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M. Z. BERGER ETAL

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DISPLAY DEVICE

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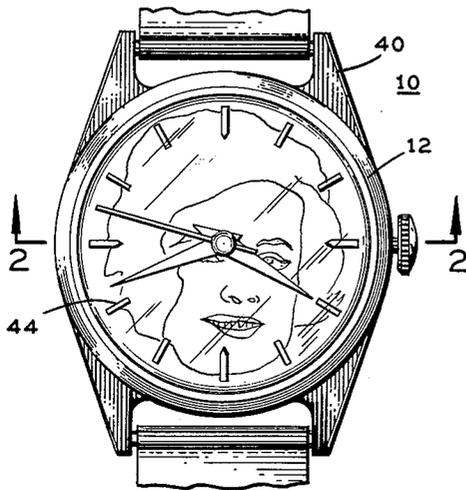


FIG. 1

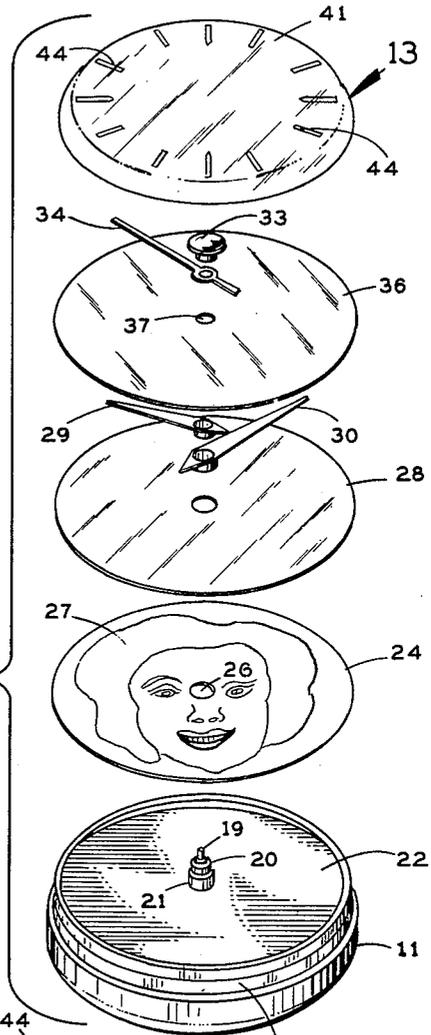


FIG. 3

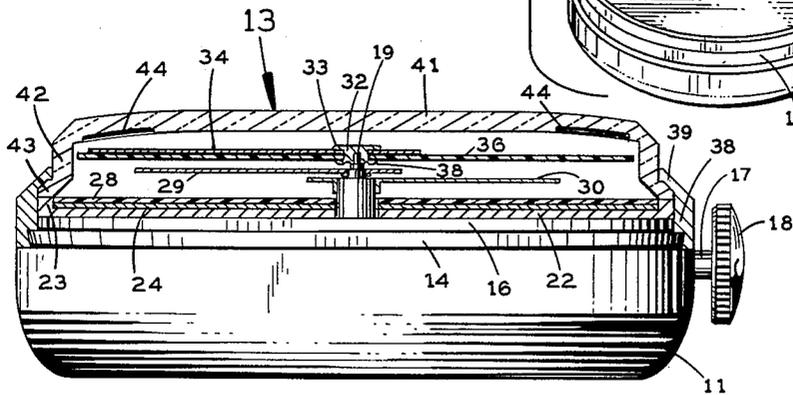


FIG. 2

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DISPLAY DEVICE

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The present invention relates generally to improvements in display devices and it relates more particularly to an improved time piece affording a periodically changing visual display.

There have been many forms of displays, both of a stationary and moving character, associated with time pieces such as watches and clocks. Where the display is of the moving type it is a common practice to actuate the display by the watch or clock timing motor. However, in the moving display type time piece either the display was rudimentary or it required a mechanical modification of or complex coupling to the timing motor. Such structural modifications are highly undesirable since they are usually expensive, and interfere with the accuracy of the time piece and otherwise leave much to be desired.

