

WRISTLET WITH ARTICULATED LINKS

The present invention concerns a wristlet having articulated links, comprising at least three longitudinal rows of links side by side, whose links are longitudinally staggered from one row to the other, the links of the two lateral rows being located vis-à-vis from each other, each pair of lateral links forming, together with a link from the center row, a modular unit, these units comprising organs articulating between each other around transverse axles piercing respective parts of contiguous modular units which materially interpenetrate.

Wristlets formed by a plurality of links articulated one with the other around axles located transversal to the wristlet have been known for a very long time, notably for watch wristlets. Generally, articulations between these links are realized by pins which are forced into the lateral links, to allow these links to pivot with the center links.

In order to allow these wristlets to be worn at the right length, i.e. the length which allows adaptation to the wearer's wrists, links located near an extremity of the wristlet are assembled by screws rather than forced pins, in order to allow the extra links to be removed. These screws are visible from outside and they appear most often on the side of the wristlet, which is detrimental to the aspect.

Another drawback of these wristlets is the difficulty arising in case of repair. If a link has to be replaced because it was damaged, it is not possible to easily separate the links capped together by forced pins and this work can be done only with an adapted tooling as well as a know-how, which is not available to the repair person, so that the wristlet has to be returned to the manufacturer, leading to delays which can be long, depending on the country where one is located.

It has already been proposed to make such wristlets entirely dismountable. Accordingly, EP-0 118 774 and CH-664 475 concern two wristlets with articulated links entirely assembled by fixing screws which are screwed laterally in order to maintain the links together with the pivoting organs between the links. Such wristlets solve part of the problem since they allow to take the wristlet completely apart and to replace any link. However, the fixing screws are visible on the whole length of the wristlet, which is detrimental to the aspect.

EP-0089 421, WO 93/0871 and WO 94/12069 concern dismountable articulated wristlets, assembled by articulating elements freely engaged on pivoting pins, these articulating elements being locked by organs which are screwed on the side of the wristlet which faces the wearers arm, so that the screws are not visible when the wristlet is worn. This represents undoubtedly an improvement of the aesthetics, which would nevertheless not fulfill the most exacting requirements of top-level articles. Indeed, in a shop-window or when purchasing, the customer first sees the wristlet not worn, so that he can notice the fixing screws whatever the side of the wristlet on which they appear. The fact of seeing screws immediately confers to such a wristlet the character of an object whose functional aspect dominates the aesthetical aspect, which is of course not adequate for a top-level article of this type, whose faultless aspect is a witness of good manufacturing.

Patent CH-558 153 concerns an articulated wristlet comprising links joined to a transverse articulating rod which protrudes at one extremity of the link and which does not extend on all its width. This rod is introduced in a recess which opens on the inferior side of the contiguous link and maintained in position by a spring-mounted locking element. In this case, the screws are replaced by a spring.

In the case of a gold wristlet, such a spring could hardly be in the same metal as the wristlet. Moreover, even if it is not a screw, the fixing organ must have an opening in order to allow the assembling, and thereby keeps a
5 functional and non ornamental character or simply an aspect whose aesthetics go along with the remaining of the wristlet.

Another type of solution has been proposed in order to solve this problem. There are articulated wristlets in which
10 the articulating mechanism is lodged in links which are formed by sorts of sleeves covering each of the segments forming the wristlet. Such solutions were disclosed in CH-653 871 as well as in EP-0 540 979. In this type of wristlets, the visible link extends necessarily on all the
15 width of the wristlet. Accordingly, the solution does not apply to wristlets formed by rows side by side of staggered links in order to obtain specific ornamental effects, notably with links made of several materials having different colors and/or with different surface finish.

20 Another solution has been proposed in CH-688 430, and consists in forming links comprising three parts of different width, longitudinally staggered the ones with the others. A narrow center part is followed by a medium width part extending from one side to the other of the middle axle
25 of the wristlet and finally by a part whose width corresponds to that of the wristlet. Each center part and each middle width part is transversally pierced at the wristlet. Each wide part of the link comprises a recess of a width corresponding to the middle width, and each middle
30 part comprises a recess having a width corresponding to the narrowest center part. Thereby, two contiguous links can imbricate the one in the other and be retained together by a barrette which is sliding in the transverse coaxial openings of the middle part and of the center part of the contiguous

link. This barrette passes freely through these openings but is actually retained as soon as one placed the next link. Indeed, the barrette strikes against the edges of the recess of corresponding width of this next link and is accordingly
5 actually stopped.

