

BRACELET FORMED OF HINGED LINKS

The present invention concerns bracelets with hinged or articulated links, particularly watch bracelets. In other words, the invention concerns bracelets whose links are assembled using pins defining pivoting axes for the links. The pins each pass through at least two partially interlocking or
5 overlapping links.

The bracelet pins are inserted into cylindrical passages arranged in the links. In order to ensure assembly of the links, the various pins must be held in place, i.e. to prevent the pins moving transversely to the bracelet once the bracelet links are assembled. Various techniques are known to
10 those skilled in the art for fixedly holding the pins in the respective bracelet passages. Moreover, particularly in order to adjust the length of the bracelet in accordance with the diameter of the wearer's wrist, it is desirable to be able to remove or add at least one link without damaging the bracelet and in an efficient manner, if possible by the user himself.

15 The present invention proposes in particular providing a reversible system for assembling the links of a bracelet with hinged links, the assembly being provided such that at least one link can easily be added to or removed from the bracelet in order to vary its length.

A watch bracelet formed of several links hinged by means of
20 alternately arranged long pins and short pins is known from GB Patent No. 2 227 155. Each long pin is permanently secured by the first end thereof to a first link. This pin is secured in a reversible manner by the second end thereof to a second link. A screw that partially passes through the passage provided in the second link to allow the second end of the pin
25 to pass forms the reversible securing device. The second end of the pin has a circular groove, which is penetrated by the securing screw. Thus, using a screwdriver, it is possible to assemble the bracelet links by screwing in small screws which block the long pins.

The bracelet link assembly device proposed in GB Patent No. 2 227 155 is advantageous in that the assembly system is relatively simple and allows links to be added or removed by unscrewing the securing screws provided at the second ends of the long pins. However, this solution
5 has some drawbacks. First of all, the securing screws are very small. A watchmaker is trained to screw and unscrew such small screws, but this is relatively difficult for a mere user. Because of their dimensions, the securing screws are easily lost as soon as they come out of the threaded holes of the second links. Moreover, when the bracelet is worn these screws may
10 become partially unscrewed with the risk of one of the long pins being released and the bracelet then being partially dismantled. For a wristwatch, this solution is to be avoided at all costs.

It is therefore an object of the present invention to propose a bracelet with hinged links assembled in a simple and efficient manner while ensuring
15 that none of the bracelet elements can be lost particularly when alterations are made to the length of the bracelet by adding or removing some links. It is another object of the invention to provide a reversible link assembly device wherein the securing element cannot be loosened by stresses exerted on the bracelet when it is being worn on the wrist.

20 The invention therefore concerns a bracelet formed of a plurality of links assembled such that at least a first link of this plurality of links can be separated from the others, this first link being assembled with at least a second link by means of a transverse pin, which is associated with means for locking its transversal position in the bracelet. These locking means are
25 arranged in a reversible manner to allow the pin to be released and the first and second links to be separated. The bracelet is characterized in that said locking means include a locking element which ensures the transversal position of the pin in a first angular position of the locking element and releases the pin along the longitudinal direction thereof in a second angular
30 position, the locking element being arranged in one of the first and second

links so that it can be rotated about its axis of rotation, and in that the locking element has a non cylindrical portion, relative to said axis of rotation, one external part of which is located at least partially in a recess arranged at the cylindrical surface of the pin when the locking element is in
5 said first angular position, this non cylindrical portion remaining opposite said pin without penetrating said recess when the locking element is in said second angular position.

According to a particular embodiment of the invention, a truncated cylinder portion forms the non-cylindrical portion of the locking element at
10 least along a plane parallel to the axis of rotation of the locking element.

Preferably, the recess provided in the pin is formed by a groove, in the surface of the pin, centred on the longitudinal axis of the pin.

In a preferred embodiment, the first position of the locking element is ensured by means for locking the angular position thereof, a user being
15 able to activate these locking means in order to allow him to rotate the locking element from the first position to the second position thereof in which the pin is released.

The first position of the locking element thus corresponds to a closed position or locking position of the pin, whereas the second position
20 corresponds to an open position or detached position of the pin and the link in which the locking element is arranged.

According to a preferred variant, the locking element is held in a cavity of the link in which it is arranged by a structure forming a stop member on the side of the external surface of the link.

