Dec. 16, 1941. A. R. FERGUSSON 2,266,183

TIMEPIECE

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Fig. 1.

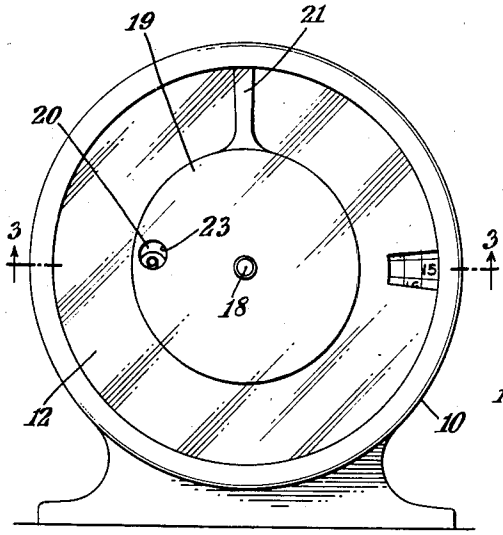


Fig. 2.

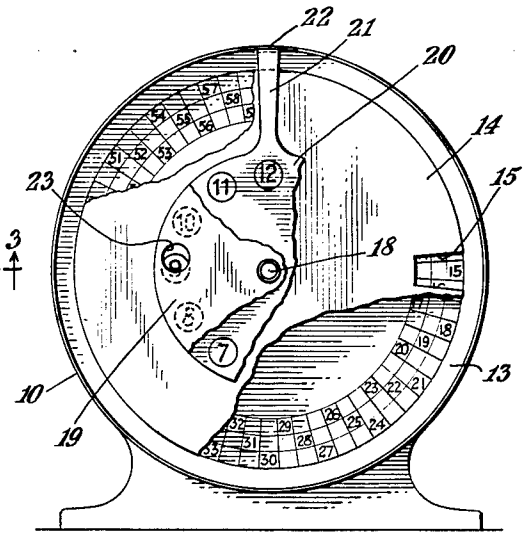


Fig. 3.

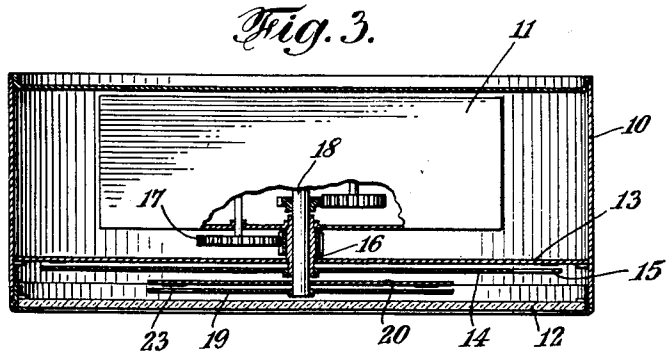
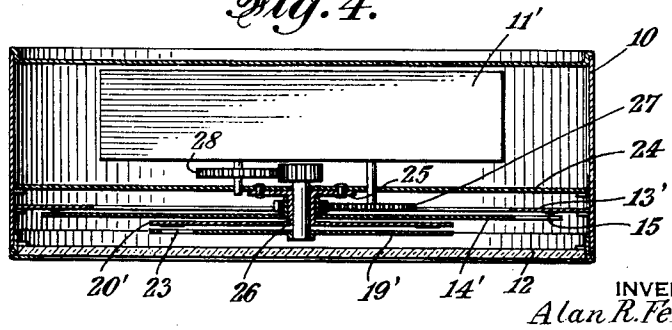


Fig. 4.



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Fig. 7.

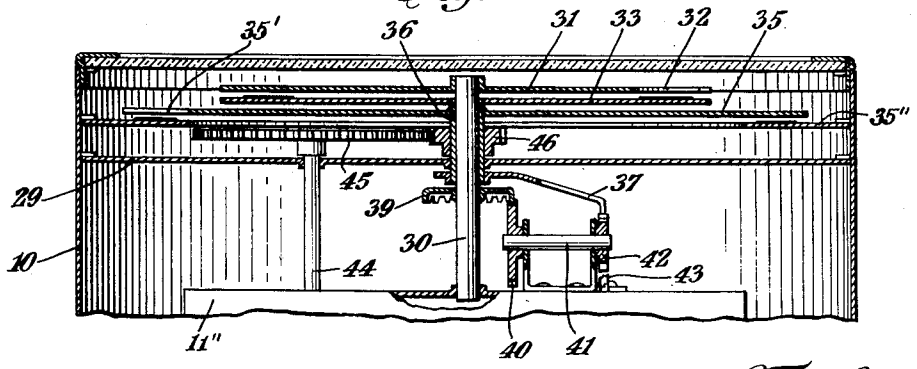


Fig. 6.

