

PATENT SPECIFICATION

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(54) APPARATUS FOR USE IN A TIMEPIECE

(71) We, KABUSHIKI KAISHI SUWA SEIKOSHA, a Japanese Company of 3—4, 4-chome, Ginza, Chuo-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns apparatus for use in a timepiece such, for example, as a wristwatch.

According to one aspect of the present invention there is provided a method of constructing an apparatus for use in a timepiece comprising assembling a dial and a holding ring such that a peripheral portion of the dial is disposed radially inwardly of a first portion of at least one flange part of the holding ring and thereafter bending a second portion of the or each flange part over the dial so as to form a hook part which overlies and engages the dial, thereby securely positioning the dial.

According to a further aspect of the present invention there is provided an apparatus when made by the method recited in the preceding paragraph for use in a timepiece.

The said peripheral portion may either engage or may be radially spaced from the said first portion of the or each said flange part.

Means are preferably provided for preventing relative circumferential movement between the dial and the holding ring. Thus the said means may comprise at least one radially outwardly extending portion of the dial, the or each radially outwardly extending portion being circumferentially located between two said first portions or being located in a recess in a said first portion.

The apparatus preferably includes a timepiece movement which is secured to the holding ring so as to be axially and radially located thereby. Thus the holding ring may be provided with at least one second hook part, the timepiece movement

being disposed radially inwardly of a first portion of the or each said second hook part, the or each said second hook part having a second portion which underlies and engages the timepiece movement, the holding ring having at least one further portion which overlies the timepiece movement.

The second portion of the or each said second hook part may have an axially tapering surface to assist in the assembling together of the holding ring and the timepiece movement.

Means are preferably provided for preventing relative circumferential movement of the holding ring and the timepiece movement. Thus the last-mentioned means may comprise at least one radially inwardly extending portion of the holding ring, the or each radially inwardly extending portion being located in a recess in the timepiece movement.

The dial may, for example, have a said radially outwardly extending portion which is disposed diametrically opposite to a said radially inwardly extending portion of the holding ring.

The invention also comprises a watch having a case within which is mounted apparatus as set forth above. Thus the case may comprise a case band which engages the outer periphery of the holding ring, and the case band may have an internally extending flange which overlies and engages the or each first-mentioned hook part.

The invention is illustrated, merely by way of example, in the accompanying drawings, in which:—

Figure 1 is a broken-away sectional view of a watch known to the Applicants,

Figures 2 and 3 are broken-away sectional views of one embodiment of a watch provided with apparatus according to the present invention, the section of Figure 2 being taken on the line A—A' of Figure 4, and the section of Figure 3 being taken on the line B—B' of Figure 4,

Figure 4 is a plan view of the structure

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shown in Figures 2 and 3, but with the omission of the watch case therefrom,

Figures 5 and 6 are broken-away sectional views illustrating the method according to the present invention,

Figure 7 is a broken-away sectional view of another embodiment of a watch provided with apparatus according to the invention, and

Figure 8 is a broken-away perspective view of yet another embodiment of apparatus according to the present invention.

In Figure 1 there is shown a wrist watch known to the Applicants which comprises a case having a case band 1 provided with a recess 1a within which is mounted a watch glass 2. The watch case is provided with a back cover 3 which is threaded into a lower portion 1b of the case band 1.

Mounted within the case band 1 is a watch movement 4 to whose upper surface there is secured a dial 5. The watch movement 4 is provided with a radially outwardly extending flange portion 4a which is mounted between an upper holding ring 8 and a lower holding ring 9, the dial 5 engaging the upper surface of the upper holding ring 8. The lower holding ring 9 is mounted in position within the case band 1 by virtue of engaging a sealing gasket 1c which is disposed between the case band 1 and the back cover 3, the sealing gasket 1c extending radially inwardly of the latter. The flange portion 4a of the watch movement 4 underlies a portion 8a of the upper holding ring 8, the upper holding ring 8 having a radially outwardly extending flange portion 8b which engages beneath a shoulder 1d of the case band 1.

