

The subject of the invention is an articulated bracelet with links, in particular an articulated bracelet for watches, composed of a first set of articulated elements and of a second set of elements enclosing the
5 elements of the said first set.

A further subject of the invention is an extension link adapted for use with this bracelet.

Articulated bracelets of the type indicated are already known, namely those which comprise a first set
10 of elements articulated to each other, forming the internal elements, also called "connecting links" or "troughs", and a second set of external elements, called "locking elements" or called, according to their configuration, "frames" or "tunnels", the elements of the
15 two sets having substantially the same size in the longitudinal direction of the bracelet, the external elements surrounding or enclosing the internal elements.

British patent No. 1,495,853 describes several embodiments of an articulated bracelet with links; these
20 links consist of two main elements, namely the first, so-called ornamental, elements, and second elements linking the first elements to each other. The aim of this bracelet is to provide a series of elements which are the said second elements which are free from pin holes which
25 are visible or accessible from the outside. Inside a series of ornamental elements there is provided a sort of "chain" formed of connecting elements, consisting of the said second elements.

The bracelet according to CH-A 630,789 comprises
30 a first series of inner elements having a generally parallelepipedal shape which each have a groove having a circular section opening on one of the transverse sides of each element and, on the opposite transverse side, a projection which also has a circular section. The articulation is formed by the introduction of the projec-
35 tion of one element into the groove of the adjacent element. The bracelet comprises a second series of elements, namely the outer elements, in the form of

stirrups which are juxtaposed and cover the inner elements which they hold together, preventing them from moving transversely. The elements of the two series are bevelled on their transverse sides in order to permit
5 limited movement about the axis of the projection.

The articulated bracelet described in CH-A 633,170 and, in an identical manner, in EP-A1/0,030,705, is formed from a chain of inner elements each having two transverse projections of L-shaped cross-section, oriented in the reverse direction, and these elements are articulated to one other by reciprocal engagement of their projections. The bracelet comprises a second set of elements in the form of frames which are juxtaposed and engage on one of the inner elements that they hold
10 together, preventing their projections disengaging from one another.
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It already emerges from the description of the two known bracelets that they have obvious drawbacks. Firstly, although their construction is quite solid and robust, their manufacture is difficult, complicated and expensive. In fact, it is very complicated to produce the inner elements of the bracelet according to CH-A 630,789 by machining sections and bevelling them; moreover, the outer element must either be crimped to its
20 corresponding inner element - which additionally excludes dismantling of the bracelet with a view to shortening or extending it - or be given dovetail milling inside (which, during use, causes undesirable jamming of the inner elements). The outer elements (frames) according to CH-A 633,170 and GB-1,495,853 are also expensive because their milling is difficult; this applies to the
25 milling of all the quadrangular recesses or openings.

Moreover, bracelets of this type in which the inner elements are not fixed to the outer elements present an additional problem. Firstly, when the first
35 elements are being fixed to the second, the bracelet can no longer be shortened or extended by the seller in order to adapt it to different wrists; this was stated in

(11)

connection with the bracelet according to CH-A 630,789. On the other hand, if the outer element is not fixed to the inner element, as in the British patent 1,495,853, the clearances between the outer elements can add to the length of the bracelet when the latter is placed or held straight and the articulations between two inner elements which are then at the place where the clearance accumulates disengage from each other. The said clearance between two outer elements is, on the one hand, inevitable due to manufacturing data and, on the other hand, necessary so that two adjacent elements can form a small angle - generally of the order of 5 to 10° - allowing the bracelet, by means of folding, to match the shape of the wrist, see Figs. 2 and 3 of the cited patent.

The first aim of the invention is to find a solution to the problems stated and to eliminate them. Another aim is to create a new construction for such a bracelet with "links and tunnels", namely comprising series of inner elements articulated to each other and outer elements ensuring the cohesion of the whole and giving it its final desired shape and limiting the angle of deflection between two adjacent inner elements. A further aim of the invention is to develop this new construction with a view to a special embodiment of bracelets which are particularly decorative and which surprise the public by the appearance of a mechanical paradox in that it appears impossible for them to shape themselves to a wrist because the form of the decoration does not appear capable of lending itself to an articulation. In particular, these are "wave" bracelets, for which the applicant has protection under a registered utility model.

