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(54) **A connecting element for arm bands**

Verbindungselement für Armbänder

Elément de connexion pour bracelet

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(73) Proprietor: **PROMOTION SPA**
36077 Altavilla Vicentina (VI) (IT)

(72) Inventors:
• **Rasia, Giovanni**
36051 Creazzo (VI) (IT)

• **Buise, Pierre Jean Marie**
I-36100 Vicenza (IT)

(74) Representative: **Bonini, Ercole**
c/o STUDIO ING. E. BONINI SRL
Corso Fogazzaro 8
36100 Vicenza (IT)

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Description

[0001] The invention concerns a connecting element particularly suited for arm bands.

[0002] A connecting element according to the preamble of claim 1 is known from the practice.

[0003] It is a known fact that one of the methods for manufacturing arm bands, consists of linking together a plurality of links by means of a plurality of pins. More specifically, a plurality of central links and a plurality of lateral links, arranged side by side to said central links from both sides, are connected with one another by means of pins, wherein each pin is placed passing through one or more central links and presents its extremities inserted in dead holes drilled in the lateral links placed by the sides of said central link.

[0004] In the embodiments belonging to the known technique, the pins which connect the links together, essentially consist of a central cylindrical body the extremities of which have a smaller diameter than the central body and a longitudinal knurl. Each extremity is inserted by interference within a corresponding dead hole drilled in the lateral link and the length of such a dead hole is greater than the length of the extremity of the pin, so as to allow the central body to rest flush against the link.

[0005] The pins of the described type present some inconveniences. A first inconvenience is that in case the interference is too great, during the fitting of the extremity of the pin into the corresponding dead hole, it may happen that one or more knurls are torn. The knurl which is torn curls on itself and positions itself between the link and the pin, thus preventing the latter from completely resting against the link itself. Therefore, between pin and link there will be a crack which allows the penetration of perspiration into the hole which lodges the knurled extremity: in the course of time, the perspiration corrodes the knurl and compromises the resistance of the coupling, causing the links to come apart.

[0006] Another inconvenience is that in case the extremity having a smaller diameter and its corresponding knurl are not perfectly made and perfectly co-axial with the body of the pin, said pin does not perfectly fit in the orthogonal direction with the links, thus compromising the aesthetic result of the arm band as a whole.

[0007] Not the last inconvenience is that, in case the pins do not perfectly fit in the orthogonal direction in the links, the flexibility of the arm band is also compromised.

[0008] *The US-A-4106877 discloses an improved pin of the type used in coupling mechanical parts together which presents a body containing a cross section of arcuate polygonal lobular configuration, but this kind of pin does not permit the rotation between said coupled parts.*

[0009] The present invention proposes to overcome all the mentioned inconveniences.

[0010] One of the purposes of the invention is to obtain a connecting element for arm bands, which prevents the links of the arm band from becoming loose because of the corrosion of the connecting element in

the point where it fits inside the links.

[0011] It is another purpose that the fitting between said connecting element and its corresponding links is always orthogonal.

[0012] Not the last purpose is for the connecting element according to the invention constantly to ensure the flexibility of the arm band.

[0013] The described purposes are achieved by a connecting element the main features of which are according to claim 1.

[0014] Advantageously, the arches which form the bulging profile of the transversal section of said pin are three in number and consist of the arches of three reciprocally intersecting circumferences. The centres of said circumferences are off-set by the same distance in relation to the centre of the transversal section of the pin along three directions converging toward the centre of the section and forming together an angle of 120°.

[0015] Therefore, the three circumference arches are tangent inside an ideal circumference having its centre in the centre of the transversal section of the pin.

[0016] With as much advantage, the connecting element is made of stainless steel containing a low percentage of sulphur.

