said toothed band is connected to a separate lever (7) associable with the other of the flaps to be fastened together, and in that said ratchet fastener structure further comprises one sliding surface (21) defined on said body (10) and other sliding surfaces (24) defined on said lateral sides (5), said sliding surfaces (21, 24) being slideably engaged by said pins (20, 22) and extending substantially parallel to each other in planes which are inclined with respect to the direction of extension of said toothed band (6), whereby the locking action of said dentated body (10) on said band (6) is increased upon a pulling action exerted on said band (6) in the direction of unthreading from said base (2), and whereby pressure exerted by said locking action of said dentated body (10) is distributed on said band substantially throughout the length of the dentated body.

2. Ratchet fastener structure, according to Claim 1, characterized in that said pair of pins (20, 22) comprise a first pin (20) supported by said lateral sides (5) and engaging with said one sliding surface (21) defined by said dentated body (10), and a second pin (22) engaging in a seat (23) defined by said dentated body (10) and slideably engaging said sliding surfaces (24) defined on said lateral sides (5).

3. Ratchet fastener structure, according to Claim 1, characterized in that said elastic means (30) interact between said base (2) and said dentated body (10) to elastically push said dentated body (10) against said toothed band (6).

4. Ratchet fastener structure, according to Claim 1 and 2 or 3, characterized in that said elastic means comprise a pair of springs (30) accommodated in recesses (31) defined laterally on said dentated body (10) and acting between the bottom of said recesses (31) and the first pin (20).

5. Ratchet fastener structure, according to Claim 1, 2, 3 or 4, characterized in that said movable dentated body (10) has a lower face defining a dentation (11) substantially affecting the entire surface of the lower face of said movable dentated body (10).

6. Ratchet fastener structure according to Claim 1, 2, 3, 4 or 5, characterized in that said movable dentellated body (10) is guided to translate in parallel planes.

Patentansprüche

1. Schnalle mit Sperrvorrichtung für Hebelverschlußzahnleisten, insbesondere für Skischuhe, mit aus einer auf einem der miteinander zu verbindenden Schuhlatten befestigbaren und mit Seitenwänden (5) versehenen, einen Eingriffsbereich für eine Zahnleiste (6) begrenzenden Grundplatte (2), mit welcher kleinen Grundplatte (2) durch ein Paar von zueinander im Abstand liegenden Stiften (20, 22) ein mit der Zahnleiste (6) in lösbaren Eingriff bringbarer beweglicher Zahnkörper (10) verbunden ist, und einer elastische Einrichtung (30), gegen welche der Körper (10) mit der Hand gedrückt werden kann, um den Zahnkörper (10) aus der Zahnleiste (6) auszuklinken, dadurch gekennzeichnet, daß die Zahnleiste mit einem separaten Hebel (7) verbunden ist, der dem anderen der zu verschließenden Lappen zugeordnet werden kann, und daß die Schnalle mit Sperrvorrichtung weiters eine auf dem Körper (10) ausgebildete Gleitfläche (21) und weitere, auf den Seitenwänden (5) ausgebildete Gleitflächen (24) aufweist, welche Stifte (20, 22) verschiebbar in die Gleitflächen (21, 24) eingreifen, die sich im wesentlichen parallel zueinander in Ebenen erstrecken, die in bezug auf die Richtung der Erstreckung der Zahnleiste (6) schräg verlaufen, wobei die Sperrwirkung des Zahnkörpers (10) auf die Leiste (6) bei einem auf die Leiste (6) in der Ausziehrichtung aus der Grundplatte (2) ausgeübten Zug verstärkt wird und wobei der durch die Sperrwirkung auf den Zahnkörper (10) ausgeübte Druck auf die Leiste im wesentlichen über die ganze Länge des Zahnkörpers verteilt wird.

2. Schnalle mit Sperrvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß das Paar von Stiften (20, 22) aus einem ersten, in den Seitenwänden (5) gelagerten Stift (20), der mit der durch den Zahnkörper (10) definierten einen Gleitfläche im Eingriff steht, und aus eineim zweiten, in einem im genannten Zahnkörper (10) ausgebildeten Sitz (23) eingreifenden und verschiebbar in die auf den genannten Seitenwänden (5) ausgebildeten Gleitflächen eingreifenden Stift (22) besteht.

