

## Watch bracelet

### Field of the invention

The present invention concerns a watch bracelet or strap. More  
5 specifically, the invention concerns a watch bracelet in which are housed  
one or more electronic components arranged to perform at least one  
electronic function.

### Background of the invention

10 There is a strong trend in the current market relating to connected  
watches having one or more electronic functions and capable of  
communicating, for example, with mobile telephones of the smart phone  
type. In the case of connected watches, the emphasis is, however, placed  
more on the range of electronic functions that such watches offer their  
15 users than on the aesthetic, timekeeping and sealing qualities of such  
watches. The connected watches currently available on the market are thus  
unattractive and relatively fragile objects whose daily use requires a great  
deal of care on the part of the user.

### Summary of the invention

20 It is an object of the present invention to overcome the  
aforementioned problems in addition to others, by providing a bracelet or  
strap that will enable one or more electronic functions to be associated with  
a watch case.

25 To this end, the present invention concerns a watch bracelet  
comprising a first bracelet strand in which is housed a first printed circuit

sheet and a second bracelet strand in which is housed a second printed circuit sheet, the first bracelet strand being connected to the second bracelet strand via a median part arranged to act as a seat for a watch case and which includes means for ensuring electrical continuity between the first  
5 printed circuit sheet and the second printed circuit sheet, at least one of the first or second printed circuit sheets carrying at least one electronic component and the other printed circuit sheet carrying at least one electrical energy source supplying the electronic component with electrical current.

According to an additional feature of the invention, the first printed  
10 circuit sheet, the second printed circuit sheet and the median part, which includes the means for ensuring electrical continuity between the first printed circuit sheet and the second printed circuit sheet, are made in one piece.

According to another feature of the invention, the first printed circuit  
15 sheet and the second printed circuit sheet are overmoulded with a first plastic material.

According to yet another feature of the invention, the median part is overmoulded with the first plastic material.

According to yet another feature of the invention, the median part is  
20 covered by an insert.

According to an additional feature of the invention, the bracelet, which is formed of the first and second printed circuit sheets overmoulded with the first plastic material and of the median part which is covered by the stiff insert, is overmoulded with a second plastic or elastomeric material or  
25 inserted in a sleeve.

According to an additional feature of the invention, the sleeve is made in one piece or is formed of an upper band and a lower band joined to each other along their peripheral edges.

According to an additional feature of the invention, the watch case  
30 includes two pairs of diametrically opposite horns and the stiff insert

includes two guide elements, which are arranged to be placed between the respective pairs of horns and each pierced with a hole for the passage of a pin to enable the bracelet to be attached to the watch case.

As a result of these features, the present invention provides a  
5 bracelet in which are housed the electronic components necessary to execute at least one electronic function and which is attached to a watch case containing a watch movement. This watch movement may be an electronic movement, a mechanical movement or a combination of two such movements. In any event, the watch case that contains the watch  
10 movement is not affected by the addition of the bracelet according to the invention which enables one or more electronic functions to be executed. The aesthetic, sealing and timekeeping properties of the watch case thus remain intact while offering the user additional electronic functions, owing to the addition of the bracelet of the invention.

15 If the bracelet is worn out or if the electrical energy source that it contains is exhausted, it can easily be exchanged for a new bracelet. Of course, according to a variant, the electrical energy source may also be rechargeable. It is also possible to envisage producing bracelets arranged to perform different electronic functions, allowing the user the possibility of  
20 choosing the bracelet that offers the electronic function that meets his requirements, or of purchasing several different bracelets at the same time.

According to an additional advantage of the invention, the fact that printed circuit sheets are disposed in the two bracelet strands and that these printed circuit sheets are also electrically connected to each other  
25 means it is possible to increase the number of electronic components housed inside the bracelet and thus to increase the number of electronic functions available to the user, or to distribute the electronic components in an optimum manner between the two bracelet strands.