A special aim of the invention is the construction of extension links making it easy to adapt the length of the bracelet without problems, without the risk of the bracelet falling into separate pieces.

The aims stated above are achieved by virtue of

the features defined in the independent claims 1 and 6 whilst the particular embodiments are the subject of the dependent claims.

5 In the present document, any element described or drawn and any combination of elements which is not technically unreasonable may present an invention or include inventive features which, without it being expressly stated, can therefore form the basis of additional claims.

10 It has been found that, if the outer elements are composed of two parts each, namely of a lower part in the form of an upturned bridge and of a generally flat ornamental upper part, the problem of complicated milling is eliminated and, surprisingly, an additional
15 advantage is achieved. In fact, it is then possible to produce the upper part in a solid or heavily plated, even laminated, noble metal and the lower part may be produced, for example, in stainless steel which guarantees the satisfactory solidity of the whole.

20 The two parts of this outer element are joined, in order to form the "tunnel", by means of a special welding technique described and claimed in the patent No. (Swiss patent application No. 5234/82, filed on 03.09.82) developed by one of the inventors of the
25 bracelet according to the invention. This technique on its own permits soldering between identical or different metals, and a solid, durable and robust link is produced which is relatively unaffected by corrosion.

A second important feature is the fact that the
30 inner elements have a special shape which permits the insertion of pins, and that pins are used to join and articulate these elements. On first sight, it appears that the articulations according to the two Swiss patents mentioned above, which articulations dispense with
35 pins, are more advantageous. However, although the absence of pins is mentioned in the patents as being an advantage, it has unexpectedly been found that that is not the case. In fact, in order to adapt the bracelet

to a wrist, it is normally necessary to shorten or extend it. The links to be taken out or to be added are those in the centre. Only the bracelet according to the invention permits this operation whilst eliminating the risk that the entire bracelet should fall apart like a broken necklace of pearls, because the pins are replaced, in a number of central links, by screw pins. During manufacture of the links, there is no need to provide various links because, according to a feature of the present bracelet, these screw links have the same diameter as the pins.

Thirdly, the problem of the outer elements being able to slide freely on the inner elements and being able to release the site of an axis of articulation through the accumulation of clearance is solved according to the invention by a provision which prevents this free sliding but does not prevent the dismantling of individual elements even by an unskilled person. This provision consists in providing a partial frictional resistance between an inner element and the outer element. In this manner, the elements are held in place and the limited longitudinal movement of each outer element with respect to its inner element is guaranteed, but this resistance must be overcome when it is desired to assemble and dismantle the bracelet. However, the extension links have a different construction.

Other advantages and features of the present invention will emerge from the description which follows, made with respect to the appended drawing and giving, by way of explanation which is in no way limiting, a practical embodiment of the bracelet.

In the drawing,

- Figure 1 is a plan view of one half of the bracelet,
- 35 - Figure 2 is a side view of this same bracelet,
- Figure 3 is a view in perspective of a link,
- Figure 4 is an exploded view in perspective of a "tunnel",

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- Figure 5 is a view in perspective of an outline of a link, and

- Figure 6 is a view similar to that of Figure 4 but which shows an extension link.

5 The bracelet represented in Figure 1 is one half only, the other half being symmetrical to the first and linked to the latter by means of a special median part which is not shown. A part for connection to a watch case is also provided at the end of each half (also not shown).

10 When the terms "length" and "width" are used to describe the elements of the bracelet, the terms refer to the links and not to the bracelet. Therefore, for example, the "length" of an element extends in the trans-

15 verse direction of the bracelet.

 In Figure 1 may be seen a number of outer elements 10, bearing the decoration of a wave 30, having a length which decreases from left to right, and outer elements 12 of uniform length. If the waves were transparent, links 14 would be seen (see also Figure 3); all the links have the same shape and the same dimensions and are strictly of the same width measured in the direction of the length of the bracelet as the outer elements or "tunnels" that may be seen clearly, in side

20 view in Figure 2.

 It may be seen in Figure 2 that elements 40 extending from elements 12 towards the median part of the bracelet allow screw heads to appear which belong to threaded pins 13. These elements are then easily removable and, by means of their removal or by means of the addition of others, enable the bracelet to be adapted to a given wrist. These elements 40 are described below.

