

[54] WATCH TIME DISPLAY ILLUMINATION
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[58] Field of Search..... **58/50 R, 50 A, 91, 127**

[56]

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[57]

ABSTRACT

A watch includes a transparency forming a watch glass, dial or case bottom carrying a luminescent material and having a metallized surface which reflects light from the luminescent material towards a time display zone.

5 Claims, 2 Drawing Figures

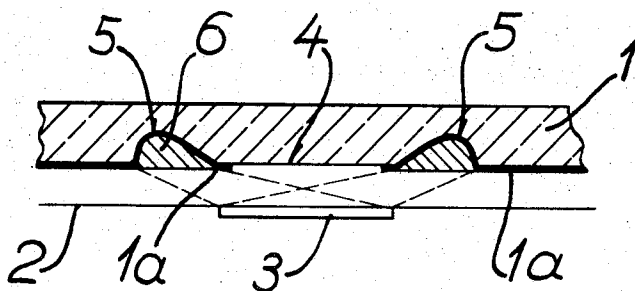


FIG. 1

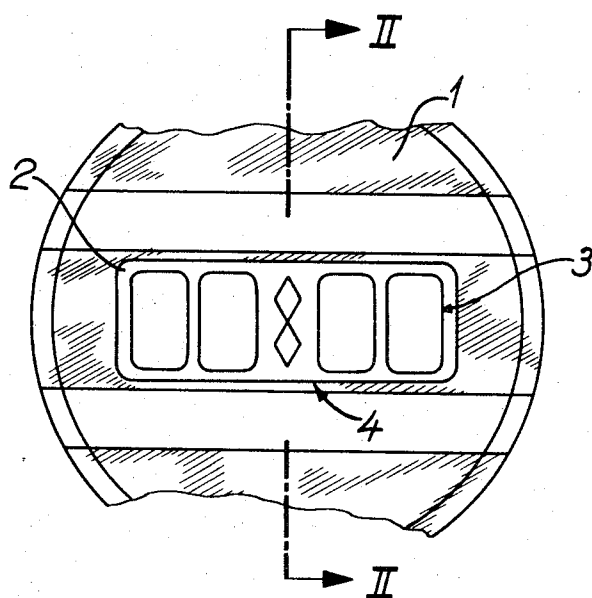
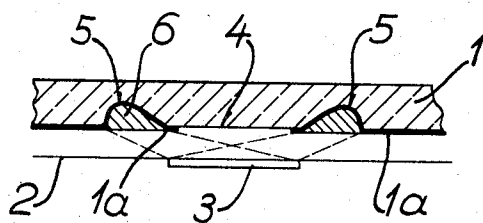


FIG. 2

WATCH TIME DISPLAY ILLUMINATION

The invention relates to watches and particularly to watches including means for illuminating a time display zone.

It has already been proposed, with a view to facilitating reading of the time in the dark, to cover all or part of a transparent dial with a luminescent material; to provide around the dial an annular glass tube containing a radio-active gas activating a layer of luminescent material; and to dispose a radio-active gas in a transparent envelope under the watch glass to activate a luminescent material on the dial.

The first of these arrangements is not always as efficient as would be desired, and in the daylight the generally green colored luminescent material is often aesthetically undesirable. The latter two arrangements are relatively complicated and the additional components employed are expensive to manufacture and assemble.

An object of the invention is to improve the efficiency of a luminescent material integrated in an existing part of a watch, e.g., in a watch glass, dial or case bottom, while simultaneously offering new possibilities in the aesthetic appearance of the watch.

The term "luminescent" material is herein used to designate materials which emit light otherwise than by incandescence or simple reflexion, e.g., by fluorescence and phosphorescence.

According to the invention, a watch comprises a time display zone, a transparency forming a watch glass, dial or case bottom, a luminescent material supported by the transparency, and a metallized layer applied on said transparency to reflect light emitted by said luminescent material towards said zone.

By, for example, metallizing the outer face of a watch glass, light rays impinging upon the metal layer with a relatively small angle of incidence are totally reflected, which provides a mirror effect to an observer, while a certain amount of light, notably from rays impinging substantially perpendicular to the metal layer, passes through this layer and can activate the luminescent material. The metal layer also acts as a reflector for directing light emitted by the luminescent material towards the time display zone.

An embodiment of the invention is shown, schematically and by way of example, in the accompanying drawings, in which:

FIG. 1 is a partial top plan view of a watch; and

FIG. 2 is a partial cross-section taken along line II—II of FIG. 1.

The drawings partially show a watch including a glass 1, and a dial 2 including a time display zone 3 which, in the example shown, is of generally rectangular overall shape and includes conventional means such as liquid crystal cells for selectively displaying four digits showing the time.