Brief description of the drawings

Other features and advantages of the present invention will appear more clearly from the following detailed description of one embodiment of the bracelet according to the invention, this example being given solely by way of non-limiting illustration with reference to the annexed drawing, in  
5 which:

- Figure 1 is a perspective view of the bracelet according to the invention wherein a first printed circuit sheet is connected to a second printed circuit sheet via a median part arranged to act as a seat for a watch case, this median part including means for ensuring electrical continuity  
10 between the first printed circuit sheet and the second printed circuit sheet and being covered by a stiff insert;

- Figure 2 is a similar view to that of Figure 1 wherein the first printed circuit sheet and the second printed circuit sheet are overmoulded with a first plastic or elastomeric material;

15 - Figure 3 is a vertical cross-section along the longitudinal axis of the bracelet of Figure 2;

- Figure 4 is a view of a sleeve into which is inserted the bracelet of Figure 2;

- Figures 5A and 5B illustrate a variant embodiment of the sleeve of  
20 Figure 4 that includes an upper band and a lower band between which is arranged bracelet according to the invention and which are assembled to each other along their peripheral edges, for example, by a seam or by heat welding, and

- Figure 6 is a perspective view of the median part that has only one  
25 arch to carry the conductive paths for electrically connecting first and second printed circuit portions to each other.

#### Detailed description of one embodiment of the invention

The present invention proceeds from the general inventive idea which consists in associating a watch case containing a watch movement, preferably but not limited to a mechanical movement, with a bracelet, in the thickness of which are housed the electronic component(s) necessary for the execution of at least one electronic function. As a result of these features, it is possible for the aesthetic appearance, mechanical properties and timekeeping qualities of the watch case to remain unchanged while adding thereto one or more additional electronic functions which will convert such a watch into a connected watch. The present invention is particularly advantageous in the case of a mechanical movement, since it can maintain the emotional aspect of a mechanical movement while increasing the range of services that such a watch is capable of providing its user.

Figure 1 is a perspective view of the bracelet according to the invention. Designated as a whole by the general reference numeral 1, this bracelet includes a printed circuit sheet 2 formed of a first printed circuit portion 4, connected to a second printed circuit portion 6, via a median part 8 which includes means for ensuring electrical continuity between first printed circuit portion 4 and second printed circuit portion 6.

Median part 8 could be separate from first and second printed circuit portions 4 and 6. In such case, additional electrical connection means such as wires would have to be provided between first printed circuit portion 4 and median part 8, and between median part 8 and second printed circuit portion 6, which is not necessarily very convenient. This is why, according to the preferred embodiment of the invention, first printed circuit portion 4, median part 8 and second printed circuit portion 6 are made in one piece. Median part 8 will thus also be formed of a printed circuit sheet portion on which electrically conductive path(s) will be structured to ensure electrical continuity between the first and second printed circuit portions 4 and 6.

As is shown, in particular, in Figure 1, median part 8, which is of approximately annular shape, is formed of two arches 8a and 8b that define an external diameter substantially corresponding to the external diameter of

a case middle 10 of a watch case 12, which is intended to be arranged above median part 8 with the insertion of an insert 14 between watch case 12 and median part 8. This insert 14 includes a stiff ring 16 whose geometry is similar to that of median part 8 and which is attached to median part 8 by  
5 any appropriate means, such as adhesive bonding. This stiff ring 16 gives median part 8 stiffness and mechanical strength and acts as a seat for watch case 12. It is understood that, owing to its ring-shape, median part 8 leaves the back of watch case 12 visible.

We will now examine bracelet 1 according to the invention, referring  
10 more particularly to Figure 3, which is a cross-sectional view on a plane extending along the longitudinal axis of bracelet 1. As is shown by this Figure, watch case 12 contains a watch movement 18 which drives a set of hands: hour hand 20a and minute hand 20b. These hour and minute hands 20a and 20b move above a dial 22 and are covered by a crystal 24.

15 It is important to understand that the watch movement 18 housed inside watch case 12 may be of any type. It may be a purely mechanical movement, or a purely electronic movement, or an electromechanical movement. The mechanical or electronic nature of watch movement 18 is actually of no importance for the purposes of the present invention, given  
20 that watch case 12 is totally independent of bracelet 1 according to the invention and the addition of such a bracelet 1 does not require any modification of the various components housed inside watch case 12.

