

APPARATUS SUCH AS A WATCH, CLOCK OR THE LIKE
HAVING A DATE TYPE DISPLAY DEVICE

5 This invention relates to an apparatus having a date type display device, and concerns particularly, but not exclusively an apparatus of this type, such as a watch or clock intended to indicate the time.

10 Such display devices usually comprise a window in a face of the apparatus, for example in the face of a watch, through which a person using the watch can see the symbols to be displayed. These symbols are disposed on a disc rotatably driven by the watch mechanism. A major disadvantage inherent in this type of known display device is the difficulty of seeing the symbols displayed, once the viewer is not strictly in line with the axis of the window.

15 This disadvantage is inherent in the conventional watch and display device shown in Figure 1 of the accompanying drawings, which is a watch of known type, and has a disc 1 carrying symbols to be displayed on its face directed towards a window 5 in a dial 3 of the watch. The disc 1 is rotatably driven by the watch movement and, as it rotates, moves across the window 5 provided in the dial 3. It will be clear that, in this watch, the part of the image which is in the portion a of the disc, is hidden from the view of the viewer positioned at 0, by a corner 7 of the window 5. In addition, as can also be seen from Figure 1, the part of the image which can be seen through the window 5 is not lit in its entirety beyond a given angle of incidence of the light rays. In fact the part b of the image on the disc that is shadowed by the edge 8 of the window is in a half-light or shadowed region.

25 To provide a partial remedy to these two disadvantages, it has already been proposed that the apparent thickness of the dial or faceplate of the watch be reduced by forming bevels on the inner edges of the window. However, this is not entirely satisfactory especially as, for mechanical reasons (veiling of the rotary disc), it is necessary to have a relatively substantial space between the rotary disc and the faceplate or dial.

30 In order to improve the ease with which the display can be read, it has also been proposed that the dimensions of the symbols displayed be enlarged by means of a magnifying lens which is fixed on a glass of the watch or which is an integral part thereof. Apart from the fact that this construction does not in any way remedy the above-mentioned defects of

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masking and shadowing, it also reduces the angle at which it is possible for the person using the watch to read the display.

5 There is thus a need for an improved apparatus such as a watch or clock having a display system which is at least substantially free of the above defects of lighting and masking and which permits the user to read the display at virtually any angle of observation.

10 According to the present invention there is provided apparatus such as a watch, clock or the like having a date type display device in which symbols to be displayed are carried by a movable carrier and are visible to a viewer through a window provided in a portion of the apparatus, which apparatus has a cluster of coherent optical fibres engaged in the window in such a way that one end of the cluster is disposed in the vicinity of the movable carrier and the other end of the cluster is at least adjacent to or substantially flush with a visible face of an element of the apparatus, with a
15 film of low-viscosity liquid being interposed between the movable carrier and the contiguous end of the cluster of fibres, in contact with said carrier and cluster end. The visible face of the element of the apparatus is or is not separate from the portion in which the window is provided.

20 The visible face will constitute the plane of reading of the display device and it may comprise the outermost face of the faceplate or dial of the apparatus such as a watch, in which case the window is provided in the faceplate in line with the movable carrier and the cluster of optical fibres is flush with the outermost face of the faceplate.

25 The reading plane for the display may also be formed by the outermost face of the glass of the apparatus such as a watch, with the cluster of optical fibres extending through the window provided in the faceplate directly above the movable carrier, to the outermost face of the glass.