The dial 5 is provided with feet 6 which are secured to the lower surface of the dial 5, each foot 6 extending into a recess in the watch movement 4 and being engaged by a screw 7 mounted in the watch movement 4. The engagement between the screws 7 and the feet 6 serves to secure the dial 5 to the watch movement 4 and serves to locate the dial 5 axially, radially and circumferentially of the watch movement 4.

In the construction of Figure 1 it is necessary to secure the feet 6 to the dial 5 and this is difficult and expensive to achieve. The need to provide both feet 6 and screws 7 unnecessarily increases the number of parts and therefore the cost, while the cost is still further increased by the need to cut threaded holes in the watch movement 4 to receive the screws 7, and to provide recesses in the watch movement 4 to receive the feet 6.

Furthermore, the construction shown in Figure 1 can be used only when the

material of the dial 5 is such as to enable feet to be secured to it. This means that it is not practicable to make the dial 5 of a material such as stone, a jewel, aluminium, plastics material, or glass, since it is not practicable to secure suitable feet to such materials. Consequently the external appearance or design of the dial 5 is limited by the fact that, in practice, the dial 5 can only be made of a limited number of materials.

In Figures 2 to 4 there is therefore shown an embodiment of a wrist watch provided with apparatus according to the present invention.

The wrist watch shown in Figures 2 to 4 comprises a watch case provided with a case band 11 having a recess 11a within which is mounted a watch glass 12.

Mounted within the case band 11 is a dial holding ring 13 and a movement holding ring 24 the radially outer periphery of each of which engages the radially inner periphery 16 of the case band 11. The watch case is also provided with a back cover 26 which is threaded into the lower portion 11b of the case band 11 and is sealed thereto by a sealing member 27 which extends radially inwardly of the case band 11.

A watch movement holding ring 24 is mounted on the sealing member 27 so as to be supported thereby, the watch movement 14 having a radially outwardly extending flange portion 14a which is seated on the movement holding ring 24 (see Figure 3).

The dial holding ring 13 has an inner peripheral wall 13d which serves to locate the watch movement 14 in the horizontal direction, i.e. radially. The upper portion of the dial holding ring 13 is provided with a hook part 17, a dial 15 having a peripheral portion 15a which is disposed radially inwardly of and in engagement with a first portion 17a of the hook part 17. The hook part 17 also has a second portion 17c which overlies and engages the dial 15. The dial 15 which is constituted by a planar disc, is mounted on the upper surface of a radially inwardly extending part 13e of the dial holding ring 13, whereby the dial 15 is tightly held between the part 13e and the portion 17c.

The upper surface of the dial 15 is provided with time-indicating indicia 15c (Figure 4), the dial 15 being provided adjacent its 12 o'clock position with a radially outwardly extending portion 15b which is located in a rectangular recess 17b in the portion 17a. Thus this construction ensures that relative circumferential movement of the dial 15 and dial holding ring 13 is prevented.

The engagement of the peripheral

portion 15a of the dial 15 with the portion 17a of the hook part 17 serves to locate the dial 15 in the radial direction, while the sandwiching of the dial 15 between the parts 13e, 17c locates it axially.

The upper surface of the portion 17c of the hook part 17 engages the lower surface of a flange 19 which extends radially inwardly of the case band 11. This construction serves to locate the dial holding ring 13, and hence the dial 15, axially.

The lower part of the dial holding ring 13 is provided with three equiangularly spaced apart hook parts 13a, the hook parts 13a engaging the timepiece movement 14 so as to secure the latter in position both axially and radially.

Thus the flange portion 14a of the timepiece movement 14 is located in a recess 20 of the dial holding ring 13, and is disposed radially inwardly of and is engaged by a portion 13b of each of the hook parts 13a. Each of the hook parts 13a, moreover, has a portion 22 which underlies and engages the watch movement 14. Since the part 13e of the dial holding ring 13 overlies the watch movement 14, the latter is held between the part 13e and the portion 22. Each of the hook parts 13a has an axially upwardly tapering surface 13c to assist in the assembling together of the dial holding ring 13 and the watch movement 14.