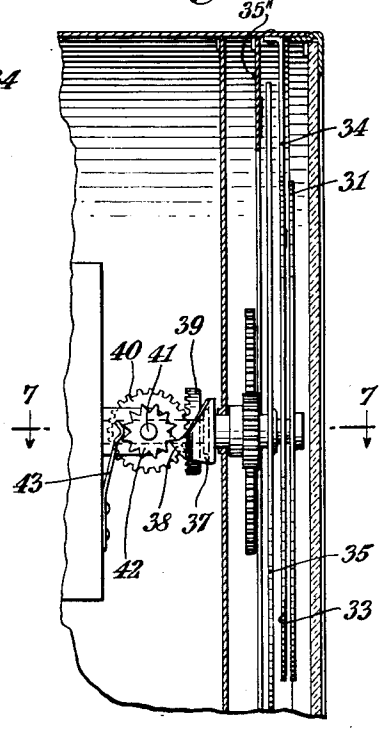
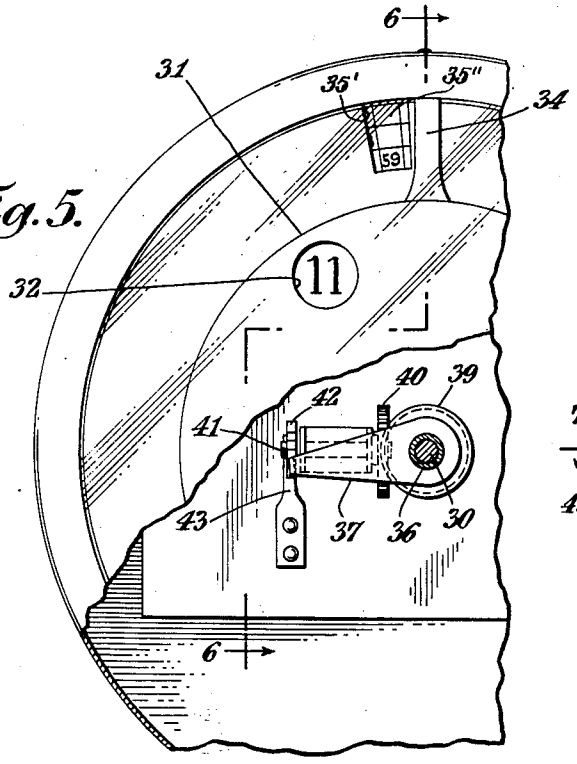


Fig. 5.



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UNITED STATES PATENT OFFICE

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TIMEPIECE

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Application March 13, 1941, Serial No. 383,067

7 Claims. (Cl. 58—125)

This invention relates to timepieces in general, and especially to the arrangement for indicating minutes and hours, in that it is contemplated to substitute for the usual minute and hour hands, movable minute and hour discs provided with suitable apertures, through which latter fixed time-indices impressed upon a stationary dial may be observed, as the discs rotate about their center axis.

One of the objects of the present invention is to provide a timepiece, wherein are provided at least two fixed time-indices carriers, one having minute indicia, the other hour indicia, said carriers being spaced from and superimposed above one another, the minute indices carrier being considerably larger than the hour-indices carrier, and wherein rotary minute and hour discs, are provided for each of the respective carriers, which discs are equipped with suitable openings for exposing the digits provided upon the carriers.

A further object of the present invention is to provide in conjunction with the aforedescribed timepiece, a minute-indices carrier wherein the minutes-indicating numbers are arranged in three concentric circles, and wherein the numbers are grouped in units of three individual numbers which are offset in respect to one another, and wherein the minute disc is provided with an opening large enough to expose at one time at least one full minute number and portions of adjacent minute numbers when passing over the minute-indices carrier.

Another object of this invention is to provide in a timepiece indicated, an hour-indices carrier of a substantially disc-like form, and wherein means are provided in the casing of the timepiece for periodically holding the carrier against movement within the casing structure of the timepiece.