Such a wristlet is entirely dismountable. If it could seem, at first sight, to be formed of several rows of staggered links, these two rows are actually constituted by only one link. Consequently, color combination by rows of
10 links in different materials are not possible with this solution.

It has already been proposed in EP 0 310 536 a wristlet formed by five rows of side by side links, of which at least the links of both lateral rows are staggered
15 longitudinally with those of the other rows. The internal lateral side of each of these lateral links comprises a half axle, the free extremity of which ends by a pivoting head shaped as a spherical segment adjacent to a groove linking this head to the cylindrical part of this half axle. The
20 latter is engaged in a boring which pierces a middle link, in which only the head at the extremity and the main part of the groove protrude from the internal lateral side of this middle link.

The center link comprises a sliding way which extends
25 longitudinally and is open at one extremity. The transverse section of this sliding way is shaped as a spherical segment corresponding to that of both heads of both half-axles of both lateral links which are located vis-à-vis from each other. In addition, this sliding way comprises two
30 longitudinal slits opening on its lateral opposed sides and whose width sensibly corresponds to the diameter of the grooves which are contiguous to the end heads. The middle and the center links comprise also a transverse boring.

In order to assemble this wristlet, one must engage each half-axle in one of the boring of the middle links, then engage the heads of the half-axle in the sliding way of the center link. One then slides these heads until that the
5 second boring of the middle links are coinciding with the boring of the center link and one puts an axle through them which maintains the five links assembled and allows the articulation of the lateral links of the contiguous modular unit. Such a conception allows to realize a wristlet which
10 is screwless and without any visible fixation.

Nevertheless, this concept of wristlets presents drawbacks. Notably it does not allow to realize a wristlet comprising only three rows of links, the middle links being indispensable. Each link is articulated around two parallel
15 axles, so that the links of a modular unit cannot be fixed one with the others. Moreover, the linking of the links by articulating elements and screwless sliding elements implies necessarily some clearance, which confers the wristlet a less solid aspect, which can lead to the impression of a
20 lesser quality, which is not acceptable for so-said top-level products.

The present invention aims to remedy, at least in part, to the drawbacks of the above-mentioned solutions. To this effect, this invention concerns a wristlet having
25 articulated links of the type previously defined, corresponding to the claim 1.

The lateral fitting of the links for the different rows allows to realize a wristlet with links which is formed by entirely dismountable modular units, the fitting links of
30 a same unit being perfectly interdependent the ones with the others. The fittings being arranged on the internal lateral side of the links, are invisible. The same is true for the locking means which, being associated to the modular unit articulating means and being linked to the fitting means,

can also be located on the inside of the wristlet and can be hidden since they are linked to the fitting means which are themselves on the inside of the wristlet. They are accordingly hidden as soon as two contiguous modular units
5 are articulated the one with the other. Consequently, the locking means are hidden gradually during assembly of the links the one after the others.

Accordingly, the lengthening or the shortening of the wristlet is possible without difficulties, at any point of
10 the planet by a re-seller and without leaving a visible trace. Indeed, all links are dismountable without that the means allowing their assembly appear from outside the wristlet.

The fitting surfaces are machined, so that the
15 fittings can be obtained with great accuracy. Each link can be brought to a desired finished state, either a final state, or an intermediate state, offering a great manufacturing flexibility. In case of damage, it is possible to disassemble the wristlet up to the damage in order to
20 repair or replace it. Accordingly, it is not necessary anymore to return the wristlet at the factory to perform this operation as in the case of non dismountable wristlets. After-sale service is accordingly simplified and improved since the repair can be done at the resale's place.

25 Other particularities and advantages will appear while reading the description which follows in which two embodiments and different variants of the present invention will be described and illustrated, schematically and as an exemple, with the help of the annexed drawings.