25 According to the invention, the locking element forms a sort of lock or cam which remains associated with the link in which it is arranged. This locking element cannot thereof be lost since it cannot be separated from the link concerned.

Other features and advantages of the present invention will also appear from the following detailed description, made with reference to the annexed drawings, given by way of non limiting example, in which:

- Figure 1 is a partial bottom view of a bracelet formed of hinged links
5 according to the invention;

- Figure 2 is a partial enlargement of Figure 1;

- Figures 3a and 3b are cross-sections of Figure 2, respectively along two orthogonal planes, showing the reversible locking device for a link assembly pin in the open position thereof;

10 - Figures 4a and 4b are cross-sections respectively along two orthogonal planes showing the reversible locking device, shown in Figures 3a and 3b, in the closed position thereof;

- Figures 5a and 5b are respectively side and top views of an external ring of the locking device shown in Figures 3 and 4;

15 - Figures 6a, 6b and 6c show a locking element in various views, and

- Figure 7 shows a pin associated with the locking device according to the invention.

With reference to Figures 1 to 7, a preferred embodiment of the bracelet according to the present invention will be described below.
20 Bracelet 2 is formed of several interlocking links 3 to 6. An assembly pin 8 passes through the interlocking parts of two adjacent links. When the links are assembled, pins 8 are introduced in cylindrical passages arranged in the interlocking parts of the various links. In order to allow the links of bracelet 2 to be easily assembled and also partially disassembled,
25 particularly to vary the length of the bracelet, the pins slide relatively freely in the transversal passages provided in the links. In order to ensure the transversal position of each pin able to move transversely to the bracelet,

i.e. along the longitudinal axis of the pin, means 10 are provided for reversibly locking the pin.

In the variant shown in Figures 1 and 2, each pin is used to assemble two links in an articulated manner. However, in other versions of the bracelet with links, it is possible, as in the aforementioned prior art, that one pins is used for assembling more than two links. Depending upon the way in which the links interlock, it is possible that one link has to be associated with two devices for locking the transversal position of the pin to hold the assembled links. In a variant, one end of the pin could be permanently fixed to one of the links. The variant shown in Figures 1 and 2 is thus in no way limiting, but precisely describes the means locking the assembly pin transversal position relative to at least one link in which the locking elements are arranged.

Locking device 10 essentially includes three elements, one of which is associated with a recess made in pin 8. Before explaining the operation of the reversible locking device, we will described each of the constituent parts of the device.

First of all, pin 8 includes a recess 22 defined by a circular groove made in the cylindrical surface of the pin and centred on the longitudinal axis 20 thereof.

Locking device 10 includes three elements 12, 14 and 16 arranged in a cavity 18 provided in particular in link 4 for locking the transversal position of pin 8 in a reversible manner, forming an articulated assembly between link 4 and the adjacent link 5.

Locking element 12 includes a circular head 24, visible and accessible from the back face of link 4. This head includes a central groove 26 for actuating the locking device in rotation using a screwdriver. Next, element 12 includes a central body formed by a non-cylindrical portion. A truncated cylinder portion forms this non-cylindrical portion 28 at

least along a plane parallel to the axis of rotation 30 of element 12. In the present case, the cylinder is machined along two parallel planes defining two diametrically opposite plane surfaces 33 and 34. These surfaces 33 and 34 are set back relative to the axis of rotation 30 and relative to the two
5 cylindrical surfaces 35 and 36 remaining between these two plane surfaces. The lateral wall of the non-cylindrical portion is thus formed of four distinct surfaces, namely set back two plane surfaces and two cylindrical surfaces defining two external parts 35 and 36 of the locking element. Finally, this element 12 includes an end part 40. This end part is circular with a lateral
10 surface whose radius at the centre corresponds to that of the external parts 35 and 36. A recess 42 is made in element 12 from the end part 40 to house therein a spring 16 for pressing the element against structure 14 partially closing cavity 18.