The dial holding ring 13 is provided with a radially inwardly extending portion 18 (Figure 4), the portion 18 being located in a recess 18a in the timepiece movement 14. This construction thus prevents relative circumferential movement of the dial holding ring 13 and the timepiece movement 14. The radially inwardly extending portion 18 is provided at the 6 o'clock position, and thus is disposed diametrically opposite to the radially outwardly extending portion 15b of the dial 15. However, other relative dispositions of the portions 15b, 18 are possible if desired.

In the construction of Figures 2 to 4, three hook parts 13a are provided but in fact any number of such hook parts may be used if desired, so that for example two, four or five such hook parts 13a may be used if desired.

As will be appreciated, in the construction shown in Figures 2 to 4 the dial 15 is not provided with a foot or feet, and consequently it can be manufactured very much less expensively than the assembly of the dial 5 and feet 6 of the Figure 1 construction. Thus the construction of Figures 2 to 4 involves the use of fewer parts and enables the dial 15 to be made from sheet material. Moreover, since the dial 15 does not need to be made

of a material to which feet may be secured, it is possible to form the dial 15 of many materials which cannot be used in the Figure 1 construction and thus the dial 15 can have a much greater range of decoration and appearance than is possible in the case of the Figure 1 construction. Furthermore, although the dial holding ring 13 is of complicated shape, it may be made of plastics material, and thus may be mass produced at low cost.

Figures 5 and 6 illustrate the manner in which the dial 15 and the holding ring 13 are assembled together. The dial holding ring 13 is initially provided with an upwardly extending portion 17a (see Figure 5) which is disposed radially outwardly of the dial 15. After the dial 15 has been assembled radially inwardly of the portion 17a, the hook part 17 is deformed in the direction of the arrow A so as to provide it with the portion 17c which overlies and engages the dial 15 so as to make the parts 13, 15 effectively integral. The hook part 17 is thus of rigid construction and it is not necessary to provide it with elasticity in the radial direction since it is not intended to dis-assemble the parts 13, 15 at any stage. The deformation of the hook part 17 may be effected by means of a conventional horizontal or flat chisel, or, alternatively, use may be made of heat or a solvent.

It will be noted that in Figures 5 and 6 the peripheral portion 15a of the dial 15 is shown as being radially spaced from the portion 17a of the hook part 17, whereas in the construction illustrated in Figures 2 and 3 there is no such radial spacing. In fact it is a matter of choice as to whether such radial spacing is provided or not, although if the dial 15 is in actual engagement with the portion 17a, e.g. is an interference fit therein, the strength with which the parts 13, 15 are secured together will be increased.

In Figure 7 there is shown a construction which is generally similar to that of Figure 2 and which for this reason will not be described in detail, like reference numerals indicating like parts. In the Figure 7 construction, however, the dial holding ring 13 is replaced by a dial holding ring 23 which has a hook part 23a which engages the dial 15, and a hook part of parts 23b engaging the watch movement 14. The dial holding ring 23, however, has a portion 23c which is of greater axial extent than the portion 13e of the dial holding ring 13, and, like the latter, underlies the dial 15 and overlies the watch movement 14. Above all, the hook part 23a is not engaged by the flange 19 which, in the Figure 7 construction, is radially aligned with the dial 15.

In the construction of Figures 2 to 4, a

single hook part 17 is employed. However, it is possible, if desired, to provide a plurality of angularly spaced apart hook parts 17, as shown for example in Figure 8.

The radially outwardly extending portion 15b of the dial 15 could then be located between two portions 17a of the hooked parts 17 rather than in a recess in just one part 17a, as previously described. Further, it would also be possible, if desired, to circumferentially locate the dial 15 by means of a plurality of radially outwardly extending portions 15b, rather than just one such portion.