25 The detail of a link 14 is represented, in enlarged perspective view, in Figure 3. The frame of the link 14 comprises four milled sections 16 which are distributed according to a staggered arrangement on the link so as to be able to receive the remaining tabs 18

of the next link, exactly in the manner of a hinge. The connection between two links is provided by the pin 20. This pin may have a diameter such that there will be friction in the bores 22 of the link, or a diameter such that there is slight clearance because the tunnel to be described prevents, in any case, the pins emerging laterally. This latter embodiment is preferred.

Instead of four milled sections 16, there may be six, eight, etc., according to the length of the link (this is the dimension in the transverse direction of the bracelet).

The lower face of the link 14 comprises a part 24 which narrows, the aim of which will be described below.

Figure 4 represents a detached view in perspective of the two parts forming the tunnel 12; the outer element 10 (Figure 1) is constructed in the same manner. Firstly, the bridge 26 is prepared by machining and internal milling. The lower parts are bevelled at an angle A between 5° and 10° , generally approximately 8° . This angle A will determine the degree of radial flexibility of the bracelet. An angle A exceeding 10° will consequently have an unattractive clearance between two elements on folding of the bracelet, and an angle less than 5° is not sufficient for the bracelet to be able to completely match the shape of certain wrists.

The upper faces 28 of the bridge, which are preferably ground, are welded according to the method described in the Swiss patent application No. 5234/82, to the covering piece called "wave" 30, the lower face of which is plane. The wave may consist of noble metal, plated metal or stainless steel, for example. (It is obvious that, according to the nature of the metals, when the noble metal is used, there may be restrictions imposed by certain national laws.) The inside of the tunnel thereby formed is defined below by an arched convex face 32 (that is to say bulged) which reflects the shape of a milling head during machining of the bridge 26, or

alternatively this convex shape may be obtained by a suitable deformation of the lower part of the bridge, which is preferred. The dimensions and the aperture of the tunnel and of the link 14 (see Figure 3) are chosen
5 such that the link 14, when introduced into the tunnel 12 or 10, encounters a certain resistance as a result of contact with respective horizontal surfaces. However, once introduced into the tunnel, the face 32 of the tunnel is opposite and inside the recess 24 of the link,
10 and the latter may be displaced freely with respect to the tunnel, although within the limits imposed by the width of the recess 24.

Figure 5 represents in perspective view an outline of the link 14. It is obtained by chasing a meniscus 34 in a rounded flat sleeve 36, or by welding or
15 gluing it inside the sleeve 36. The milling operation according to the arrows 38 directly supplies the link 14. Figures 4 and 5 have been introduced to demonstrate the great simplicity of the manufacture of the elements
20 forming the bracelet according to the invention compared with those of previous similar bracelets.

During assembly of the bracelet, the pins 20 (Figure 3) are inserted between two adjacent links 14. It is possible to crimp or weld the pins but this is
25 generally not necessary because the pins 20 are prevented from leaving their housings by the presence of the tunnel 12 (or 10). As seen in Figures 2 and 4, the links 14 may make a pivoting movement, driving the tunnel, about the axis of their pins, by virtue of the bevel A of the tunnel.
30 With the angles A of 8° , the maximum pivoting angle is therefore 16° .

Figure 6 represents a view in perspective of an extension link 40. (There is also a connection link - between the last element according to Figure 4 and this
35 extension link 40 - the construction of which will be obvious for the person skilled in the art.)

This link 40 has a general shape which is similar to the element 12 (Figure 4) except with respect to

the articulation. As in Figure 4, a part in the form of a wave 30 is welded to the plane upper faces 28 of the bridge 26A. The surface 32 is plane and therefore it is not arched. The upper part of the bridge 26A comprises two projections 42, 42A, which are symmetrical with respect to the median vertical plane. The projection 42 is perforated by a bore 44 whilst the projection 42A comprises a blind threaded bore 44A.

Grooves 46 are provided on the rear faces of the bridge 26A, which are intended to receive the projections 42, 42A of the neighbouring link 40.