[0017] Further scope of applicability of the present invention will become apparent from the detailed description given hereinafter. However, it should be understood that the detailed description and specific example, while indicating a preferred embodiment of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description and from the drawings, wherein:

- Fig. 1 shows the connecting element according to the invention composed by a tubular element and by a pin fitting within said tubular element;
- Fig. 2 shows the pin of the connecting element represented in Fig. 1;
- Fig. 3 shows the front view of the pin of Fig. 2;
- Fig. 4 shows the magnified representation of Fig. 3;
- Fig. 5 shows some of the links of an arm band arranged in an exploded view and with the connecting element according to the invention fitting inside the central links;
- Fig. 6 shows the links of Fig. 5 already assembled;
- Fig. 7 shows in a cross-section the magnified detail of the coupling of the connecting element according to the invention with the links which form the arm band.

[0018] The connecting element for arm bands according to the invention, indicated as a whole with 1, is represented in Fig. 1 wherein it can be observed that it is composed by a tubular element 2 inside which a pin 3 is inserted, the latter being visible in better detail in the drawing representations of the Figs. 2 and 3.

[0019] Said pin 3, as can be observed in particular in the Figs. 3 and 4, presents its body complete with three lobes 150 which develop following a longitudinal direction according to the axis 31 of the pin 3, the transversal section 30 of which presents, therefore, a bulging profile formed by three arches 50. Said three arches 50 belong to as many circumferences 51, the centres 61 of which are arranged along three axes 91 and at the same distance 71 in relation to the centre 81 of said transversal section 30, toward which said axes 91 converge. Said distance 71 is the radius of a circumference 710 having a centre 81 in which said centres 61 are lined up. Moreover, said axes are reciprocally slanted of an angle 70 equivalent to 120°. In such a way the three arches 50 of each circumference 51 are arranged internally tangent in relation to an ideal circumference 80, the centre 81 of which coincides with the point of intersection of said axes 91, which represents the intersection of the transversal section plane of the pin 3 with the axis 31 of the pin 3 itself.

[0020] When the pin 3 is fitted inside the tubular element 2 it is perfectly centered, and its longitudinal axis 31 coincides with the longitudinal axis of the tubular element 2 and it also constitutes the longitudinal axis of the entire connecting element 1.

[0021] As has already been said, the connecting element 1 has the function of connecting a plurality of links with one another, which are represented in the Figs. 5 and 6, wherein they are indicated as a whole with 4, and which form the arm band. In particular, as can be observed in Fig. 5, said links, indicated as a whole with 4, comprise a plurality of central links 41 which are comprised between a plurality of first lateral links 42 and second lateral links 43, arranged on opposite sides in relation to said central links 41 and constituting the edges of the arm band, wherein said central links and said lateral links are joined together through a plurality of connecting means 1.

[0022] It is pointed out that said central links can be one or more than one, arranged side by side.

[0023] It can be observed, in particular, that each of said central links 41 presents a pair of through holes 410, the diameter of which is equivalent to the outer diameter of the tubular element 2 and such, therefore, as to lodge a connecting element 1. In a similar way, each of said lateral links 42 and 43 presents a pair of dead holes 420 and 430 respectively, within each of which the extremity 310 of each pin 3, which protrudes in relation to the width 40 of the corresponding central link, fits by interference.

[0024] The tubular element 2 also fits by interference in the corresponding hole 410 of each central link 41, so that the reciprocal rotation between central links and lateral links can be ensured by the rotation of the pin 3 inside the tubular element 2.

[0025] It can be also observed both in Fig. 5 and in Fig. 7 and also in Fig. 1, that the length 300 of each tubular element 2 is equivalent to the width 40 of the

central links 41, so that when each connecting element 1 is inserted in the corresponding central link 41, only the extremities 310 of the pins 3 protrude from the latter.