In order to assemble the construction shown in Figures 2 to 4, the dial 15 and the dial holding ring 13 are first located appropriately in the circumferential direction and these parts are then permanently secured together as shown in Figures 5 and 6. The dial holding ring 13 is then pressed downwardly on the movement 14 (or the latter is pressed upwardly into the dial holding ring 13) so that the axially tapering surfaces 13c ride over the flange portion 14a of the watch movement 14, the hooked parts 13a being splayed radially outwardly and then snapping back into the position shown in Figure 2 due to the resilience of the portions 13b. When the hook parts 13a have snapped back in this way, the flange portion 14a is firmly located and retained in the recess 20 which positions it both axially and radially. The holding ring 13 is moreover appropriately located circumferentially with respect to the watch movement 14 prior to being pressed down thereon so that the radially inwardly extending portion 18 enters the recess 18a in the time piece movement 14, whereby to ensure that relative circumferential movement between the holding ring 13 and the timepiece movement 14 is prevented. The hands (not shown) of the watch are then secured in position by a known technique, and the dial and watch movement are then introduced into the watch case.

WHAT WE CLAIM IS:—

1. A method of constructing an apparatus for use in a timepiece comprising assembling a dial and a holding ring such that a peripheral portion of the dial is disposed radially inwardly of a first portion of at least one flange part of the holding ring, and thereafter bending a second portion of the or each flange part over the dial so as to form a hook part which overlies and engages the dial, thereby securely positioning the dial.

2. Apparatus when made by the method claimed in claim 1 for use in a timepiece.

3. Apparatus as claimed in claim 2 in which the said peripheral portion engages

the first portion of the or each said flange part.

4. Apparatus as claimed in claim 2 in which the said peripheral portion is radially spaced from the first portion of the or each said flange part.

5. Apparatus as claimed in any preceding claim in which means are provided for preventing relative circumferential movement between the dial and the holding ring.

6. Apparatus as claimed in claim 5 in which the said means comprise at least one radially outwardly extending portion of the dial, the or each radially outwardly extending portion being circumferentially located between two said first portions or being located in a recess in a said first portion.

7. Apparatus as claimed in any of claims 2 to 6 which includes a timepiece movement which is secured to the holding ring so as to be axially and radially located thereby.

8. Apparatus as claimed in claim 7 in which the holding ring is provided with at least one second hook part, the timepiece movement being disposed radially inwardly of a first portion of the or each said second hook part, the or each said second hook part having a second portion which underlies and engages the timepiece movement, the holding ring having at least one further portion which overlies the timepiece movement.

9. Apparatus as claimed in claim 8 in which the second portion of the or each second hook part has an axially tapering surface to assist in the assembling together of the holding ring and the timepiece movement.

10. Apparatus as claimed in claim 8 or 9 in which means are provided for preventing relative circumferential movement of the holding ring and the timepiece movement.

11. Apparatus as claimed in claim 10 in which the last-mentioned means comprise at least one radially inwardly extending portion of the holding ring, the or each radially inwardly extending portion being located in a recess in the timepiece movement.

12. Apparatus as claimed in claims 6 and 11 in which the dial has a radially outwardly extending portion which is disposed diametrically opposite to a said radially inwardly extending portion of the holding ring.

13. Apparatus as claimed in claim 2 and substantially as hereinbefore described with reference to and as shown in the Figures 2 to 4, or in Figure 7, or in Figure 8 of the accompanying drawings.

(12)



single hook part 17 is employed. However, it is possible, if desired, to provide a plurality of angularly spaced apart hook parts 17, as shown for example in Figure 8.

5 The radially outwardly extending portion 15b of the dial 15 could then be located between two portions 17a of the hooked parts 17 rather than in a recess in just one part 17a, as previously described. Further, it would also be possible, if desired, to

10 circumferentially locate the dial 15 by means of a plurality of radially outwardly extending portions 15b, rather than just one such portion.

