Aug. 13, 1935. A. J. GEOFFRION 2,011,517

CLOCK DIAL

Filed Sept. 4, 1934 2 Sheets-Sheet 1

Fig. 1.

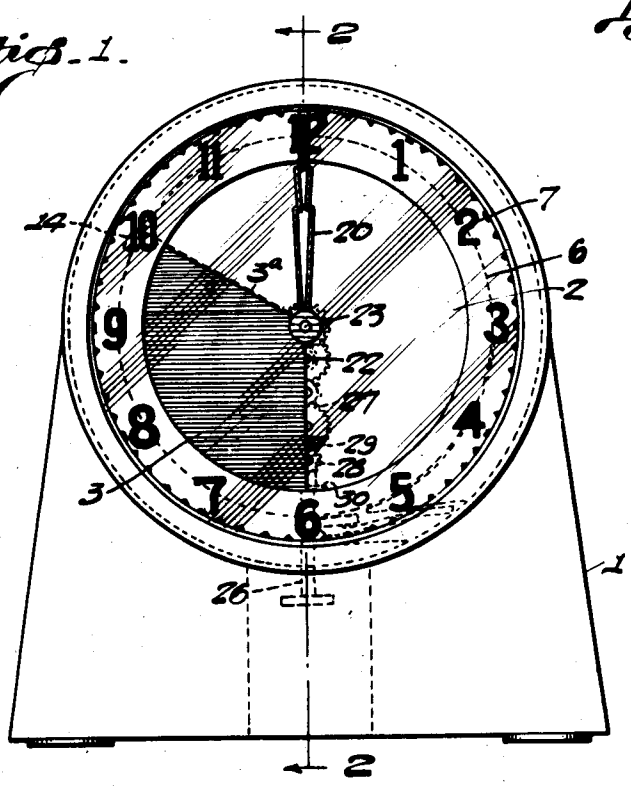


Fig. 2.

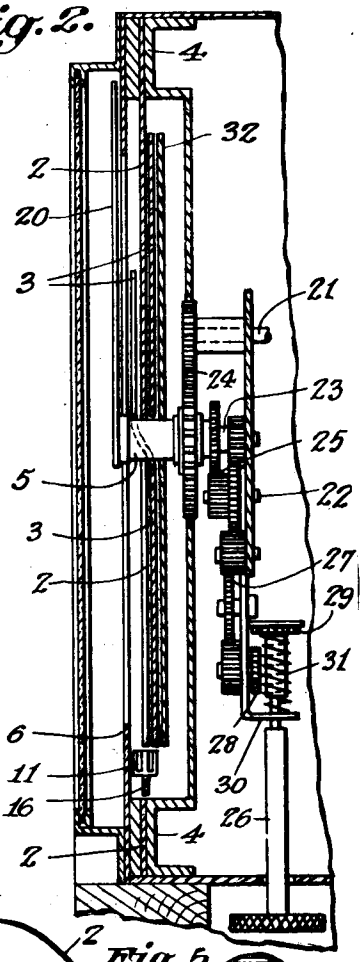


Fig. 3.

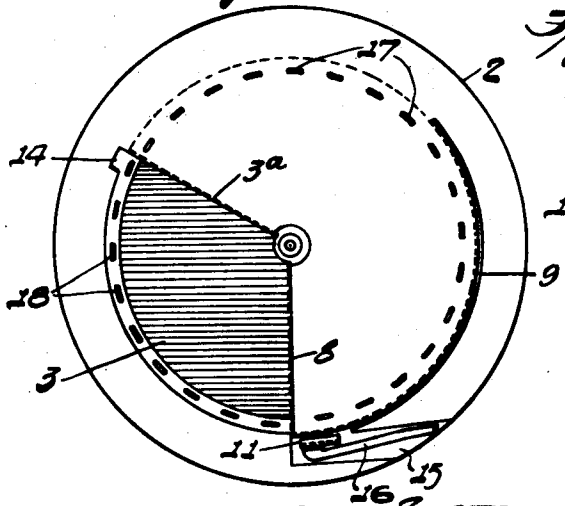


Fig. 4.