It is therefore understood from the foregoing that the present invention is particularly advantageous in the case where watch movement  
25 18 is a mechanical movement. Indeed, the addition of a bracelet 1 of the invention to a watch case 12 containing such a purely mechanical watch movement 18 enables unprecedented electronic functions to be offered to the user, without impairing the aesthetic appearance, mechanical qualities and sealing of watch case 12.

30 As mentioned above, first printed circuit portion 4 is electrically connected to second printed circuit portion 6 via median part 8, on which

are structured the electrically conductive path(s) ensuring electrical continuity between these two printed circuit portions 4 and 6. Such an arrangement has numerous advantages, among which the following can be mentioned: the possibility of having more electronic components in the bracelet and thus of increasing the number of electronic functions available to the user, or of distributing the electronic components in an optimum manner between the two bracelet strands. In particular, it is possible to envisage mounting the electrical energy source(s) on one of the printed circuit sheets, and the electronic components on the other printed circuit sheet.

As revealed by an examination of Figure 3, electronic components such as a microcontroller 26 for an accelerometer 28, an atmospheric pressure sensor 30 and a magnetic sensor 32 are mounted on the surface of first printed circuit portion 4, whereas an electrical current source 34 and an integrated circuit 36 able to communicate with another apparatus using, for example, a Bluetooth, Wi-Fi or NFC interface, are mounted on second printed circuit portion 6.

An examination of Figure 1 reveals, in particular, that watch case 12 includes two pairs of diametrically opposite horns 38 and insert 14 includes two guide elements 40 arranged to be placed between the respective pairs of horns 38 when watch case 12 is placed on insert 14. These two guide elements 40 are each pierced with a hole 42 for the passage of a pin 44 for attaching bracelet 1 to watch case 12.

When all the electronic components are mounted on the respective printed circuit portions 4, 6 and insert 14 has been properly placed on median part 8, the assembly is overmoulded with a first layer 46 of plastic or elastomeric material in order to form first and second arms 48 and 50. The purpose of this first overmoulding layer 46 is to protect the electronic components mounted on printed circuit portions 6, 8 from external attacks and to give the resulting arms 48 and 50 their shape and mechanical strength. Preferably, pins 44 are engaged through horns 38 and guide

elements 40 during the overmoulding operation in order to prevent holes 42 being clogged with the overmoulding material.

The bracelet 1 that results from the overmoulding operation and which includes the two arms 48, 50, connected to each other by median  
5 part 8 covered by insert 14, and in the thickness of which are housed the electronic components necessary for the execution of the desired electronic function(s) is then finally slid inside a sleeve 52 which, in the example shown in Figure 4, includes a first strand 54 and a second strand 56 connected to each other by a connecting part 58, which is adapted in size  
10 and shape to receive median part 8 of bracelet 1, covered by insert 14. This sleeve 52 is, for example, obtained by moulding or injection moulding an elastomeric material while ensuring that first and second strands 54 and 56 are hollow and each provided with an opening 60 so that the two arms 48 and 50 can slide therein. According to a variant embodiment illustrated in  
15 Figures 5A and 5B, sleeve 52 includes an upper band 62 and a lower band 64 between which is arranged bracelet 1 according to the invention and which are assembled to each other along their peripheral edges 66, for example, by a seam or by heat welding.

It goes without saying that this invention is not limited to the  
20 embodiment that has just been described and that various simple modifications and variants can be envisaged by those skilled in the art without departing from the scope of the invention as defined by the annexed claims. In particular, as an alternative to sleeve 52, it could be envisaged to subject bracelet 1 according to the invention to a second overmoulding  
25 operation intended to overmould the two arms 48, 50 and median part 8 which connects them, with a second layer of a plastic or elastomeric material, which may be the same or different from the material used for the first overmoulding layer 46. Also, as illustrated in Figure 6, median part 8 may have only one arch 68 to carry the conductive paths for electrically  
30 connecting first and second printed circuit portions 4 and 6 to each other.