[0026] In order to compose the arm band, the lateral links 42 and 43 are laterally pressed against the central links 41, so that the dead holes 420 and 430 of the lateral links can receive the extremities 310 of the pins 3 which present bevelled sections 80 to make easier their insertion into the dead holes 420 and 430. Since the depth 450 of each dead hole 420 and 430 is bigger than the length 350 of the extremity 310 of each pin 3, the extremity of each tubular element 2 rests flush against the surface of the corresponding lateral link adjacent to it, thus isolating the extremity 310 of each pin 3 from the outside environment.

[0027] Once the fitting has been completed, the relative articulation between the links is ensured, as has been said, by the running fit existing between the pin 3 and the tubular element 2 within which it fits.

[0028] On the basis of what has been said, it is understood that the connecting element according to the invention achieves all the proposed purposes.

[0029] The first purpose that has been achieved is that of avoiding the eventual formation of burrs, during the insertion of the extremities of the pins into the corresponding dead holes of the lateral links, which can penetrate between each tubular element 2 and the corresponding lateral link thus compromising the orthogonality of the fitting. In fact, since the outer profile of the extremities 310 of the pins 3 are shaped like arches 50 of circumferences 51, the possibility of material protruding, due to an excessive interference between the pin and the hole is avoided. This, on the contrary, may happen in the pins according to the known technique since their extremities present knurls.

[0030] This presents the advantage that the tubular element always rests flush against the lateral links, without leaving slits through which perspiration or other corrosive liquids can penetrate into the dead holes lodging the extremities of the pins. In addition, the arches of circumference 51, which constitute the profile of the extremities of the pin which are inserted into the dead holes of the lateral links, present a wide contact surface which is more difficult to be damaged by possible corrosive liquids than the knurls in the connecting pins with which the arm bands belonging to the known technique are obtained. Therefore, a better resistance of the arm band to the corrosion is ensured on the whole.

[0031] The purpose that has been also achieved is that of avoiding a possible lack of orthogonality between pins and links during the assembling operation. In fact, the profile of the pin is preferably obtained by means of a roll-forming operation, beginning from a pin having a circular section. The roll-forming operation ensures the perfect symmetry of the pin section which is obtained and consequently, the perfect co-axiality between the pin and the tubular element within which it is inserted.

[0032] During the manufacturing process, the pin and

its corresponding tubular element which form each connecting element, may be obtained in whichever sizes and of any material, preferably stainless steel of the AISI 316L type.

[0033] Moreover, the transversal profile of the pin can also consist of a number of arches differing from three and such arches can be also arranged in a non-symmetrical position in relation to the centre of the transversal section of the pin itself.

Claims

1. A connecting element (1) for arm bands consisting of links, said connecting element being adapted to join the central links (41) of an arm band with the corresponding lateral links (42, 43) arranged by their sides and forming the sides of the arm band, and comprising:

- a tubular element (2) suitable to fit into a through hole (410) drilled in each of said central links (41);
- a pin (3) inserted in said tubular element (2) and presenting its extremities (310) protruding from said tubular element (2) and adapted to be inserted each within a corresponding dead hole (420, 430) drilled in the corresponding lateral link (42, 43), **characterized in that** said pin (3) is equipped with at least three lobes (150) which develop following its axial direction and that give to the transversal section (30) of said pin (3) a bulged profile formed by at least three reciprocally intersecting arches (50), said pin being rotatable inside said tubular element (2) and having its extremities (310) adapted to fit by interference into said dead hole (420,430) of said lateral link (42, 43).

2. A connecting element (1) according to claim 1, **characterized in that** said bulging profile is formed by three arches (50), each belonging to a circumference (51), said circumferences presenting their respective centres (61) arranged along three axes (91) and at the same distance (71) from the centre (81) of said transversal section (30) toward which said axes (91) converge, said axes (91) being reciprocally slanted of an angle (70) equivalent to 120°.

3. A connecting element (1) according to claim 1, **characterized in that** said tubular element (2) presents a length (300) equivalent to the width (40) of one or more of said central links (41) arranged side by side.