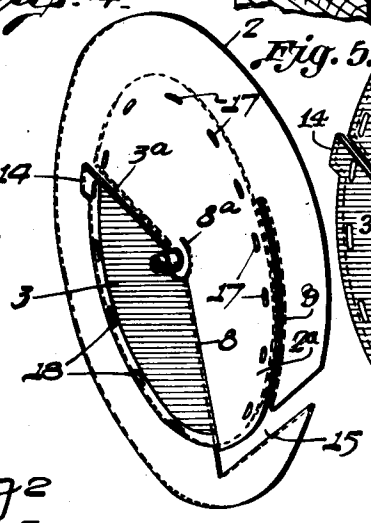


Fig. 5.

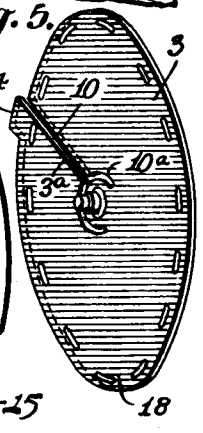
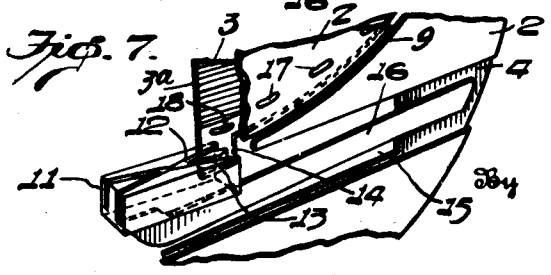


Fig. 7.



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Aug. 13, 1935. A. J. GEOFFRION 2,011,517

CLOCK DIAL

Filed Sept. 4, 1934 2 Sheets-Sheet 2

Fig. 6.

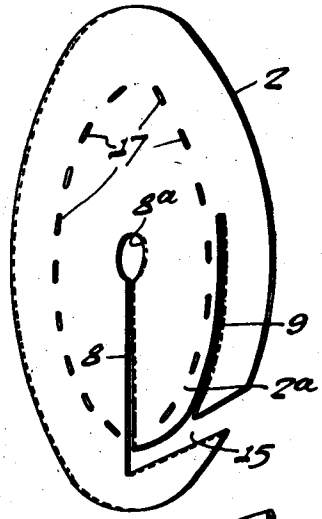


Fig. 8.

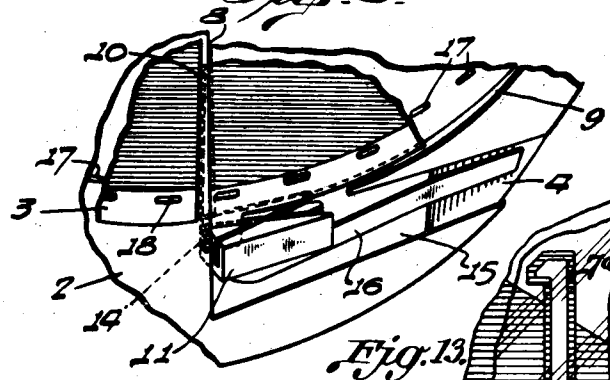


Fig. 13.

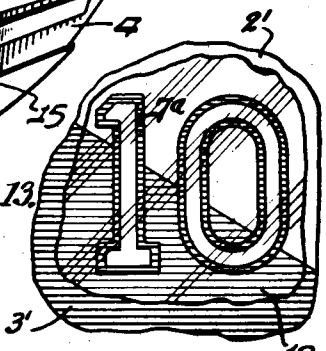


Fig. 9.

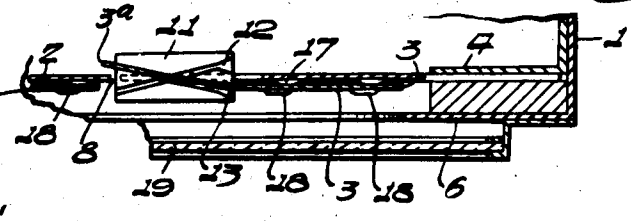


Fig. 12.