List of parts

- Bracelet 1
- Printed circuit sheet 2
- 5 First printed circuit portion 4
- Second printed circuit portion 6
- Median part 8
- Arches 8a, 8b
- Case middle 10
- 10 Watch case 12
- Insert 14
- Stiff ring 16
- Watch movement 18
- Set of hands: hour hand 20a and minute hand 20b
- 15 Dial 22
- Crystal 24
- Microcontroller 26
- Accelerometer 28
- Atmospheric pressure sensor 30
- 20 Magnetic sensor 32
- Power supply source 34
- Integrated circuit 36
- Pairs of horns 38
- Guide elements 40

Hole 42

Pin 44

First overmoulding layer 46

First arm 48

5 Second arm 50

Sleeve 52

First strand 54

Second strand 56

Connecting part 58

10 Opening 60

Upper band 62

Lower band 64

Peripheral edges 66

Arch 68

## **CLAIMS**

1. A watch comprising:

a bracelet or strap; and

a watch case;

wherein the bracelet or strap includes a first arm in which is housed a first printed circuit portion, and a second arm in which is housed a second printed circuit portion,

wherein the first arm is connected to the second arm via a median part configured to act as a seat for the watch case and which includes an element for ensuring electrical continuity between the first printed circuit portion and the second printed circuit portion,

wherein at least one of the first or second printed circuit portions carries at least one microcontroller and the other printed circuit portion carries at least one electrical energy source supplying the microcontroller with electrical current,

wherein the watch case is electronically totally independent from the bracelet or strap.

2. The watch according to claim 1, wherein the first printed circuit portion, the second printed circuit portion, and the median part, which includes the element for ensuring electrical continuity between the first printed circuit portion and the second printed circuit portion, are made in one piece.

3. The watch according to claim 2, wherein the median part includes at least one arch.

4. The watch according to claim 3, wherein the median part is covered by an insert.

5. The watch according to claim 4, wherein the watch case includes two pairs of diametrically opposite horns, and wherein the insert includes two guide elements, configured to be placed between the respective pairs of horns and each pierced with a hole for the passage of a pin to enable the bracelet or strap to be attached to the watch case.

6. The watch according to claim 5, wherein the first arm and the second arm are formed by the first printed circuit portion and the second printed circuit portion overmolded with a first overmolding layer.

7. The watch according to claim 6, wherein the insert is also overmolded with the first overmolding layer.

8. The watch according to claim 2, wherein the median part is covered by an insert.

9. The watch according to claim 8, wherein the watch case includes two pairs of diametrically opposite horns, and wherein the insert includes two guide elements, configured to be placed between the respective pairs of horns and each pierced with a hole for passage of a pin to enable the bracelet or strap to be attached to the watch case.

10. The watch according to claim 9, wherein the first arm and the second arm are formed by the first printed circuit portion and the second printed circuit portion overmolded with a first overmolding layer.

11. The watch according to claim 10, wherein the insert is also overmolded with the first overmolding layer.

12. The watch according to claim 1, wherein the median part is covered by an insert.

13. The watch according to claim 12, wherein the watch case includes two pairs of diametrically opposite horns, and wherein the insert includes two guide elements, configured to be placed between respective pairs of horns and each pierced with a hole for passage of a pin to enable the bracelet or strap to be attached to the watch case.

14. The watch according to claim 13, wherein the first arm and the second arm are formed by the first printed circuit portion and the second printed circuit portion overmolded with a first overmolding layer.

15. The watch according to claim 14, further comprising a sleeve including a first strand and a second strand connected to each other by a connecting part, wherein the first and second strands are hollow and each include an opening so that the first and second arms can slide therein.

16. The watch according to claim 14, wherein the insert is also overmolded with the first overmolding layer.

17. The watch according to claim 16, further comprising a sleeve including a first strand and a second strand connected to each other by a connecting part, wherein the first and second strands are hollow and each including an opening so that the first and second arms can slide therein.

18. The watch according to claim 17, wherein the sleeve includes an upper band and a lower band joined to each other along peripheral edges thereof.

19. The watch according to claim 16, wherein the bracelet or strap is overmolded with a second layer of plastic or elastomeric material.

20. The watch according to claim 15, wherein the sleeve includes an upper band and a lower band joined to each other along peripheral edges thereof.

21. The watch according to claim 14, wherein the bracelet or strap is overmolded with a second layer of plastic or elastomeric material.