It is thus a principal object of the present invention to provide an improved display device.

Another object of the present invention is to provide an improved time piece display device.

Still another object of the present invention is to provide an improved time piece affording a moving visual display.

A further object of the present invention is to provide a periodically changing visual display associated with a time piece and driven by the timing motor thereof.

Still a further object of the present invention is to provide an improved time piece display device of the above nature characterized by its simplicity, attractiveness and the unique effect afforded thereby.

The above and other objects of the present invention will become apparent from a reading of the following description taken in conjunction with the accompanying drawing, wherein:

FIGURE 1 is a top plan view of a wrist watch embodying the present invention;

FIGURE 2 is a sectional view taken along line 2—2 in FIGURE 1; and

FIGURE 3 is an exploded perspective view thereof.

In a sense the present invention contemplates the provision of a display device comprising a base member carrying a visual representation, a first sheet of light polarizing material overlying said representation, a second sheet of light polarizing material overlying said first light polarizing sheet, and a drive motor rotating at least one of said light polarizing sheets to alternately substantially visually mask and expose said representation.

The present display mechanism is advantageously associated with a time piece such as a watch or clock and in its preferred form includes a face plate the front of which carries a visual representation over which is superimposed a layer of a light polarizing material. A timing motor is positioned behind the face plate and includes a central second hand drive shaft and minute and hour hand cannon shafts coaxial with the second hand shaft, the ternary of shafts projecting through the center of the face plate and light polarizing layer. Minute and hour hands are affixed to the cannon shafts and a second hand is affixed to the center shaft, and rotating with the center shaft is a disc of a light polarizing material which overlies the minute and hour hands as well as the polarizing layer covered representation. A crystal or transparent window which carries hour designating indicia is associated with the time piece to enclose the time indicating hands, face plate and light polarizing elements. The rotation of the

light polarizing disc brings the light polarizing axis thereof alternately into parallel and perpendicular relationship with the light polarizing axis of the underlying light polarizing layer to thereby successively visually expose and mask the underlying representation every thirty seconds.

Referring now to the drawings which illustrate a preferred embodiment of the present invention, the reference numeral 10 generally designates an improved wrist watch display device which includes a watch casing 11, a cover 12 and a window plate or crystal 13. The casing 11 is of the usual cup shaped configuration and is provided, along the rim of the opening thereto, with an upstanding peripheral rib 14 having an inwardly downwardly beveled outer face. Housed in the casing 11 is a conventional timing motor of any desired type having a disc shaped top wall 16 engaging the rib 14 and provided with a winding stem 17 registering with a corresponding opening in the casing 11 and terminating in a finger piece 18.

The usual ternary of coaxial shafts projects from the timing motor through a central opening in the top wall 16 and includes a central second hand drive shaft 19 and inner and outer cannon shafts 20 and 21 respectively for driving the minute and hour hands. A circular mounting plate or frame 22 is superimposed on the wall 16 and is provided with an upstanding peripheral shoulder 23. A disc shaped picture member 24 is superimposed on and suitably affixed to the plate 22 and registers with the shoulder 23 and has a central opening 26 registering with the motor shaft ternary which projects through an opening in the plate 22. The picture member 24 may be a photograph, drawing, print or the like and is provided on its front face with any desired representation or subject matter 27.

A first light polarizing disc 28 is superimposed on the picture member and has a central opening registering with the shaft ternary. The polarizing disc 28 is co-extensive with the picture member and registers with the peripheral shoulder 23. It should be noted that the shoulder 23 may be inwardly beaded or upset along the upper edge thereof to engage the upper border of the polarizing disc 28. The light polarizing disc 28 may be formed of any suitable sheet material having a light polarizing axis lying in the plane thereof, such as Polaroid or the like. Positioned above the first light polarizing disc 28 and affixed to the cannon shafts 20 and 21 are the usual upper and lower minute and hour hands 29 and 30 respectively.