4. A connecting element (1) according to claim 1, **characterized in that** each extremity (310) of said

pin (3) presents a length (350) which is shorter than the length (450) of the corresponding dead hole (420, 430) of said lateral link (42, 43).

5. A connecting element (1) according to claim 1, **characterized in that** said pin (3) and said tubular element (2) suited to lodge said pin (3), form with each other a running fit.

6. A connecting element (1) according to claim 1, **characterized in that** each of said extremities (310) of said pin (3) is adapted for an interference fit with each dead hole (420, 430).

7. A connecting element (1) according to claim 1, **characterized in that** said pin (3) is made of stainless steel.

8. A connecting element (1) according to claim 1, **characterized in that** said tubular element (2) is made of stainless steel.

9. A connecting element (1) according to claim 7 or 8, **characterized in that** said stainless steel is steel of the AISI 316L type.

Patentansprüche

1. Verbindungselement (1) für Armbänder, bestehend aus Gliedern, wobei das Verbindungselement angepasst ist, die mittleren Glieder (41) eines Armbands mit den entsprechenden seitlichen Gliedern (42, 43) zu verbinden, wobei letztere nebeneinanderliegend angeordnet sind und die Seiten des Armbands darstellen, folgendes umfassend:

- ein röhrenförmiges Element (2), geeignet, in eine durchgehende Öffnung (410) zu passen, die in jedes der mittleren Glieder (41) gebohrt ist;
- ein Stift (3), der in dieses röhrenförmige Element (2) eingesteckt ist und dessen Enden (310) aus dem röhrenförmigen Element (2) herausragen und angepasst sind, um jeweils in ein entsprechendes, blindes Loch (420, 430) eingesteckt zu werden, welches in das entsprechende, seitliche Glied (42, 43) gebohrt ist, **dadurch gekennzeichnet, dass** der Stift (3) mit wenigstens drei Nocken (150) versehen ist, die seiner axialen Richtung entlang verlaufen und dem Querschnitt (39) des Steckers (3) ein ausgebautes Profil verleihen, das durch wenigstens drei sich gegenseitig überschneidende Bögen (50) gebildet ist, wobei dieser Stift drehbar ist innerhalb des röhrenförmigen Elements (2) und an seinen Enden (310) angepasst ist, durch Interferenz mit dem blinden Loch (420, 430) des seitlichen Glieds (42, 43) zusammen-

zupassen.

2. Verbindungselement (1) gemäß Patentanspruch 1),
dadurch gekennzeichnet, dass das ausgebauchte Profil durch drei Bögen (50) gebildet ist, von denen jeder zu einem Umfang (51) gehört, wobei die Mittelpunkte (61) dieser Umfänge an drei Achsen (91) und im selben Abstand (71) zum Mittelpunkt (81) des Querschnitts (30), zu dem die Achsen (91) konvergieren, angeordnet sind, wobei diese Achsen (91) gegenseitig um einen Winkel (70) von 120° geneigt sind. 5 10
3. Verbindungselement (1) gemäß Patentanspruch 1),
dadurch gekennzeichnet, dass das röhrenförmige Element (2) eine Länge (300) aufweist, die der Breite (40) einer oder mehrerer, seitlich nebeneinander liegender mittlerer Glieder (41) entspricht. 15
4. Verbindungselement (1) gemäß Patentanspruch 1),
dadurch gekennzeichnet, dass das jedes Ende (310) des Stifts (3) eine Länge (350) aufweist, die kürzer ist als die Länge (450) des entsprechenden, blinden Lochs (420, 430) des seitlichen Glieds (42, 43). 20 25
5. Verbindungselement (1) gemäß Patentanspruch 1),
dadurch gekennzeichnet, dass der Stift (3) und das röhrenförmige Element (2) für die Aufnahme des Stifts (3) miteinander eine Laufpassung bilden. 30
6. Verbindungselement (1) gemäß Patentanspruch 1),
dadurch gekennzeichnet, dass jedes der Enden (310) des Stifts (3) zur Bildung einer Interferenzpassung mit jedem blinden Loch (420, 430) angepasst ist. 35
7. Verbindungselement (1) gemäß Patentanspruch 1),
dadurch gekennzeichnet, dass der Stift (3) aus Edelstahl besteht. 40
8. Verbindungselement (1) gemäß Patentanspruch 1),
dadurch gekennzeichnet, dass das röhrenförmige Element (2) aus Edelstahl besteht. 45
9. Verbindungselement (1) gemäß Patentanspruch 7) oder 8), **dadurch gekennzeichnet, dass** der Edelstahl vom Typ AISI 316L ist. 50