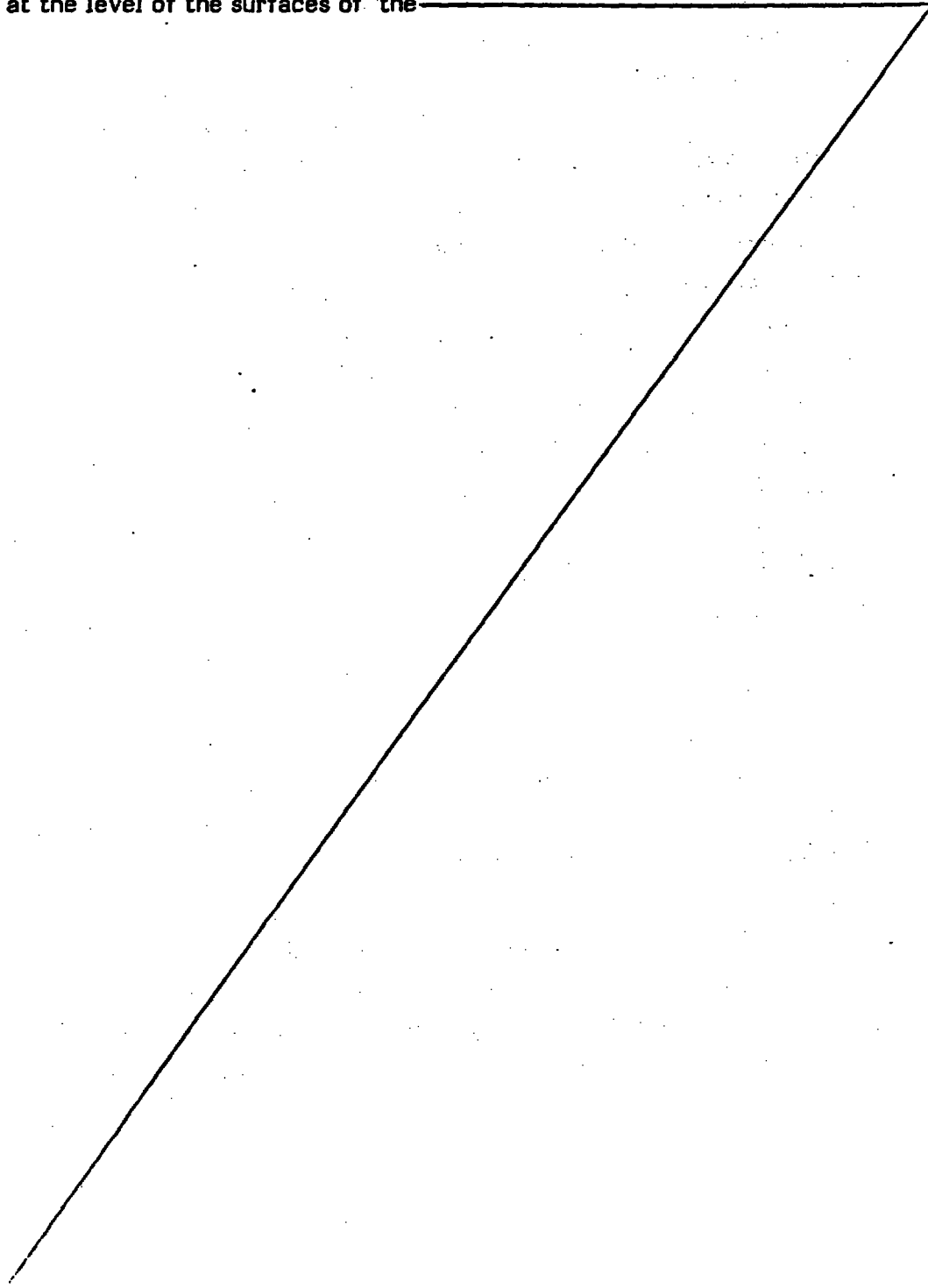
30 Finally, the reading plane for the display device may be formed by an outermost face of a casing of the apparatus such as a watch, in which case the window is provided in the body of the casing directly above the movable carrier, as far as an outermost face of the casing, with the cluster of fibres being disposed in the window so as to be flush with the outermost face.