3. Schnalle mit Sperrvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die elastische Einrichtung (30) zwischen der Grundplatte (2) und dem Zahnkörper (10) wirkt, um den Zahnkörper

(10) elastisch gegen die Zahnleiste (6) zu drücken.

4. Schnalle mit Sperrvorrichtung nach den Ansprüchen 1 und 2 oder 3, dadurch gekennzeichnet, daß die elastische Einrichtung aus einem Paar von Federn (30) besteht, die in seitlich auf dem Zahnkörper (10) ausgebildeten Vertiefungen (31) sitzen und zwischen dem Boden der Vertiefungen (31) und dem ersten Stift (20) wirken.

5. Schnalle mit Sperrvorrichtung nach den Ansprüchen 1, 2, 3 oder 4, dadurch gekennzeichnet, daß der bewegliche Zahnkörper (10) eine untere Seite aufweist, die eine Zahnung (11) definiert, welche im wesentlichen die ganze Oberfläche der unteren Seite des beweglichen Zahnkörpers (10) einnimmt.

6. Schnalle mit Sperrvorrichtung nach den Ansprüchen 1, 2, 3, 4 oder 5, dadurch gekennzeichnet, daß der bewegliche Zahnkörper (10) zur Verschiebung in parallelen Ebenen geführt ist.

Revendications

1. Structure d'attache à rochet pour la bande dentée d'un levier de fermeture, en particulier pour chaussures de ski, comportant une base (2) pouvant être fixée à l'une des pattes à réunir et munie de côtés latéraux (5) délimitant une zone d'engagement d'une bande dentée (6), un corps dentelé mobile (10) étant relié à ladite petite base (2) par une paire de tiges espacées (20, 22) et pouvant être amené en engagement libérable avec ladite bande dentée (6), et des moyens formant ressort (30) à l'encontre desquels ledit corps (10) peut être poussé manuellement pour séparer ledit corps dentelé (10) de ladite bande (6), caractérisée en ce que ladite bande dentée est reliée à un levier distinct (7) pouvant être associé à l'autre des pattes à réunir, et en ce que ladite structure d'attache à rochet comporte en outre une surface de glissement (21) ménagée sur ledit corps (10) et d'autres surfaces de glissement (24) prévues sur lesdits côtés latéraux (5), lesdites surfaces de glissement (21, 24) étant en contact coulissant avec lesdites tiges (20, 22) et s'étendant sensiblement parallèlement entre elles dans des plans inclinés par rapport à la direction de l'étendue de ladite bande dentée (6), de telle sorte que l'action de blocage dudit corps dentelé (10) sur ladite bande (6) soit accrue lors d'une action de traction exercée sur ladite bande (6) dans le sens d'un dégagement de ladite base (2), et de telle sorte que la pression exercée par ladite action de blocage dudit corps dentelé (10) soit répartie sur ladite bande sensiblement sur toute la longueur du corps dentelé.

2. Structure d'attache à rochet, selon la revendication 1, caractérisée en ce que ladite paire de tiges (20, 22) comporte une première tige (20) supportée par lesdits côtés latéraux (5) et en contact avec ladite première surface de glissement (21) définie par ledit corps dentelé (10), et une seconde tige (22) pénétrant dans un siège (23) défini par ledit corps dentelé (10) et glissant sur lesdites surfaces de glissement (24) ménagées sur lesdits côtés latéraux (5).

3. Structure d'attache à rochet selon la revendication 1, caractérisée en ce que lesdits moyens élastiques (30) interagissent entre ladite base (2) et ledit corps dentelé (10) pour pousser élastiquement ledit corps dentelé (10) contre ladite bande dentée (6).

4. Structure d'attache à rochet selon les revendications 1 et 2 ou 3, caractérisée en ce que lesdits moyens élastiques comportent une paire de ressorts (30) logés dans des évidements (31) pratiqués latéralement sur ledit corps dentelé (10) et agissant entre le fond desdits évidements (31) et la première tige (20).