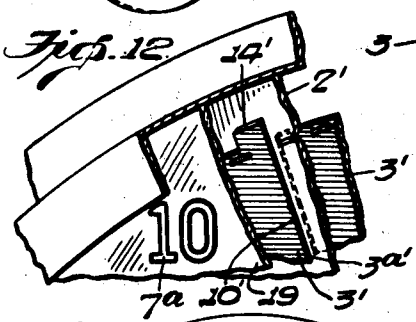


Fig. 10.

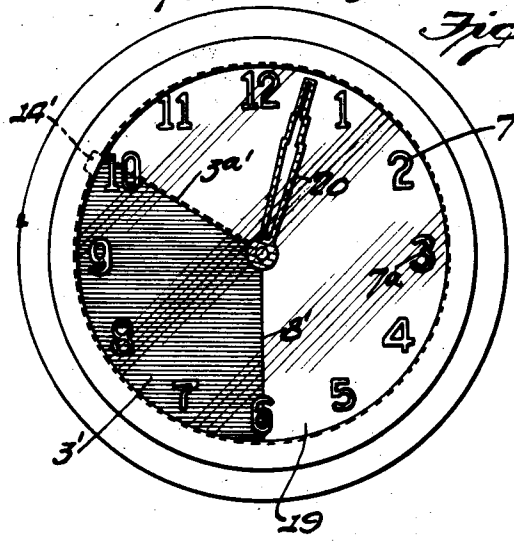
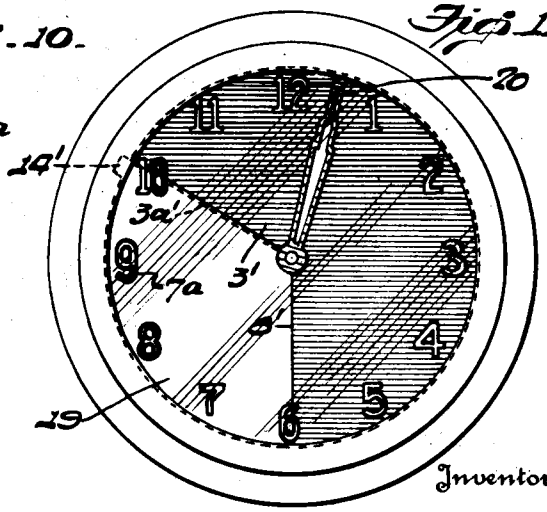


Fig. 11.



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UNITED STATES PATENT OFFICE

2,011,517

CLOCK DIAL

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Application September 4, 1934, Serial No. 742,659

6 Claims. (Cl. 58—127)

This invention relates to clock dials, and has for one of its objects to provide a clock dial which will indicate the time in a novel manner, and which may be easily seen and read at any period of the day or night.

The invention has for a further object to provide a clock dial which, as the "dark" hours of the day (which, for purposes of illustration, may be the hours between 6 P. M. to 6 A. M.) advance, will proportionately change from a light to a dark color, and which as the "light" hours of the day (which, for purposes of illustration, may be the hours between 6 A. M. and 6 P. M.) advance, will proportionately change from a dark to a light color, whereby the dial will indicate the part of the "dark" or "light" portion of the day which has passed, and thus be easily read.

According to the invention the dial comprises a pair of discs of contrasting colors, preferably white and black, respectively, one of which is stationary and the other of which is movable, the movable disc moving gradually over the face of the stationary disc during one portion of the day and gradually moving behind the face of the stationary disc during another portion of the day, so that the dial will, in effect, proportionately change from a light to a dark color as the "dark" hours of the day advance, and in effect, will proportionately change from a dark to a light color as the "light" hours of the day advance.

According to the invention the stationary and movable discs are concentrically arranged and each is provided with a radial slit, the movable disc being rotated at a rate corresponding to the rate of movement of the hour hand of a clock, and the slitted movable disc moving through the slit of the stationary disc from the rear side to the front side of the latter as the "dark" hours of the day advance, and moving through said slit from the front side to the rear side of the stationary disc as the "light" hours of the day advance.