Revendications

1. Un élément de jonction (1) pour bracelets se composant de mailles, ledit élément de jonction étant indiqué pour relier les mailles centrales (41) d'un bracelet aux mailles latérales correspondantes (42, 43) situées sur les côtés de celle-ci et formant les côtés du bracelet, et comprenant : 55

- un élément tubulaire (2) indiqué pour être adapté dans un trou passant (410) percé dans chacun desdites mailles centrales (41) ;
- un pivot (3) inséré dans ledit élément tubulaire (2) et avec ses extrémités (310) sortant dudit élément tubulaire (2) et chacune desdites extrémités étant indiquée pour être insérée à l'intérieur d'un trou borgne correspondant (420, 430) percé dans la maille latérale correspondante (42, 43), **caractérisé en ce que** ledit pivot (3) est équipé d'au moins trois lobes (150) qui se développent suivant son direction axiale et qui donnent à la section transversale (30) dudit pivot (3) un profil bombé formé par au moins trois arcs (50) se coupant réciproquement, ledit pivot pouvant pivoter à l'intérieur dudit élément tubulaire (2) et ayant ses extrémités (310) indiquées pour être adaptées par interférence dans ledit trou borgne (420, 430) de ladite maille latérale (42, 43).

2. Un élément de jonction (1) selon la revendication 1, **caractérisé en ce que** ledit profil bombé est formé par trois arcs (50), chacun appartenant à une circonférence (51), lesdites circonférences présentant leurs centres correspondants (61) situés le long de trois axes (91) à la même distance (71) du centre (81) de ladite section transversale (30) vers laquelle lesdits axes convergent, lesdits axes (91) étant réciproquement inclinés d'un angle (70) de 120°.
3. Un élément de jonction (1) selon la revendication 1, **caractérisé en ce que** ledit élément tubulaire (2) a une longueur (300) équivalente à l'épaisseur (40) d'une ou plusieurs desdites mailles centrales (41) situées l'une à côté de l'autre.
4. Un élément de jonction (1) selon la revendication 1, **caractérisé en ce que** chaque extrémité (310) dudit pivot (3) a une longueur (350) qui est inférieure par rapport à la longueur (450) du trou borgne correspondant (420, 430) de ladite maille latérale (42, 43).
5. Un élément de jonction (1) selon la revendication 1, **caractérisé en ce que** ledit pivot (3) et ledit élément tubulaire (2) indiqué pour loger ledit pivot (3) forment ensemble un accouplement libre.
6. Un élément de jonction (1) selon la revendication 1, **caractérisé en ce que** chacune desdites extrémité (310) dudit pivot (3) est indiquée pour un accouplement d'interférence avec chaque trou borgne (420, 430).
7. Un élément de jonction (1) selon la revendication 1, **caractérisé en ce que** ledit pivot (3) se compose d'acier inoxydable.

8. Un élément de jonction (1) selon la revendication 1, **caractérisé en** ce que ledit élément tubulaire (2) se compose d'acier inoxydable.

9. Un élément de jonction (1) selon la revendication 7 ou 8, **caractérisé en ce que** ledit acier inoxydable est un acier de type AISI 316L.

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