Affixed to the second hand drive shaft 19 is a hub or coupling member 32 having an upper outwardly directed peripheral flange 33. A second hand 34 is provided with an enlarged annular section between its ends which engages the hub 32 directly below the flange 33. A second light polarizing disc 36 which may be formed of the same material as the first light polarizing disc 24 and has a polarizing axis in the plane thereof, immediately underlies the second hand 34 and has a central opening 37 registering with the hub 32. Also engaging the hub 32 along the underface of the disc 36 is a washer of about the diameter of the flange 33, the hub 32, second hand 34, disc 36 and the washer being locked into a rigid assembly by a peripheral flange suitably formed on the bottom of the hub 32 and tightly bearing on the underface of the washer. It should be noted that the second polarizing disc 36 is of somewhat smaller diameter than the first disc 28.

The cover member 12 includes a collar 38 surrounding the shoulder 23 and the edge of the plate 16 and tightly releasably engaging the beveled outer face of the casing rib 14. The collar 38 projects above the shoulder 23 and terminates in a bezel defining inwardly upwardly directed flange 39. A pair of brackets 40 project from op-

posite sides of the collar 38 and support band or strap engaging pins in the usual manner.

The watch crystal 13 may be molded of a transparent synthetic organic resin and includes a top disc 41 provided with a depending peripheral collar 42 which terminates in an outwardly directed lip 43. The lower border of the collar 42 bears against the upper inner edge of the bezel 39 and the lip 43 complements and is engaged by the confronting faces of the bezel 39 and the upper face of the rib 23. Formed in the peripheral under face of the crystal disc 41 are circumferentially spaced radially extending hour designating grooves 44 which are suitably inlaid or coated to render them clearly and easily visible.

In operation, the second, minute and hour hands, 29, 30 and 34 are driven in the usual manner to provide an indication of the time. The second polarizing disc 36 is rotated by the shaft 19 a revolution a minute about its central axis so that the axis of light polarization thereof rotates therewith between positions parallel and at right angles to the light polarizing axis of the stationary first light polarizing disc 28. The interval between parallel and completely crossed axes of polarization of the discs 28 and 36 is fifteen seconds so that the transmission of light through the overlying discs 28 and 36 increases from minimum to maximum in fifteen seconds and returns to minimum transmission in the following fifteen seconds. As a consequence, the representation 27 is periodically completely masked or substantially invisible for a short period every thirty seconds and is visible between said masking periods. Since the degree of light transmission does not abruptly change, the masking and unmasking of the representation 27 is gradual, approaching and leaving the position of right angles of the light polarizing axes of the discs 28 and 36, so that the representation 27 is slowly periodically rendered visible and invisible thereby providing an attractive display. Since the second, minute and hour hands and the hour indicia are not viewed through both light polarizing discs 28 and 36 these are always completely visible and the reading of the time is thus not interfered with.

While there has been described and illustrated a preferred embodiment of the present invention it is apparent that numerous alterations, omissions and additions may be made without departing from the spirit thereof.

What is claimed is:

1. A time piece display device comprising an opaque face plate carrying a visual representation on the front face thereof, a layer of light polarizing material directly superimposed upon said visual representation, a disc of light polarizing material overlying said polarizing layer, a timing motor disposed behind said face plate and including a second hand drive shaft passing axially through said face plate and polarizing layer and affixed to said polarizing disc substantially at the center thereof, a pair of minute hand and hour hand drive cannon shafts coaxial with said second hand drive shaft and driven by said timing motor, and a minute hand and an hour hand affixed to said cannon shafts and disposed between said polarizing layer and said polarizing disc.

2. The time piece display device of claim 1 including a second hand affixed to said second hand drive shaft and extending radially along the face of said polarizing disc.

3. The time piece display device of claim 1 including a transparent window member overlying said polarizing disc and carrying circumferentially spaced hour designating indicia.

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