According to the invention the leading radial edge of the movable disc functions as the hour hand of the clock during the "dark" hours of the day and the trailing radial edge of such disc functions as the hour hand during the "light" hours of the day, the contrasting colors of the discs making these edges easily visible at any period of the day of night.

The invention has for a further object to provide for the clock dial a minute hand which will be easily visible when overlying a portion of either of the discs.

According to the invention the hour-indicating numerals may be borne by an annulus which is mounted in front of the marginal portions of the discs, such numerals being of a color contrasting with that of the annulus, or these numerals may be provided upon a transparent disc of substantially the same diameter as the light and dark colored discs, in substantially the same color as the light colored disc but outlined in substantially the same color as the dark colored disc, so that, when a portion of the dark colored disc is behind any of such numerals, such numerals will appear as wholly of the same color as the light colored disc, and any numerals behind which a portion of the dark colored disc is not disposed will appear in the same color as the light colored disc but outlined in the same color as the dark colored disc.

The invention will be described with reference to the accompanying drawings wherein preferred embodiments of the invention are shown, but it is to be understood that the invention includes such equivalents as come within the appended claims.

Referring to the drawings:

Figure 1 is a front elevation of a clock embodying my invention, the dark colored disc being shown as so disposed relatively to the light colored disc as to indicate that four of the "dark" hours of the day have passed;

Figure 2 is a sectional view on an enlarged scale taken on the line 2—2 of Figure 1 as viewed in the direction indicated by the arrows.

Figure 3 is a front elevation of the dial shown in Figure 1, the annulus which bears the hour-indicating numerals being omitted;

Figure 4 is a perspective view of the dial as shown in Figure 3;

Figure 5 is a perspective view of the dark colored disc of the dial;

Figure 6 is a perspective view of the light colored disc of the dial;

Figure 7 is a perspective view of the lower portions of the discs comprised in the dial and of the means for directing the leading edge of the dark colored disc through the radial slit of the light colored disc in front of or behind the light colored disc;

Figure 8 is a view similar to Figure 7 wherein the leading edge of the dark colored disc is shown as being directed through the radial slit of the light colored disc behind the latter disc;

Figure 9 is a horizontal sectional view of the parts shown in Figure 8 immediately above the means for directing the leading edge of the dark colored disc through the radial slit of the light colored disc in front of or behind the latter disc;

Figure 10 is a front elevation of a modified form of the dial, the dial being shown with the discs positioned to indicate that four hours of the "dark" portion of the day have passed;

Figure 11 is a view similar to Figure 10 showing the discs illustrated in Figure 10 positioned to indicate that four hours of the "light" portion of the day have passed;

Figure 12 is a perspective view of fragmentary portions of the discs which form the dial shown in Figures 10 and 11; and

Figure 13 is a fragmentary detail view on an enlarged scale of one of the hour-indicating numerals and the cooperative discs, as shown in Figs. 10, 11, and 12.

The dial may be embodied in timepieces of any size or character which embodies a dial, such as wrist and other watches or kitchen, parlor, hall, alarm, tower and other clocks. It is accordingly to be understood that the term "clock", as used herein, includes any timepiece which embodies a dial. The dial is shown as applied to a clock 1 of conventional form and construction and as comprising a stationary disc 2 and a disc 3 rotatable on an axis concentric with the disc 2. The discs 2 and 3 are of different colors, the disc 2 being preferably white, and the disc 3 being preferably black. The disc 2 has a marginal portion which projects outwardly beyond the periphery of the disc 3, and is secured to the front frame member 4 of the clock. The disc 3 is rotated once every twelve hours by the hour arbor 5 of the clock and preferably is connected at its center to said hour arbor. A ring or annulus 6, bearing the numerals "1" to "12", disposed in the conventional manner, is secured to the front frame member 4 of the clock in front of the discs 2 and 3.