For assembly, a connecting link 14 (see Figure 3) is inserted into the aperture of the connection link 40 which has just been described, and the pin 13 is introduced firstly into the bore 44, then into the bore 22 of a connecting link, then into a bore 22 of the connecting link of the adjacent element, and finally the pin 13 is screwed into the blind bore 44A. This embodiment therefore comprises the simultaneous joining of the outer element and of the inner element which greatly facilitates adaptation of the bracelet to a given wrist even by an unskilled person.

The person skilled in the art will understand that it is possible to make modifications and variations to the bracelet according to the invention without departing from the scope of the invention. For example, the choice of materials is practically limitless. The ornamental part 30 may have other shapes. The angle A may be progressive, namely that the sides of the bridge 26 forming this angle may be rounded. All the parts may be surface-treated, chromium-plated, plated etc. The arched surface 32 of the part 26 (Figure 4) may be concave instead of convex which gives the same effect from the point of view of limited mobility with respect to the tunnel when the connecting link 14 has the corresponding bulged lower face.

CLAIMS

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1. Articulated bracelet with links, composed of a set of inner elements articulated to one another and a set of outer elements each of which encloses an inner element, the width of the outer element corresponding, with a slight clearance, to the distance between the axes of articulation of the inner element, characterized in that the outer element (10, 12) consists of two parts, namely a part in the shape of a bridge (26) and an ornamental flat part (30), in that the part in the form of a bridge (26) is welded to the latter in order to form the outer element in the form of a tunnel, and in that the inner element (14) is joined by pins (20) to the adjacent inner elements, the part in the form of a bridge (26) of the outer element having a horizontal interior surface which is slightly arched and intended to be accommodated in a corresponding recess (24) of the inner element, or vice versa.

2. Bracelet according to Claim 1, characterized in that the ornamental parts (30) have the form of a wave.

3. Bracelet according to Claim 1, characterized in that the inner elements (14) have the shape of a hinge having two housings (18) at least on each side for the pin.

4. Bracelet according to Claim 1, characterized in that the outer element (10, 12) is bevelled on the sides extending transversely to the longitudinal axis of the bracelet, forming an angle (A) of between 5 and 10° with the vertical part of the said side.

5. Bracelet according to Claim 4, characterized in that the said angle is of approximately 8°.

6. Extension link, which can be used in the bracelet according to Claim 1, characterized in that it comprises an inner element having the form of a hinge having two housings (18) at least on each side for a connecting pin (13), and an outer element consisting of an ornamental upper flat part (30) welded to a lower



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part in the form of a bridge (26A), the latter having on its vertical front face two lateral projections (42, 42A), one of which is pierced by a bore (44) and the other having a blind threaded bore (44A) which is co-axial to the first bore (44), a threaded pin (13) being intended to be inserted into the bores and screwed into the threaded bore (44A), the pin (13) also passing through the bores (22) of two adjacent inner elements (14) forming a hinge, and in that the part in the form of a bridge (26A) comprises on its vertical rear face two grooves (46) adapted to the form and size of the projections (42, 42A).





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5 a set of inner elements articulated to one another
and a set of outer elements each of which
encloses an inner element, the width of the outer
element corresponding, with a slight clearance,
to the distance between the axes of articulation of
the inner element, characterized in that the outer
element (10, 12) consists of two parts, namely a
part in the shape of a bridge (26) and an ornament-
10 al flat part (30), in that the part in the form of a
bridge (26) is welded to the latter in order to form
the outer element in the form of a tunnel, and in
that the inner element (14) is joined by pins (20) to
the adjacent inner elements, the part in the form
of a bridge (26) of the outer element having a
15 horizontal interior surface which is slightly arched
and intended to be accommodated in a corre-
sponding recess (24) of the inner element, or vice
versa.

20 2. Bracelet according to Claim 1, characterized
in that the ornamental parts (30) have the form of
a wave.

3. Bracelet according to Claim 1, characterized
in that the inner elements (14) have the shape of a
hinge having two housings (18) at least on each
25 side for the pin.

4. Bracelet according to Claim 1, characterized
in that the outer element (10, 12) is bevelled on
the sides extending transversely to the longitudi-
nal axis of the bracelet, forming an angle (A) of
30 between 5 and 10° with the vertical part of the
said side.