5. Structure d'attache à rochet selon l'une quelconque des revendications 1 à 4, caractérisée en ce que ledit corps dentelé (10) possède une face inférieure définissant une dentelure (11) affectant sensiblement toute la surface de la face inférieure dudit corps dentelé mobile (10).

6. Structure d'attache à rochet selon l'une quelconque des revendications 1 à 5, caractérisée en ce que ledit corps dentelé mobile (10) est guidé pour se déplacer en translation dans des plans parallèles.

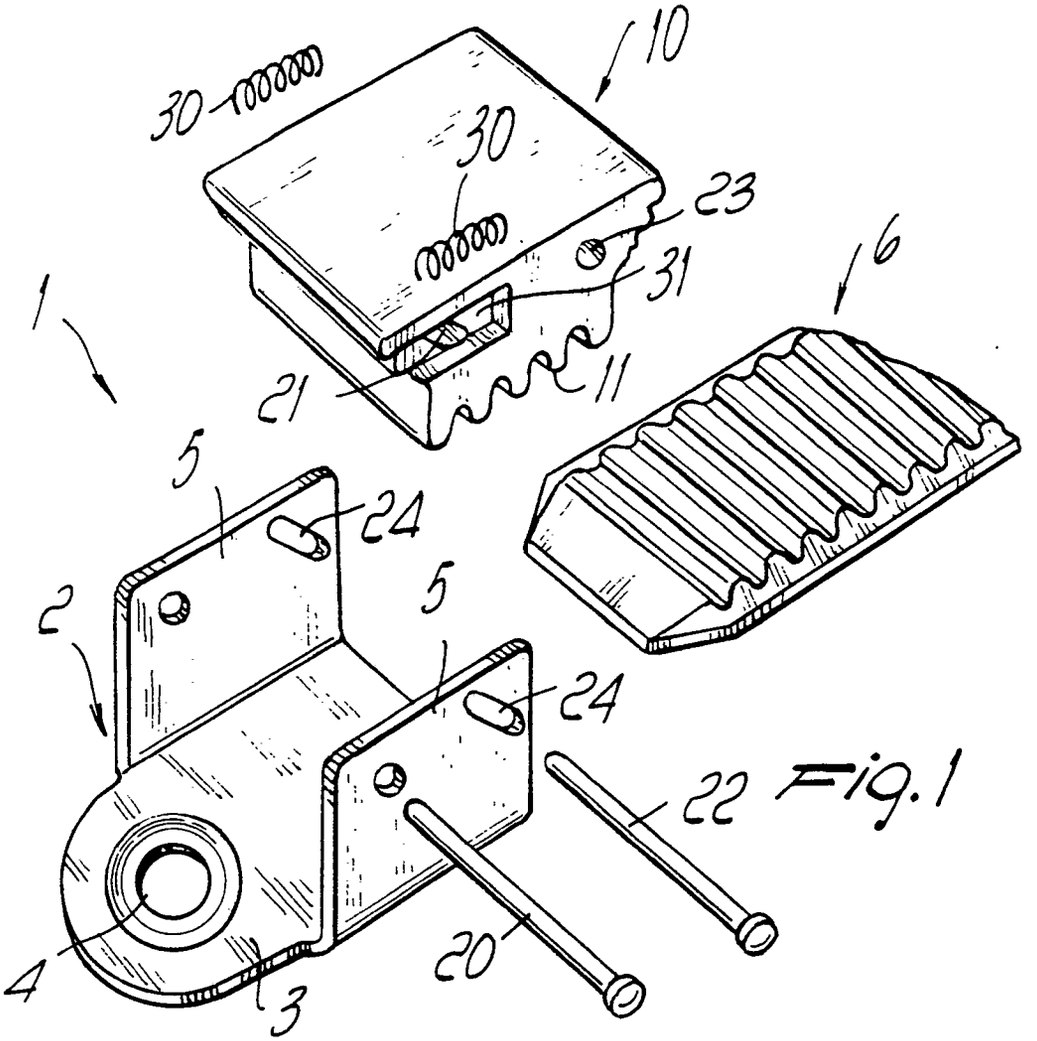


Fig. 1

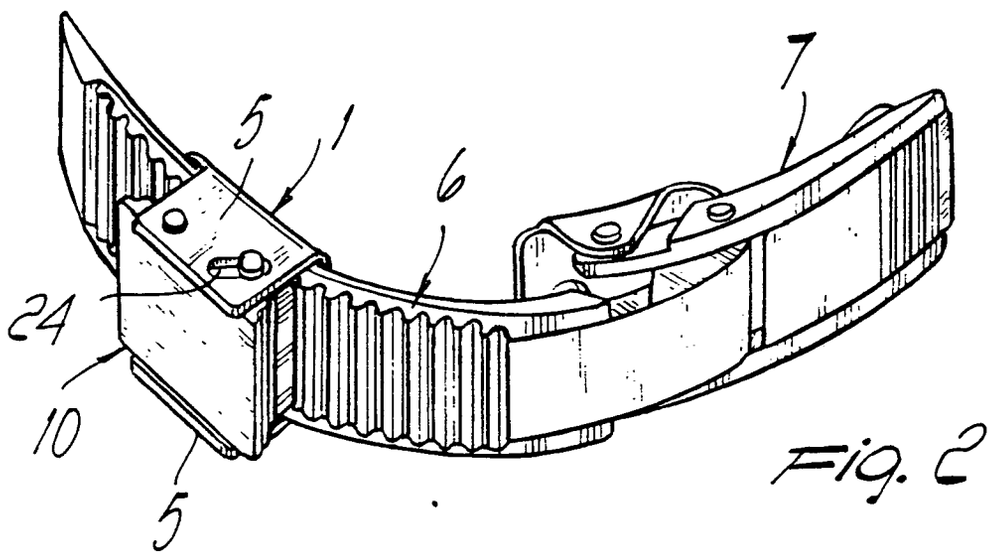


Fig. 2

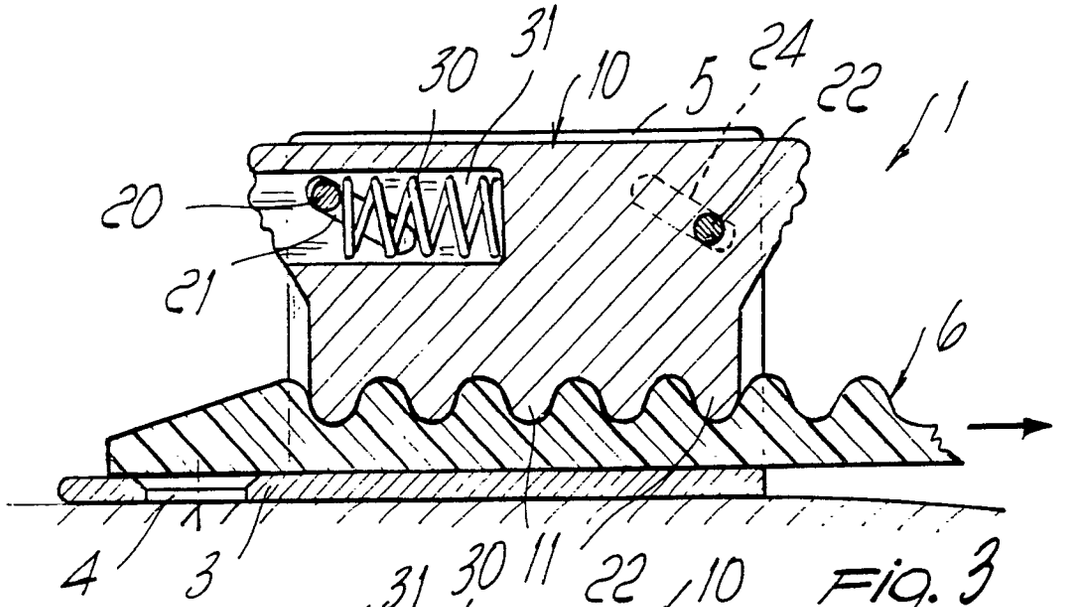


Fig. 3

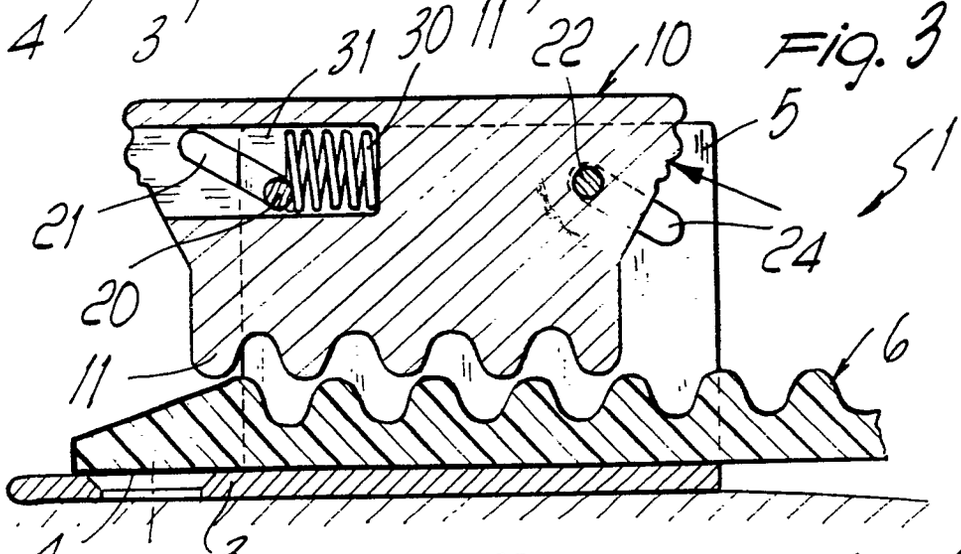


Fig. 4

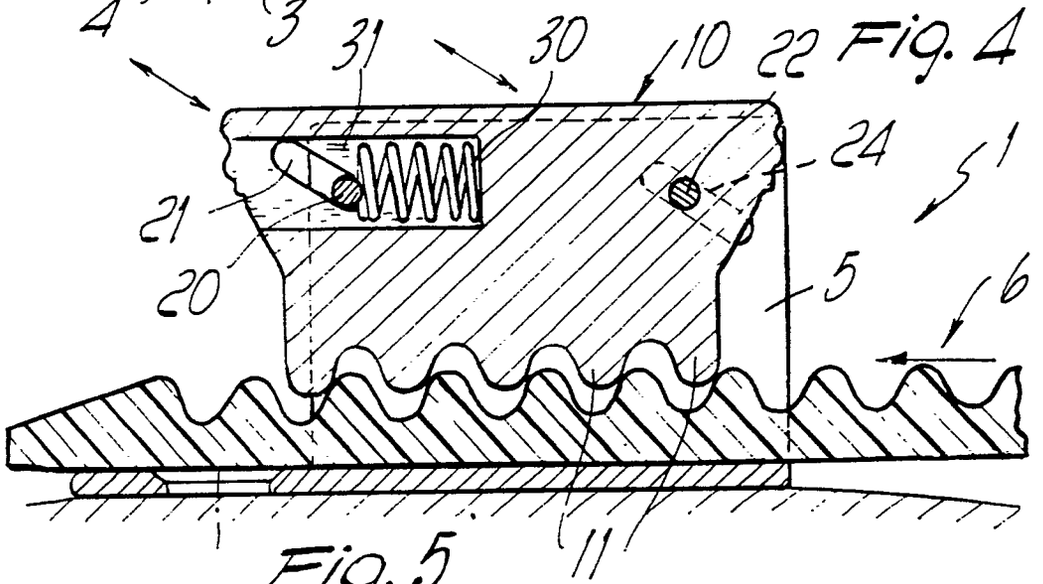


Fig. 5