The inner surface of glass 1, i.e., that facing dial 2, is covered with a thin metallic layer 1a with a central rectangular unmetallized portion forming a window 4 for viewing zone 3. The metal of layer 1a can, for example, be chromium applied by vacuum deposition.

The inner surface of glass 1 also includes, in the neighborhood of window 4 and the periphery of zone 3, two elongate grooves 5 extending along the opposite, longer edges of window 4. The surface of these grooves 5, which in cross-section are each in the shape of a pa-

rabola whose axis is inclined towards the zone 3, is also metallized by layer 1a which terminates at the facing inner edges of these grooves. The grooves are filled with a solid luminescent material 6. The two metallized grooves 5 thus form reflectors for the light emitted by material 6, and direct this light towards the display zone 3.

The metallized grooves 5 filled with material 6 could, of course, extend around the shorter sides of window 4, forming a continuous groove of rectangular configuration.

Alternatively the display zone could be annular, for example of circular, oval or rectangular shape, and the inner surface of the glass would include an appropriate metallization and groove, disposed at the center or towards the peripheral edge of the glass, and an unmetallized portion forming a window for viewing the display zone.

The above described arrangements provide the watch with an adequate and appropriately concentrated illumination of the time display. The metallized glass provides a pleasing aesthetic appearance, and ensures concealment of the luminescent material.

Various other embodiments will now be described by way of example.

One embodiment includes a watch glass formed of two shell-like parts in non-scratchable hardened mineral glass, welded together at their edges in order to form a cavity in which a luminescent gas is enclosed.

The luminescent gas can be activated by including traces of radioactive gas such as tritium, strontium or krypton 85. The outer surface of the glass is metallized by vacuum depositing a layer of chromium, thus providing a mirror effect to an observer.

The chromium can, if desired, be colored by depositing on the chromium a layer of silica. During the metallization process, a screen is applied to the outer face of the glass and when removed leaves an entirely transparent non-metallized portion which is disposed so as to allow a time display zone of the watch to remain visible. For a watch with a conventional time display formed by hands cooperating with time indicia in annular array, the transparent portion will preferably be a ring surrounding a central metallized disk which conceals the center of the dial. For a watch with a digital time display of the type shown in FIG. 1, the transparent portion could define a single window as indicated in FIG. 1, or several windows each corresponding to a digit to be displayed.

In another embodiment, the watch glass can be formed in one piece and have a metallized outer surface with an appropriately shaped window or windows, and the inner face of the glass (i.e., facing the display zone) can be coated at suitable locations with a layer of fluorescent material such as calcium, zinc or cadmium sulfate, possibly activated by a trace of a radioactive metal or salt.

Alternatively, a single piece glass could be metallized on its outer face and contain a phosphorescent material in discrete cavities provided in the glass, for example in a central zone under the metallized part.

Another possibility is to provide a dial in transparent material enclosing or carrying a gaseous or solid luminescent material. A surface of the dial facing a watch movement can be entirely metallized, or partially metallized to leave windows for observation of a display of the date or a digital display of time.

Another alternative is for the transparency to form a bottom of a watch case enclosing a skeleton watch movement, i.e., in which the main plate is cut out to show the works. The outer surface of the transparent bottom can be metallized, and the luminescent material supported by the transparent bottom in any of the previously described manners. Illumination of the dial and time display zone is thus provided from behind, through the skeleton movement.

What is claimed is:

1. A watch comprising a time display zone, a transparency forming a watch glass, dial or case bottom, a luminescent material supported by the transparency, and a metallized layer applied on said transparency to reflect light emitted by said luminescent material towards said zone.

2. A watch according to claim 1, comprising means defining a plurality of discrete cavities in said transparency, said luminescent material being disposed in said cavities.

3. A watch according to claim 1, in which said trans-

parency forms a watch glass and includes an inner face disposed facing said zone, and comprising means defining a groove in said inner surface of the transparency, said groove including an edge disposed in the proximity of said zone, said metallized layer being applied on said inner surface of said transparency and on the surface of said groove and terminating in the neighborhood of said edge of said groove to leave an unmetallized portion of said surface of the transparency through which said zone is visible, said luminescent material being disposed in said groove.

4. A watch according to claim 3, in which said groove has a transverse cross-section substantially in the shape of a parabola whose axis is inclined with respect to said inner surface towards said zone.

5. A watch according to claim 4, in which said zone is rectangular, and two metallized grooves containing luminescent material are disposed in said inner surface of said transparency in the proximity of opposite sides of said zone.

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