5. Bracelet according to Claim 4, characterized
in that the said angle is of approximately 8°.

35 6. Extension link, which can be used in the
bracelet according to Claim 1, characterized in
that it comprises an inner element having the
form of a hinge having two housings (18) at least
on each side for a connecting pin (13), and an
outer element consisting of an ornamental upper
40 flat part (30) welded to a lower part in the form of
a bridge (26A), the latter having on its vertical
front face two lateral projections (42, 42A), one of
which is pierced by a bore (44) and the other
having a blind threaded bore (44A) which is co-
45 axial to the first bore (44), a threaded pin (13)
being intended to be inserted into the bores and
screwed into the threaded bore (44A), the pin (13)
also passing through the bores (22) of two adjac-
ent inner elements (14) forming a hinge, and in
50 that the part in the form of a bridge (26A)
comprises on its vertical rear face two grooves
(46) adapted to the form and size of the projec-
tions (42, 42A).

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Patentansprüche

1. Gliederarmband mit Gelenkverbindung be-
stehend aus einem Satz gelenkig miteinander
60 verbundener innerer Elemente und einem Satz
äusserer Elemente, von denen jedes ein inneres
Element einrahmt, wobei die Breite des äusseren
Elementes bis auf einen kleinen Zwischenraum
der Entfernung zwischen den Gelenkachsen des
inneren Elements entspricht, dadurch gekenn-
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Claims

1. Articulated bracelet with links, composed of



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zeichnet, dass das äussere Element (10, 12) aus zwei Teilen besteht, nämlich einem brückenförmigen Stück (26) und einem flachen Verzierungsstück (30), dass das brückenförmige Stück (26) zur Bildung des äusseren Elementes in der Form eines Tunnels mit letzterem Verzierungsstück verlötet ist, und dass das innere Element (14) durch Stifte (20) mit den benachbarten inneren Elementen vereinigt ist, wobei das brückenförmige Stück (26) des äusseren Elementes eine leicht gebogene, horizontale innere Oberfläche aufweist, die zur Einlagerung in eine entsprechende Höhlung (24) des inneren Elementes, oder umgekehrt, bestimmt ist.

2. Armband nach Anspruch 1, dadurch gekennzeichnet, dass die Verzierungsstücke (30) wellenförmig sind.

3. Armband nach Anspruch 1, dadurch gekennzeichnet, dass die inneren Elemente (14) die Form eines Scharnieres haben und für den Stift auf jeder Seite mindestens zwei Lager (18) aufweisen.

4. Armband nach Anspruch 1, dadurch gekennzeichnet, dass das äussere Element (10, 12) an den sich quer zur Längsachse des Armbandes erstreckenden Flanken abgeschrägt ist und mit dem vertikalen Teil besagter Flanke einen Winkel (A) zwischen 5 und 10° bildet.

5. Armband nach Anspruch 4 dadurch gekennzeichnet, dass dieser Winkel etwa 8° beträgt.

6. Verlängerungsglied verwendbar im Armband nach Anspruch 1, dadurch gekennzeichnet, dass es aus einem inneren Element mit der Form eines Scharnieres gebildet ist und für den Verbindungspflock (13) auf jeder Seite mindestens zwei Lager (18) aufweist, sowie aus einem äusseren Element, das aus einem mit einem Unterteil in der Form einer Brücke (26A) verlöteten, oberen flachen Verzierungsstück (30) besteht, wobei ersterer Unterteil an seiner vertikalen Stirnseite zwei solche Vorsprünge (42, 42A) aufweist, von denen einer von einer Bohrung (44) durchzogen ist und der andere eine zur ersten Bohrung (44) coaxial mit einem Gewinde versehene Blindbohrung (44A) aufweist, ein mit einem Gewinde versehene Pflock (13), der zur Einfügung in die Bohrung und zur Verschraubung in die mit einem Gewinde versehene Bohrung (44A) bestimmt ist, wobei der Pflock (13) auch die Bohrungen (22) der beiden benachbarten, das Scharnier bildenden inneren Elemente (14) durchquert und dass das brückenförmige Stück (26A) an seiner vertikalen Hinterfläche zwei an die Form und Grösse der Vorsprünge (42, 42A) angepasste Hohlkehlen (46) aufweist.