The disc 2 is formed preferably of light sheet metal or other suitable material, and has a radial slit 8 extending from an opening 8^a at its center to a point adjacent its periphery, preferably in the direction of the hour-indicating numeral "6" on the ring or annulus 6. A portion of the disc 2 is cut away between a substantially horizontal line extending to the right of the slit 8 and a second line parallel to said line to afford a space 15 for a purpose to appear later, and an arcuate slit 9 extends from such cutaway portion to a point above a horizontal line through the center of the disc. The portion or segment 2^a of the disc 2 between the radial slit 8 and the arcuate slit 9, is freely flexible. The body of the disc 2 is spaced from the frame member 4 of the clock, and the ring or annulus 6 which bears the numerals is spaced from the body of the disc 2 so as to permit the portion 2^a of the disc to be flexed forwardly and rearwardly.

The disc 3 is also formed of light sheet metal or other suitable material, and has a radial slit 10 extending from its periphery to an arcuate slit 10^a adjacent to its center. The flexible segment 2^a of the disc 2, and the flexible nature of the disc 3, permits the leading radial edge 3^a of the disc 3 to be flexed forwardly or rearwardly beyond the plane of the disc 2 when, during rotation of the disc 3, such edge comes into alignment with the slit 8 of the disc 2. If at that time the leading radial edge 3^a of the disc 3 is flexed forwardly it moves through the slit 8 from behind the disc 2 over the front side or face of the disc 2, but if at that time the leading radial edge 3^a of the disc 3 is flexed rearwardly it moves through the slit 8 from in front of the disc 2 behind the latter.

Means are provided for flexing the leading radial edge 3^a of the disc 3 to cause it to move through the slit 8 of the disc 2 in front of or behind the disc 2. The means shown for this purpose will now be described. As shown in Figures 7, 8, and 9 a block 11 is arranged in the space 15 of the disc 2, which block has, in its upper side, a pair of vertically disposed intersecting grooves 12 and 13, and the disc 3 has a lip 14 extending radially therefrom with one of its edges in alignment with the leading radial edge 3^a thereof, which lip is adapted, at the end of each rotation of the leading radial edge of the disc 3, to move through one or the other of said grooves. The grooves 12 and 13 are angularly disposed to the plane of the disc 2, the groove 12 extending from a point rearwardly of the disc 2 to a point forwardly of such disc, so that, when the lip 14 of the disc 3 enters and moves through said groove, the leading radial edge 3^a of the disc 3 will be flexed forwardly and caused to move through the slit 8 of the disc 2 in front of the latter disc. The groove 13 extends from a point forwardly of the disc 2 to a point rearwardly of such disc, so that, when the lip 14 enters and moves through said groove, the leading radial edge 3^a of the disc 3 will be flexed rearwardly through the slit 8 of the disc 2 to cause said disc to move behind the disc 2. The block 11 is supported in the space 15 of the disc 2 by a spring 16 secured to the front frame member 4 of the clock. The spring 16 supports the block 11 with the right hand or entrance ends of its grooves 12 and 13 positioned in the path of the lip 14 on the disc 3 as said lip approaches the slit 8 of the disc 2, and permits the block to yield slightly during the passage of the lip through either of the grooves.

The disc 2 has an annular series of lugs 17 projecting from its front face which contact with the rear side of the disc 3 when the disc 3 is moving over the front face of the disc 2, and the disc 3 has an annular series of lugs 18 projecting from its front face which contact with the rear of the disk 2 when the disc 3 is moving behind the disc 2. The lugs 17 and 18 prevent the opposing faces of the two discs from contacting throughout their whole extent and thus prevent abrasion of the faces of said discs by the rotation of the disc 3 relatively to the disc 2.

The ring or annulus 6 is opaque and overlies peripheral portions of the discs 2 and 3, and the hour-indicating numerals 7 borne by said ring or annulus are of a color contrasting with that of the ring or annulus. For example, the ring or annulus may be white and the hour-indicating numerals may be black or vice versa. Obviously the disc 2 may be coated with luminous paint in order that the portion thereof not covered by the disc 3 may be clearly visible at night. Minute-designating marks are also provided on the annulus between the adjacent hour-indicating numerals, as shown in Fig. 1, to cooperate with the minute hand 20 of the clock.