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The optical bridge formed by the low-viscosity liquid interposed between the movable carrier carrying the symbols to be displayed and the contiguous end of the cluster of optical fibres improves the clarity of the image of the symbol displayed, by preventing multiple parasitic reflections at the level of the surfaces of the

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clusters of fibres and the viewing surface. Also this arrangement avoids the danger of scratching the adjacent surfaces, by movement of the carrier member, since it is possible for the adjacent surfaces to be sufficiently far apart without adversely affecting the clearness of the image. In addition, in the event that those two surfaces should come into contact, the lubrication effect provided by the liquid will prevent scratches from being produced.

In a particularly attractive alternative embodiment of the invention, the cluster of fibres is mounted "floatingly" on the film of liquid which is disposed on the movable carrier, being held in position laterally by the inside surfaces of the window. Besides its simplicity, this embodiment has the advantage of providing a constant spacing between the cluster of fibres and the movable carrier. This provides virtually complete elimination of scratching and elimination of the irregularities in the image observed, due to the differences in distance between the movable carrier and the cluster of fibres.

The liquid may rest on the outermost face of the carrier or it may be housed in a dish or cup on the carrier.

The liquid may simply be an oil of the type used in timepieces for lubricating small movements.

For a better understanding of the present invention, and to show how the same may be carried into effect, reference will now be made by way of example to the accompanying drawings, in which:

Figure 1 is a view in axial section of part of a watch with a known type of date display device;

Figure 2 is a view similar to that of Figure 1 in section of apparatus such as a watch, according to the invention;

Figure 3 is a view in section taken along line III-III in Figure 2;

Figures 4 and 5 are partial sectional views similar to the views shown in Figures 1 and 2 respectively, of other embodiments of the invention;

Figures 6 and 7 are partial sectional views of alternative embodiments of the apparatus such as a watch shown in Figure 2; and

Figure 8 is a view in section taken along line VIII-VIII in Figure 7.

Figures 2 and 3 of the accompanying drawings show an apparatus of the invention in the form of a watch having a casing 20 closed at its outermost part by a glass 22. It has a dial or faceplate 24 which is apertured at its centre with an opening 26 for two spindles 28 and 30 to pass there-

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through; the spindles respectively carrying hands 32 and 34 of the watch. It also has a circular window 36 therethrough, in which a cluster 38 of coherent optical fibres is fixed, for example by glueing. The upward or outermost end 40 of the cluster of fibres 38 is disposed at least substantially flush with or in the plane of the upward or outermost surface of the faceplate 24 while its lower or innermost end 42 is disposed at a short distance from the surface of a movable carrier in the form of a rotary disc 44 carrying symbols to be displayed, for example dates. Thus, from the point of view of the user of the watch, the symbols, as date information, will not appear to be at the bottom of the cup or dish but at the surface of the faceplate on which they will stand out clearly, as can be seen from Figure 3 (see also Figure 8). Although not shown in Figures 2 to 5, a film of low-viscosity liquid is interposed between the movable carrier 44 and the contiguous end 42 of the cluster of fibres 38, in contact with the carrier 44 and cluster end 42, to provide an optical bridge therebetween.

In the embodiments shown in Figures 4 to 7, the members described with reference to Figure 2 are denoted by the same references.

In the watch shown in Figure 4, the window 36' in which the cluster 38 of optical fibres is housed is provided in a side portion of the casing 20, directly above the disc 44, and the outermost or upward end of the cluster 38 of fibres is flush with the upward or outermost face of the casing, which then constitutes the display reading plane.

In Figure 5, the window 36 in which the cluster 38 of optical fibres is engaged is provided in the faceplate or dial 34, as in the case of the embodiment shown in Figure 2, but the upward part thereof is engaged in an opening 46 in the glass 22 of the watch, with the upward or outermost end of the cluster of fibres 38 being disposed flush with the outside surface of the glass 22.

Figures 6 and 7 show two alternative embodiments of the watch of Figure 2, in which the cluster 38 of optical fibres is still housed in a window 36 in the dial or faceplate 24, and in which the optical bridge, intended to improve the quality of reading of the symbols displayed, is provided between the end 42 of the cluster 38 and the disc 44.