It will be noted first of all that, within the scope of the present
15 invention, a single surface 34 set back from another lateral surface 36 relative to axis of rotation 30 is sufficient for the operation of the locking device described here. However, the presence of the two diametrically opposite plane surfaces 33 and 34 facilitates manipulation of the device for a user. In order to ensure that locking element 12 works in association with
20 groove 22 made in pin 8, the non cylindrical portion of the locking element only needs to have a lateral wall that has a maximum distance relative to a first geometrical plane X-X, including axis of rotation 30, which is less than the maximum distance from this lateral wall relative to a second geometrical plane Y-Y also including axis of rotation 30 (see Figure 6c). Thus, as will
25 become clear below in the description of the operation of the locking device with reference to Figures 3 and 4, in the open position the locking element has an angular position substantially corresponding to a position of said geometrical plane parallel to the longitudinal axis 20 of pin 8, whereas the closed position of this locking element for releasing the pin corresponds to

another angular position in which said second geometrical plane is substantially parallel to the longitudinal axis of the pin.

Structure 14 is used for partially closing aperture 18 in link 4 so as to hold locking element 12 in the cavity. It therefore forms a stop member for
5 two shoulders 37 and 38 of the locking element defined by the external parts 35 and 36 whose radius at the centre is greater than the radius of head 24. Structure 14 forms a ring whose central aperture has a radius adjusted to the radius of head 24 of element 12. Structure 14 is formed of
10 an annular base 44 on which two projecting parts 45 and 46 are mounted diametrically opposite relative to the central axis of the structure which is identical to axis of rotation 30 of the locking element. Structure 14 defines two bottom steps 47 and 48 and two top steps 49 and 50. For shoulders 37 and 38 of the locking element, structure 14 thus defines four different angular positions, shifted by 90°. It will be noted that the structure, axially
15 forming a stop member for the locking element, only needs to have two steps at the periphery of the locking element and located at two different levels along the axis of rotation of the locking element. These two steps must be arranged to allow one shoulder of the locking element to be pressed by spring 16 against the bottom step when it is in the closed
20 position, whereas it is pressed against the top step when the locking element is in the open position, such that a user has to exert pressure on the locking element to bring it from the closed position, where the pin is locked, to the open position, where the pin is released.

With reference to Figures 3 and 4, the operation of the locking device
25 according to the preferred embodiment of the invention will be described below. It will be noted that Figures 3a and 3b show the locking element in an open position, Figure 3b being a cross-section perpendicular to that of Figure 3a. Moreover, Figures 4a and 4b are also orthogonal views similar to Figures 3a and 3b, but with the locking element in a closed position.

Cavity 18 opens out onto the bottom surface of the link in which it is machined. This cavity 18 thus defines a blind hole in which locking element 12 is arranged with spring 16 placed in its central hole 42. Spring 16 thus pushes element 12 in the direction of the external aperture
5 of cavity 18. To prevent element 12 being able to leave the latter, the annular structure 14 is arranged on the side of the opening of cavity 18 at the periphery of the locking element such that its head 24 is located in the central aperture of structure 14 and that at least one external shoulder of element 12 is stopped against a horizontal surface of structure 14, whatever
10 the angular position of the locking element. More specifically, in the situation where the locking element has an angular position corresponding to the open position of the locking device, as shown in Figures 3a and 3b, the two shoulders 37 and 38 of the locking element abut against the two top steps 49 and 50 of structure 14. It will be noted that the set of steps of
15 structure 14 and the set of lateral surfaces of element 12 have not been referenced in all of the Figures to avoid overloading the drawings. In the open position, the locking element is slightly pushed into cavity 18, the plane lateral surface 34 thereof being located opposite pin 8. In this open position, locking element 12 does not penetrate groove 22 of pin 8. Thus,
20 this pin can be moved freely transversely, i.e. along the longitudinal axis 20. In this position, the non-cylindrical portion 28 of element 12 is located opposite pin 8 without however penetrating recess 22 thereof. In other words, the open position of the locking element corresponds to a parallel orientation of plane surfaces 33 and 34 to longitudinal axis 20 of pin 8.
25 These surfaces 33 and 34 are set back sufficiently that they do not intersect the section of pin 8 over its entire length, in projection into the cross-sectional plane of Figure 3a.