15 In order to assemble the construction shown in Figures 2 to 4, the dial 15 and the dial holding ring 13 are first located appropriately in the circumferential direction and these parts are then

20 permanently secured together as shown in Figures 5 and 6. The dial holding ring 13 is then pressed downwardly on the movement 14 (or the latter is pressed upwardly into the dial holding ring 13) so that the axially

25 tapering surfaces 13c ride over the flange portion 14a of the watch movement 14, the hooked parts 13a being splayed radially outwardly and then snapping back into the position shown in Figure 2 due to the

30 resilience of the portions 13b. When the hook parts 13a have snapped back in this way, the flange portion 14a is firmly located and retained in the recess 20 which

35 positions it both axially and radially. The holding ring 13 is moreover appropriately located circumferentially with respect to the watch movement 14 prior to being pressed down thereon so that the

40 radially inwardly extending portion 18 enters the recess 18a in the time piece movement 14, whereby to ensure that relative circumferential movement between the holding ring 13 and the timepiece

45 movement 14 is prevented. The hands (not shown) of the watch are then secured in position by a known technique, and the dial and watch movement are then introduced into the watch case.

WHAT WE CLAIM IS:—

50 1. A method of constructing an apparatus for use in a timepiece comprising assembling a dial and a holding ring such that a peripheral portion of the dial is disposed radially inwardly of a first portion

55 of at least one flange part of the holding ring, and thereafter bending a second portion of the or each flange part over the dial so as to form a hook part which overlies and engages the dial, thereby securely

60 positioning the dial.

2. Apparatus when made by the method claimed in claim 1 for use in a timepiece.

3. Apparatus as claimed in claim 2 in which the said peripheral portion engages

the first portion of the or each said flange part.

4. Apparatus as claimed in claim 2 in which the said peripheral portion is radially spaced from the first portion of the or each said flange part.

5. Apparatus as claimed in any preceding claim in which means are provided for preventing relative circumferential movement between the dial and the holding ring.

6. Apparatus as claimed in claim 5 in which the said means comprise at least one radially outwardly extending portion of the dial, the or each radially outwardly extending portion being circumferentially located between two said first portions or being located in a recess in a said first portion.

7. Apparatus as claimed in any of claims 2 to 6 which includes a timepiece movement which is secured to the holding ring so as to be axially and radially located thereby.

8. Apparatus as claimed in claim 7 in which the holding ring is provided with at least one second hook part, the timepiece movement being disposed radially inwardly of a first portion of the or each said second hook part, the or each said second hook part having a second portion which underlies and engages the timepiece movement, the holding ring having at least one further portion which overlies the timepiece movement.

9. Apparatus as claimed in claim 8 in which the second portion of the or each second hook part has an axially tapering surface to assist in the assembling together of the holding ring and the timepiece movement.

10. Apparatus as claimed in claim 8 or 9 in which means are provided for preventing relative circumferential movement of the holding ring and the timepiece movement.

11. Apparatus as claimed in claim 10 in which the last-mentioned means comprise at least one radially inwardly extending portion of the holding ring, the or each radially inwardly extending portion being located in a recess in the timepiece movement.

12. Apparatus as claimed in claims 6 and 11 in which the dial has a radially outwardly extending portion which is disposed diametrically opposite to a said radially inwardly extending portion of the holding ring.

13. Apparatus as claimed in claim 2 and substantially as hereinbefore described with reference to and as shown in the Figures 2 to 4, or in Figure 7, or in Figure 8 of the accompanying drawings.

14. A method of constructing an apparatus for use in a timepiece substantially as hereinbefore described with reference to Figures 2 to 8 of the accompanying drawings.

15. A watch having a case within which is mounted apparatus as claimed in any of claims 2 to 13.

16. A watch as claimed in claim 15 in which the case comprises a case band which engages the outer periphery of the holding ring.

17. A watch as claimed in claim 16 in which the case band has an internally extending flange which overlies and engages the or each first-mentioned hook part.

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