30 Figure 1 is a partial view in perspective of a segment of a wristlet of which three links forming a modular unit, according to the first embodiment, are illustrated in a non-fitted position;

figure 2 is a view similar to figure 1 of a variant of this first embodiment;

figure 3 is a view similar to figure 1 illustrating another variant of this first embodiment;

5 figure 4 is a view similar to figure 1 of a second embodiment with cut parts, illustrating the elements in a non-fitted position;

figure 5 is a view similar to the preceding figure, illustrating the elements in locked position.

10 Figure 1 shows a segment of a wristlet 1, as well as three links, a center link 2 and two lateral links 3 and 4. Each lateral link 3, 4 comprises a pivoting rod 5, respectively 6 and a fitting surface 7, respectively 8. This fitting surface, 7, 8 is formed, in this example, by a
15 hollow profiled body, formed by cutting a tubular element, which is forced or brazed in a recess, which is not visible, arranged on the internal lateral side of each link 3, 4.

The profiled bodies forming the fitting surfaces 7, 8 pierce a middle element 9, respectively 10. The fixing
20 between the profiled bodies and the middle elements is realized by forcing or brazing. Each middle element 9, 10 is staggered longitudinally from link 3, respectively 4, in the longitudinal axis of the wristlet 1. The part of this middle element 9, 10 which is staggered from respective links 3, 4,
25 is pierced by an opening 11 respectively 12, whose axle is transverse from the wristlet 1.

Center link 2 comprises a fitting surface 13 constituted by a path which is transverse to the axis of the wristlet 1 and whose section has a shape which is comple-
30 mentary to the fitting surfaces 7 and 8 from the lateral links 3 and 4. This center link 2 also comprises a transverse path 14 provided with a threading. This transverse path 14 is actually aligned on the openings 11 and 12 piercing the middle elements 9 and 10.

Two screws 15 and 16 are designed to pierce the respective openings 11 and 12 and screw in path 14. Openings 11 and 12 are shaped to each present a shoulder aiming to retain the head of the respective screws 15, 16 and to press
 5 respective middle elements 9, 10 against the center link 2, the fitting surfaces 7 and 8 being then fitted in the fitting surface which pierced the center link: the heads of the screws 15, 16 each present a cylindrical recess 15a, 16a of which only 16a is visible, coaxial with the axis of the
 10 respective screw. This cylindrical recesses function is to receive the respective pivoting pins 5, 6 of both lateral links 3, 4, after being fitted in the center link 2.

These lateral links 3, 4 are then locked in this fitting position by screws 15 and 16. As soon as these links
 15 2, 3, 4 are locked together, they form a modular unit 17 which behaves as one and only one piece, articulated around the axis of the coaxial pivoting pins 5, 6, mounted pivotingly in the cylindrical recesses 15a, 16a.

All the links of the wristlet are assembled the ones
 20 after the others as just described, each assembly of a modular unit 17, formed by a center link 2 and two lateral links 3, 4 being locked by the screws 15, 16 which also function as pivoting organs between modular unit 17. One should notice that it is not indispensable that each modular
 25 unit 17 be locked by screws 15, 16. It would suffice indeed, that only the last modular unit 17 of the wristlet or of the strand, when the wristlet is formed by several strands, be locked by one or two screws so that all the successive modular unit be locked.

30 Indeed, each pair of lateral links 3, 4 of a modular unit 17 encloses the middle elements 9, 10 joined to the links 3, 4 of the preceding modular unit 17 and keep them from getting unfitted as soon as these middle elements 9, 10 are taken in-between center link 2 and lateral links 3, 4 of

a following modular unit 17. Consequently, if only the last modular unit 17 is locked by one or two screws 15, 16, (a single screw can screw in a threading area in the opposed middle elements 9, 10, instead of the threading arranged in the center link 2), all modular units 17 located between the first and the last modular unit 17 are locked. One could also, as an exemple, place screw 15, 16 only with one modular unit out of two or three.

For the same reasons, one can see that screws 15 and 16 cannot get unscrewed, since they are kept from that by both lateral links 3, 4 of the next modular unit against which they get stuck as soon as they get unscrewed. This assembly mode, entirely dismountable, is for this reason also completely hidden, since only the last screw(s) appear(s) on the lateral side of the lateral links 3, 4 at the extremity.