In order to pass from the open position of Figure 3 to the closed position of Figure 4, locking element 12 must be rotated by an angle of 90°,
30 particularly using a screwdriver inserted into the groove of head 24. During

this rotation, on the one hand, the external part 35 of element 12 at least partially penetrates groove 22 of pin 8, which has the effect of locking the latter. On the other hand, shoulders 37 and 38 of element 12 undergo an angular shift relative to the top steps 49 and 50 of structure 14 until they
5 finally descend one level via the action of spring 16 to abut against the two bottom steps 47 and 48 of structure 14. In this closed position, head 24 of element 12 is substantially flush with the external surface of link 4. Moreover, element 12 is locked in the position locking pin 8 by structure 14 and spring 16 which presses element 12 against the structure. Structure 14
10 and spring 16 thus form means locking the closed position of element 12,. These locking means for element 12 are arranged to allow a user to release element 12 in rotation by pressing on head 24 to allow the shoulders of element 12 to pass from a bottom level, corresponding to the bottom steps of structure 14, to a top level corresponding to the top steps of structure 14.
15 Next, via a movement of rotation of element 12, the user can bring the locking element into its open position in which the pin is then released. However, without the deliberate intervention of the user, the action of spring 16 on element 12 ensure that the latter remains in the locking position after the bracelet links have been mounted.

20 Generally, the means used for locking the pin locking element are formed by the arrangement of a structure in cavity 18 defining at least two steps at the periphery of the locking element, which are located at two different levels along axis of rotation 30 of the locking element, and by a spring 16 used to press one shoulder of the locking element against the
25 bottom step when the locking element has an angular position corresponding to the closed position, i.e. in a position preventing the pin from moving along its longitudinal axis.

It will also be noted that the term "link" used must be understood in the widest sense to include any intermediate element between other links
30 and elements of the bracelet that are not visible on the top thereof.

In another particular embodiment of the invention, a single locking device placed between two close passages is used to lock or release two neighbouring pins respectively arranged in these two passages. Thus, the invention is not limited to the single embodiment shown in the Figures.

CLAIMS

1. Bracelet formed of a plurality of links (3 to 6) assembled such that at least a first link (4) of said plurality of links can be separated from the others, said first link being assembled with at least a second link (5) by means of a transverse pin (8), which is associated with first means (10) for
5 locking said pin in the transverse position thereof in said bracelet, said first locking means being arranged in a reversible manner to allow said pin to be released and said first and second links to be separated, characterized in that said first locking means include a locking element (12), which ensures said transverse position of the pin in a first angular position of said locking
10 element and releases said pin along the longitudinal direction thereof in a second angular position, said locking element being arranged in one of said first and second links so as to be able to rotate about the axis of rotation (30) thereof, said locking element having a non cylindrical portion (28), relative to said axis of rotation, one external part (35, 36) of which at least
15 partially penetrates a recess (22) arranged in the cylindrical surface of said pin when said locking element is in said first angular position, said non cylindrical portion remaining opposite said pin without penetrating said recess when said locking element is in said second angular position.

20 2. Bracelet according to claim 1, characterized in that said non cylindrical portion (28) of said locking element has a lateral wall that has a maximum distance relative to a first geometrical plane (X-X), including said axis of rotation (30), which is less than the maximum distance of said lateral wall relative to a second geometrical plane (Y-Y) also including said axis of
25 rotation, said second angular position substantially corresponding to a position of said geometrical plane parallel to the longitudinal axis (20) of said pin and said first angular position substantially corresponding to a

position of said second geometrical plane parallel to the longitudinal axis of said pin.

3. Bracelet according to claim 1, characterized in that said non-
5 cylindrical portion is formed by a truncated cylinder portion at least along a plane parallel to said axis of rotation.

4. Bracelet according to any of the preceding claims,
characterized in that said recess is formed by a groove (22) in the cylindrical
10 surface of the pin, centred on the longitudinal axis (20) of said pin.

5. Bracelet according to any of the preceding claims,
characterized in that said first position of said locking element (12) is
ensured by second means (14, 16) for locking the angular position thereof,
15 said second locking means being able to be released by a user to allow
said locking element to rotate from the first position to the second position
thereof in which said pin is released.

6. Bracelet according to claim 5, characterized in that said locking
20 element (12) is arranged in a cavity (18) of the link in which said element is
arranged, and in that said second locking means are formed by the
arrangement of a structure (14) in said cavity defining at least two steps (47,
50) at the periphery of said locking element, which are located at two
different levels along the axis of rotation (30) of said locking element, and
25 by a spring (16) used to press one shoulder (37) of said locking element
against the bottom step in said first position such that said user has to exert
pressure on said locking element in order to bring the latter into the second
position in which said shoulder is then against the top step of said structure.