A modified form of the dial is illustrated in Figures 10, 11, and 12, where the hour-indicating numerals are shown as outlined in a color contrasting with that of the disc 2' on a transparent disc 19 disposed in front of the discs 2' and 3' having the radial slits 8' and 10' respectively, the disc 3' having a lip 14' thereon corresponding to the lip 14 of the disc 3 hereinbefore described and having a leading edge $3^{a'}$, and the discs 2' and 3' are shown as being of a diameter large enough to lie behind the hour-indicating numerals. The hour-indicating numerals borne by the transpar-

ent disc 19 and designated 7a may be of substantially the same color as the light colored disc 2' outlined in substantially the same color as the dark colored disc 3', so that, when a portion of the dark colored disc 3' is behind any of such numerals, such numerals will appear as wholly of the same color as the light colored disc 2' and any numerals behind which a portion of the dark colored disc 3' is not disposed will appear in the same color as the light colored disc 2' but outlined in the same color as the dark colored disc 3'.

The minute hand 20 of the clock may be painted substantially the same color as the light colored disc 2 or 2' with a border or margin of substantially the same color as the dark colored disc 3 or 3', so that, when it occupies a position over the dark colored disc 3 or 3', its light colored portion will be clearly visible and, when it occupies a position over an uncovered portion of the light colored disc 2 or 2', its dark colored portion will be clearly visible.

Shafts 21 and 22 rotated by clock mechanism, not shown, operate the hour arbor 5 and the minute arbor 23. The hour arbor 5 is connected to the shaft 21 by gears 24, and the minute arbor 23 is connected to the hour arbor 5 by gears 25. Any well known mechanical or electrical clock mechanism may be employed, as will be understood. Any suitable means for setting the disc 3 and the minute hand 20 may be employed. The means shown for that purpose in Figures 1 and 2 comprises a vertically extending and manually operable shaft 26 connected to the arbors 5 and 23 by a train of gears 27, including a gear 28 engageable by a gear 29 on the shaft 26 when the disc 3 and hand 20 are to be set. The shaft 26 is vertically slidable in a bracket 30 which supports the gears 27, and it is normally held by a spring 31 in position to maintain its gear 29 out of engagement with the gear 28. A plate 32 may be mounted on the hour arbor 5 behind the discs 2 and 3 as shown in Fig. 2 to prevent contact thereof with the clock mechanism.

In the operation of the clock as shown in Figs. 1 to 9 inclusive, the dark colored disc 3 is rotated at a rate corresponding to the rate of movement of the hour hand of a clock. Durin the "dark" hours of the day, the dark colored disc 3 moves through the slit 8 from behind the light colored disc 2. As the dark colored disc 3 moves through the slit 8 of the disc 2 it gradually covers the face of the light colored disc 2, with the result that the dial will, in effect, change from a light to a dark color proportionately as the "dark" hours of the day pass. At the end of the "dark" hours of the day, the dark colored disc 3 will extend completely over the face of the light colored disc 2 and, just before the leading radial edge 3a of said disc comes into alignment with the slit 8 of the disc 2 the lip 14 of said disc will enter the right-hand end (Figures 7, 8, and 9) of the groove 13 in the block 11 whereby the leading radial edge of the disc 3 will be deflected rearwardly and caused to enter the slit 8 of the disc 2 so as to move behind the latter disc, so that, during the "light" hours of the day, the dark colored disc 3 will move through the slit 8 behind the light colored disc 2. As the dark colored disc moves through said slit behind the light colored disc 2, it will gradually uncover the front face of the light colored disc 2, with the result that the face of the clock within the annulus 6 will, in effect, change from a dark to a light color proportionately as the "light" hours of the day pass. At the end of the "light" hours of the day, the dark colored disc 3 will be wholly disposed behind the light colored disc 2, whereupon its leading radial edge 3a will be deflected forwardly through the slit 8 by the movement of its lip 14 through the groove 12 of the block 11 so that, during the "dark" hours of the next day, the dark colored disc 3 will again move over the front face of the light colored disc 2.