Of course, for manufacturing reasons, it is generally advantageous to realize the different links or at least some among them from several pieces which are assembled by forcing or brazing. As already mentioned, lateral links 3 and 4 can advantageously be realized with four assembled pieces. In this example, center link 2 is one piece.

In the variant illustrated in figure 2, is disclosed a center link 2, in which the threading, arranged in the transverse part 14, is carried by an independent cylindrical piece 18, constituting a floating nut, disposed in the transverse path 14.

This represents a variant aiming to facilitate manufacturing, half the center link 2 can then be a simple extruded element that one can cut up the desired width.

As one can notice, in the embodiment and the variant which were just described in relation with figure 1 and 2, center link has a rectangular profile when viewed in plan and shape, after assembly of the modular unit 17, with both

middle elements 9, 10 disposed on each side, a composite center link also rectangular. Center link 2 in itself is, preferably, embossed when compared to middle elements 9, 10, conferring an original ornamental aspect. This center link 2
5 could have another profile than that which is illustrated, the contiguous side of both middle elements 9, 10, then corresponding to the profile of the center link 2 and forming preferably with it a rectangular composite link, whatever the shape of link 2.

10 Of course, the shapes are not restrictive, but are simply disclosed here to show the aesthetical possibilities that this embodiment allows. One can also notice that advantageously, all center links, each formed by one center link 2 and two middle elements 9, 10, have the same width on
15 all the links of the wristlet 1. When it is a watch-wristlet in particular, the width of each of the strands of the wristlet, diminishes progressively from the fixation to the watchcase toward the clasp. In this case, this diminution in width can, preferably, be realized by reducing the width of
20 lateral links 3, 4.

According to still another variant, illustrated in figure 3 as a variant of the first embodiment, a water-resistant joint 39 is disposed around the pivoting pins 5, 6. This joint is shaped to present a diametrical rib 39a
25 aimed to engage in the slip of each of the screws 15 and 16 to make it interdependent of these crews. This joint allows to protect the pivoting surfaces from the infiltration of foreign elements, abrasive or corrosive, susceptible of being detrimental to the good operation of pivoting organs.
30 It could also be possible to put a water-resistant joint at the bottom of the screws heads 36, 37 in the second embodiment.

The second embodiment illustrated by figures 4 and 5 is based on the same principle as the first embodiment, but sensibly differs in its realization.

On can find in this second embodiment one wristlet 21, 5 of which only one segment is illustrated, formed by a row of center links 22 and of two rows of lateral links 23, 24. The last center link 22 and the two last lateral links 23, 24 are presented unmounted.

A rod 25 pierces a transverse path arranged in one 10 extremity of center link 22. This rod 25 extends outside of the lateral opposed side of this link. Two annular grooves 25a, 25b of which only the second of them is visible, are arranged between the two respective extremities of this rod and the respective opposed lateral sides of center link 22, 15 so freeing both heads 25c, 25d at both extremities of rod 25.

The opposed lateral sides of center link 22 each comprise one hollow cavity of which only one, 26, is visible. These hollow cavities 26 form sliding ways each of 20 which is designed to receive and guide one of the middle elements 27, 28 fixed at the internal lateral side of respective lateral links 23, 24. These middle elements 27, 28 are longitudinally staggered from lateral links 23, 24. Like in the preceding embodiment, the part of each middle 25 element 27 28 which extends beyond respective lateral links 23, 24 is pierced by an opening 29, respectively 30.

A second path 35, provided with an interior threading pierces the center link 22, near its transverse extremity which is opposed to that pierced by rod 25.

30 The internal lateral sides of lateral links 23, 24, each comprise two recesses 31, 32, respectively 33, 34. Recesses 31, 33 each comprise one opening 31a, 33a giving access to these respective recesses. These openings 31a, 33a each present a circular part, the diameter of which is

slightly superior to that of heads 25c, 25d to allow their introduction in respective recesses 31, 33. These openings 31a, 33a are followed by a narrower part, the width of which is slightly superior to the diameter of the annular grooves 25a, 25b of rod 25. The narrower parts of these openings 31a, 33a form lips 31b, 33b, aiming to retain the heads 25c, 25d in respective recesses 31, 33. The second recesses 32 and 34, have a circular cylindrical section.