Another object of the present invention is to provide in a timepiece, fixed minute and hour-indices carriers, spaced from one another, and movable minute and hour discs cooperating with their respective carriers, and wherein means are provided for actuating the hour disc by the operation of the minute disc at the moment when the latter approaches, and is about to pass the mark indicating the sixtieth minute of the hour.

The foregoing and still further objects and advantages of the present invention will become more fully apparent from the following description of the accompanying drawings, forming presently preferred forms of my invention, and in which

Fig. 1 is a front elevation of my timepiece;

Fig. 2 is a similar illustration with portions broken off;

Fig. 3 is a sectional view taken on line 3—3 of Fig. 1;

Fig. 4 illustrates a modified form of construction of my timepiece, shown also in section;

Fig. 5 is a partial plan view of another embodiment of my timepiece;

Fig. 6 is a partial cross sectional view taken on line 6—6 of Fig. 5; and

Fig. 7 is a vertical cross sectional view taken on line 7—7 of Fig. 6.

Referring now to Figs. 1, 2 and 3, numeral 10 denotes a casing structure within which is provided a clockwork or motor 11, serving as motive power for the timepiece. At the front of the structure is the usual crystal or glass cover 12, beneath which is mounted a disc-like frame 13 and the visible, operative portion of the timepiece. As shown in Fig. 2, frame 13 serves as minute-indices carrier, upon which are impressed or otherwise provided three concentric rows of numerals, arranged in fields or groups of three. The numerals of each group are offset relative to one another.

Movably mounted adjacent to minute-indices carrier 13 is a minute disc 14, provided with an opening 15, which latter is so dimensioned as to expose at least one of the numerals of one number group and portions of numerals adjacent to the exposed numeral. Minute disc 14 is mounted on a sleeve or hollow shaft 16 and is actuated by gear 17 from motor 11. Passing through sleeve 16 is shaft 18 upon which is mounted hour disc 19. The later is superimposed above a fixed hour-indices carrier 20. This carrier is in the form of a disc from which projects arm 21, extending and secured to rim 22 of the casing. (See Fig. 2.) Hour disc 19 is provided with an aperture 23, which is adapted to expose the hour numerals provided upon carrier 20.

In Fig. 4 a somewhat different construction of my timepiece is illustrated, wherein an intermediate frame member 24 is added, which supports flange 25 of a fixed sleeve 26, to which latter is secured the hour-indices carrier 20'. In this construction the numerals indicating minutes are placed upon a ring dial 13', above which operates a minute disc 14', driven by a gear train 27, whereas the hour disc 19' is actuated by a gear train 28, extending from motor 11'.

Another embodiment of my invention is illustrated in Figs. 5, 6 and 7. Here again a casing 10 is shown, within which is mounted a motor 11'', disposed behind a brace or frame member 29. Extending from and rotatably lodged at the center of motor 11'' is a shaft 30, at the upper end of which is secured hour disc 31, provided with aperture 32. Below hour disc 31 is arranged an hour-indices carrier 33, which is secured against movement by arm 34. (See Figs. 5 and 6.) Beneath the hour-indices carrier is operatively mounted minute disc 35, which is secured to a sleeve 36, the latter extending through frame 29 and being guided by shaft 30. Minute disc 35 has an opening 35', which is intended to

expose the minute markings provided upon minute indices ring 35'', disposed beneath disc 35 and secured to casing 10. These minute markings upon ring 35'' are similar to those shown on disc 13 of Fig. 2. At the other end of sleeve 36 is fixedly mounted an arm 37 terminating in sharp point 38 (See Fig. 6.)

Below the attached end of arm 37 there is secured to free shaft 30 an inverted gear 39, which is in engagement at right angles with a gear 40, fixedly mounted at one end of short shaft 41, which latter is disposed at right angles to shaft 30. At the other end of shaft 41 there is secured a star wheel 42, which is normally held against movement by a spring detent 43. (See Fig. 6.) It will be observed that star wheel 42 possesses twelve points and twelve depressions, intended for a twelve hour timepiece. Obviously for a twenty-four hour timepiece a corresponding number of prongs and depressions must be provided.

As shown in Fig. 7, a drive shaft 44 extends from motor 11'' and carries a gear 45 in engagement with gear 46, which is keyed to sleeve 36 of the minute disc.