In the construction shown in Figure 6, the cluster 38 is fixed with respect to the dial or faceplate 24 and the face of the rotary disc 44 which is towards the lower or innermost end of the cluster 38 is coated with a liquid 48 having a low viscosity index, for example clock oil for a timepiece movement, of the type marketed by the company MOBIUS, under reference No. 9027. The film of oil is in contact with the adjacent end of the cluster 38 and thus provides an optical bridge between the fibres and the disc 44. It also eliminates or reduces the dangers of scratching as a result of accidental contact between the cluster of fibres and the faceplate or dial. Additionally in the embodiment of Figure 6 the upper end of the fibre cluster 38 is at least adjacent to the visible face provided by the watch glass 22.

In the alternative embodiment of the invention, shown in Figure 7, the liquid 48 is contained in an annular cup in the disc 44, in which the lower or innermost end of the cluster 38 of optical fibres rests. Instead of the cluster 38 being rigidly fixed with respect to the dial or faceplate 24, it is mounted floatingly in the window 36, the side surfaces of which serve simply to guide the cluster 38 and hold it in position. In this case, the cluster 38 of fibres may be displaced under a force applied thereto by the disc 44, with a constant spacing therefrom being maintained. This avoids any danger of scratching the disc and/or the end face of the cluster of fibres. In the embodiment of Figure 7 the upper end of the fibre cluster 38 is at least substantially flush with the visible face provided by the dial or faceplate 24.

The invention therefore provides simple improvements which are easy to carry into effect, in watches, clocks or the like which are fitted with a movable display system of the date type, for the purpose of improving viewing of the information carried by the display system.

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CLAIMS

1. Apparatus such as a watch, clock or the like having a date type display device in which symbols to be displayed are carried by a movable carrier and are visible to a viewer through a window provided in a portion of the apparatus, which apparatus has a cluster of coherent optical fibres engaged in the window in such a way that one end of the cluster is disposed in the vicinity of the movable carrier and the other end of the cluster is at least adjacent to or substantially flush with a visible face of an element of the apparatus, with a film of low-viscosity liquid being interposed between the movable carrier and the contiguous end of the cluster of fibres, in contact with said carrier and cluster end.
2. Apparatus according to claim 1, wherein the portion in which the window is disposed and the element having the face with which an end of the cluster of fibres is at least adjacent to or substantially flush form one and the same member.
3. Apparatus according to claim 2, wherein said member is a faceplate of the apparatus.
4. Apparatus according to claim 2, wherein said member is a portion of a casing of the apparatus.
5. Apparatus according to any one of claims 2 to 4, wherein the cluster of fibres is rigidly fixed with respect to said member.
6. Apparatus according to claim 1, wherein said portion in which said window is disposed and the element having the face with which an end of the cluster of fibres is at least adjacent to or substantially flush, form or are two separate members.
7. Apparatus according to claim 6, wherein the window is disposed in a faceplate of the apparatus and the respective end of the cluster of fibres is flush with an external face of a glass of the apparatus.



8. Apparatus according to claim 6 or claim 7, wherein said cluster of fibres is rigidly fixed with respect to said element and/or said portion.
- 5 9. Apparatus according to any one of claims 1 to 8, wherein said cluster of fibres is mounted floatingly on said liquid.
- 10 10. Apparatus according to claim 9, wherein said liquid is disposed at the surface of the movable carrier.
11. Apparatus according to claim 9, wherein said liquid is disposed in an annular cup in the movable carrier.
12. Apparatus according to any one of claims 9 to 11, wherein said cluster of fibres is freely mounted in the window.
- 15 13. Apparatus such as a watch, clock or the like, substantially as hereinbefore described with reference to Figures 2 and 3, Figure 4, Figure 5, Figure 6 or Figure 7 of the accompanying drawings.
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