When heads 25c, 25d of these rods are introduced in recesses 31 and 33 through the circular part of openings 31a and 33a, the middle elements 27, 28 engage in the sliding ways formed by recesses 26 of center link 22. Nevertheless, as can be seen on figure 4, these middle elements 27, 28 are located at some distance from the extremity of these recesses 26, so that the openings 29, 30 are out of axis when compared to opening 35.

Recesses 31, 33 are designed and sized to allow the center link 22 to move longitudinally when compared to lateral links 23, 24, on a distance corresponding to that between the extremities of middle elements 27, 28 and the respective contiguous extremities of recesses 26 of center links 22, in which they are slidingly engaged. Consequently, in order to lock the three assembled links 22, 23, 24, it is sufficient to slide the center link 22 from the position illustrated in figure 4 to that illustrated in figure 5.

This translation allows to align openings 29, 30 on the axis of the path 35 located at one of the extremities of center link 22. Simultaneously, this translation engages the annular grooves 25a in the narrow parts of openings 31a, 33a, keeping thereby the heads 25c, 25d of rod 25 from getting out of recesses 31a, 33a. The whole is then locked in this position, by screwing two screws 36, 37 at both extremities of threaded path 35, through openings 29, 30, thereby keeping center link 22 from any longitudinal

movement. The heads of these two screws 36, 37 are constituted by cylinders which protrude laterally from center link 22 and are designed to engage in recesses 32, 34 of opposed lateral links 23, 24, during assembly of the links 22, 23, 24 to form one of the modular units 38 of wristlet 21. This wristlet can be lengthened by a successive modular unit 38 such as that which was just described, until that the desired length is obtained.

This second embodiment has been more specially, although not exclusively, studied in view of small dimension wristlets, notably ladies' watch wristlets. Accordingly, instead of realizing the pivoting of the modular units by forcing the pivoting pins 5, 6 of figure 1 in cylindrical recesses 15a, 16a of the heads of the screws 15 and 16, one forces the cylindrical heads of screws 36, 37 in recesses 32, 34, which allows to have smaller diametrical screws than in the first embodiment.

Of course, in the second embodiment, the path 35 could have no threading and receive a single rod which goes through it and protrudes laterally from both sides of link 22 and lodges in recesses 32, 34 of lateral links 23, 24, instead of the two screws 36, 37. This rod would allow to lock the assembled links of the modular unit 38, as do screws 36, 37. The last modular unit only must be locked by one or two screws, since a single rod sliding through path 35 and opening 29, 30 would not then be laterally held by lateral links 23, 24 of the next modular unit.

Some functional parts of the wristlet according to the invention could be realized in different materials than the other parts. This is notably the case for the organs aiming to the pivoting of the modular units 17 or 38 between them. Accordingly, one could realize these parts or their surfaces with, for example, a ceramic material. One of these pivoting surfaces could also be coated by a lubricating material.

Such arrangements could lead to reduce further the necessary clearance between the surfaces and to improve the accuracy of the assembly and of the articulation between the different elements of the wristlet.

CLAIMS

1. Wristlet having articulated links, comprising at least three longitudinal rows of links (2, 3, 4; 22, 23, 24) side by side, whose links are longitudinally staggered from one row to the other, the links (3, 4; 23, 24) of the two lateral rows being located vis-à-vis from each other, each pair of lateral links (3, 4; 23, 24) forming, together with a link from the center row, (2; 22), a modular unit (17; 38), these units comprising organs (5, 6, 15a, 16a; 32, 34, 36, 37) articulating between each other around transverse axles piercing respective parts of contiguous modular units (17; 38) which materially interpenetrate, characterised in that the opposed lateral sides of said center link (2; 22) on the one hand and the internal lateral sides of said lateral links (3, 4; 23, 24) of each modular unit (17; 38) on the other hand, are coupled with means (7, 8, 13; 25-28, 31, 33) for laterally fitting these links (2, 3, 4; 22, 23, 24) one within each other in a defined position, and in that the organs (5, 6, 15a, 16a; 32, 34, 36, 37) for articulating the contiguous modular units (17; 38) are associated with screws (15, 16; 36, 37), for longitudinally and/or laterally locking said fitting means (7, 8, 13; 25-28, 31, 33) so that the links (2, 3, 4; 22, 23, 24) of each modular unit (17; 38) be fixed the ones to the others in said defined position.