Operation

The minute disc is operated from motor 11'' through shaft 44, gears 45 and 46. As the minute disc travels over minute indices ring 35'', aperture 35' successively exposes the minute numbers marked upon the ring. Since gear 46 is mounted on sleeve 36, and this sleeve carries arm 37, the latter will be also rotated together with minute disc 35. Upon a full rotation of arm 37 point 38 of the latter will engage one of the prongs of star wheel 42, whereby shaft 41 is actuated and causes, through gears 40 and 39, the turning of shaft 30, upon which hour disc 31 is mounted. Each movement of shaft 41 brings opening 32 of hour disc 31 above an hour numeral provided upon carrier 33. Thus the hour disc is being actuated through the movement of the minute disc every sixty minutes. The movement of the hour disc takes place at the moment when the opening of the minute disc approaches and is about to pass over numeral 60 or zero of the minute-indices carrier, mounted below.

While I have described in the foregoing specific forms of my invention, it is quite obvious that changes and improvements may be incorporated therein, and I therefore reserve for myself the right to make such changes and improvements, without departing from the broad scope of my invention, as defined by the annexed claims.

I claim:

1. In a timepiece, a casing, stationary minute-indices and hour-indices carriers fixedly held in the casing and spaced from and superimposed above one another, and movable minute and hour discs operatively mounted in near proximity to the said respective carriers, said minute-indices carrier being provided with three concentric rows of numerals, said numerals being grouped to form units of three individual numbers, offset relative to one another, said minute disc being provided with an opening large enough to always fully disclose at least one of the numbers of one unit, and portions of adjacent numbers.

2. In a timepiece, as per claim 1, said hour-indices carrier being smaller than the minutes-indices carrier and being provided with means for fixedly engaging the casing structure.

3. In a timepiece, as per claim 1, said hour-indices carrier being smaller than the minutes-indices carrier and being provided with means for fixedly engaging the casing structure, said hour-indices carrier comprising a disc formation, said means for fixedly engaging the casing structure comprising an arm extending from said disc formation, said arm extending and being secured to the body of the casing.

4. In a timepiece, as per claim 1, said hour-indices carrier being smaller than the minutes-indices carrier and being provided with means for fixedly engaging the casing, said hour indices carrier comprising a disc formation, said means for fixedly engaging the casing consisting of a flanged sleeve extending centrally from said disc formation, the flange of the sleeve being associated with the casing.

5. In a timepiece, a casing, frame members therewithin, a motor, stationary minute-indices and hour-indices carriers fixedly mounted in the casing and spaced from each other, a minute disc operatively mounted adjacent to the minutes-indices carrier, an hour disc operatively mounted adjacent to the hour-indices carrier, said motor actuating said minute and hour discs, said minute-indices carrier having three concentric rows of numerals, the latter being grouped in units of three individual numbers which are offset to one another, said hour-indices carrier having hour numerals arranged in a circle, said minute disc having an opening large enough to always disclose at least one full number of one unit and portions of adjacent numbers, said hour disc having an opening adapted to disclose but one hour numeral at one time.

6. In a timepiece, as per claim 5, transmission means connecting said motor with the minute disc and including a sleeve for the latter and a gear on the sleeve driven by the motor, and means for hourly actuating the hour disc through the operation of the minute disc when the opening of the latter approaches a position at which numeral sixty of the minute-indices carrier becomes visible.

7. In a timepiece, as per claim 5, transmission means connecting said motor with the minute disc and including a sleeve for the latter and a gear on the sleeve driven by the motor, and means for hourly actuating the hour disc through the operation of the minute disc when the opening of the latter approaches a position at which numeral sixty of the minute-indices carrier becomes visible, said hour disc actuating means comprising an arm fixedly associated with the sleeve of the minute disc and adapted to complete one full revolution every sixty minutes, a gear transmission having a shaft disposed at right angles to the axis of the hour disc, a gear associated with the shaft of the hour disc, a gear fixedly mounted upon the transmission shaft, in engagement with the hour shaft gear, and a detent-controlled star wheel, also mounted rigidly with the transmission shaft, said star wheel being actuated by said minute disc arm once every hour, whereby the hour disc is caused to move hourly so that its opening will expose consecutively the hour digits provided upon the hour-indices carrier therebelow.

ALAN R. FERGUSSON.