Due to the arrangement of the slit 8 of the light colored disc 2 in radial alignment with the hour-indicating numeral "6", the dark colored disc 3 will start to move over or cover the face of the light colored disc 2 at 6 P. M., and it will start to move from or uncover the face of the light colored disc at 6 A. M., the hours from 6 P. M. to 6 A. M. being considered the "dark" hours of the day, and the hours from 6 A. M. to 6 P. M. being considered the "light" hours of the day. As the periods at which the dark colored disc 3 starts to move over and from the face of the light colored disc 2, depends upon the hour-indicating numeral in alignment with which the slit 8 is arranged, it should be apparent that any of the other twelve consecutive hours of the day may be considered the "dark" hours of the day and the remaining twelve hours the "light" hours of the day. For example, the slit 8 of the light colored disc 2 may be disposed in radial alignment with the hour-indicating numeral "7", and the block 11 may be correspondingly disposed. Under these conditions, the hours from 7 P. M. to 7 A. M. and the hours from 7 A. M. to 7 P. M. may be considered the "dark" and "light" hours, respectively, of the day.

The operation of the clock embodying a dial as shown in Figs. 10 to 13 inclusive is the same as just described, the light colored and dark colored discs 2' and 3' however cooperating with the hour-indicating numerals 7a in the manner hereinbefore described with reference to these figures.

I claim as my invention:

1. A dial for a timepiece, comprising a stationary circular disc having a radial slit, a second circular disc concentric with the stationary disc and rotatable relatively thereto, said second dial having a radial slit, means for rotating said second disc, and means operable at the end of one rotation of the second disc to direct one edge of the radial slit thereof through the radial slit of the stationary disc over the front face of the latter disc and operable at the end of the next rotation of the second disc to direct said edge through the radial slit of the stationary disc behind the latter.

2. A dial for a timepiece, comprising a pair of concentric discs each having a radial slit, clock means for rotating one of said discs relatively to the other, and means engageable with one of said discs, at approximately the end of one rotation of said disc relatively to the other disc, for directing a radial edge of such disc forwardly through the radial slit of the other disc and, at the end of the next rotation of such disc, to direct said radial edge thereof rearwardly through the slit of the other disc.

3. A dial for a timepiece comprising a pair of discs relatively rotatable to one another on a common axis, each of said discs having a radial slit, one of said discs having a tongue projecting radially therefrom adjacent its radial slit, a member mounted adjacent the outer end of the radial slit of the other disc and having a pair of grooves directed toward the periphery of the first named disc and angularly disposed relatively to one another and to said disc, each of said grooves having

its opposite ends disposed, respectively, behind and in front of the first named disc, one of said grooves being adapted, when the leading radial edge of the first named disc has completed one revolution, to receive the tongue of said disc and guide a radial edge of said disc forwardly through the radial slit of the other disc and the other of said grooves being adapted, when said radial edge has completed its next revolution, to receive said tongue and guide said radial edge rearwardly through the radial slit of the other disc.

4. A timepiece according to claim 1 wherein the face of one of the discs is of a color contrasting with that of the face of the other disc.

5. A dial for a timepiece according to claim 1 including an annulus overlying the peripheries of the two discs and bearing hour-designating numerals and minute-designating marks between adjacent hour-indicating numerals, a minute hand movable over said annulus, and means for imparting a complete revolution of said minute hand relatively to said annulus during each movement of the leading edge of the movable disc between each adjacent pair of said hour-designating numerals.

6. A dial for a timepiece comprising a transparent dial member having hour-designating numerals outlined thereon, a pair of discs behind said dial, the front face of one of said discs being of substantially the same color as that of the hour designating numerals of said dial member and each of said discs having a radial slot, one of said discs being rotatable relatively to the other concentrically with said dial member, means engageable with said rotatable disc near the end of each revolution thereof and operable at the end of one revolution of said rotatable disc to direct a radial edge of said disc forwardly through the radial slit of the other disc and at the end of the next revolution of said rotatable disc to direct said radial edge rearwardly through the radial slit of the other disc, and means for imparting a complete revolution to said rotatable disc once every twelve hours.

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