2. Wristlet according to claim 1, characterised in that said organs (15, 16; 36, 37) for locking the three links (2, 3, 4; 22, 23, 24) fitted one in each other comprise three respective openings (11, 12, 14; 29, 30, 35), one (14; 35) provided at the transverse extremity of the center link (2; 22) protruding longitudinally from the two lateral links (3, 4; 23, 24), the two others (11, 12; 29 30) through the respective exttremities of two middle elements (9, 10; 27,



28) forming longitudinal extensions of the lateral links, the transverse dimension in fitting position of the extensions of the middle elements (9, 10; 27, 28) corresponding to the clearance between two lateral links (3, 4; 23, 24) of the contiguous modular unit (17; 38), the locking organs, (15, 16; 36, 37) being arranged to axially join said openings (11, 12, 14; 29, 30, 35), the articulating organs (5, 6, 15a; 16a; 32, 34, 36, 37) interdependent with these locking organs (15, 16; 36, 37), respectively, from the internal lateral side of said lateral links (3, 4; 23, 24) having cylindrical complementary surfaces co-axial with the articulating axles in order to fit the ones in the others.

3. Wristlet according to claim 2, characterised in that said opening (14, 35) provided in the center link (2; 22) comprises a threading, whereas the external sides of the two openings (11, 12, 29, 30), provided through the middle elements (9, 10; 27, 28) longitudinally extending both lateral links (3, 4; 23, 24), are shaped to receive the respective heads of two screws (15, 16; 36, 37), each of which is engaged in said threading on each side of said center link (2; 22), these two screws (15, 16; 36, 37), constituting said locking means of the three links (2, 3, 4; 22, 23, 24) of the modular unit (17; 38).

4. Wristlet according to claim 3, characterised in that a cylindrical recess (15a, 16a) is provided in the head of each locking screw (15, 16) to receive a rod (5, 6), interdependant with the internal side of a lateral link (3, 4).

5. Wristlet according to claim 3, characterised in that the head of the locking screw (36, 37) comprises a cylindrical part protruding from said center link (22), whereas the lateral link (23, 24) comprises a cylindrical



complementary cavity (32, 34) engaging on this cylindrical part.

6. Wristlet according to anyone of claim 2 to 5, characterised in that said middle element (27, 28) forming
5 extensions interdependent respectively with the two lateral links (23, 24), enclosing the center link (22), form sliding blocks engaged into sliding-ways (26) formed in each lateral side of the center link (22), susceptible to define two relative limiting longitudinal positions between the center
10 link (22) and each of the lateral link (23, 24) and in that a rod (25), ended by a head (25c, 25d) at each extremity, protrudes from one of the contiguous lateral side of each of the pairs of contiguous lateral sides between the center link (22) and the two lateral links (23,24), whereas the
15 other of each of these pairs of contiguous sides comprises an opening (31a, 33a) to allow said head (25c, 25d) to move in one of the two relative limiting longitudinal positions between the center link (22) and the contiguous lateral link (23,24) and to give acces to a recess (31,33) sized to allow
20 movements of this head (25c, 25d) on a distance corresponding to the amplitude of relative movement between said slide-way (27, 28) and said sliding-block (26), a shoulder (31b, 33b) being shaped on a part of the opening of this recess (31, 33) on the lateral side of the link (23, 24), to axially retain said head (25c, 25d) in the other of
25 the relative limited positions between the center link (22) and the contiguous lateral link (23, 24), this position corresponding to that where said three openings (29, 30, 32) are axially lined up.

30 7. Wristlet according to anyone of claims 2 to 6, characterised in that said middle element (9, 10) is formed by a link which is interdependent with each lateral link (3, 4).



8. Wristlet according to anyone of the preceding claims, characterised in that water-resistant means (39) are provided to protect the pivoting surfaces (5, 6, 15a, 16a) between said modular units (17, 38).

5

10

15

20

25

30

