

Dec. 22, 1936.

G. O. HARM

2,065,491

CLOCK

Filed Aug. 7, 1934

2 Sheets-Sheet 1

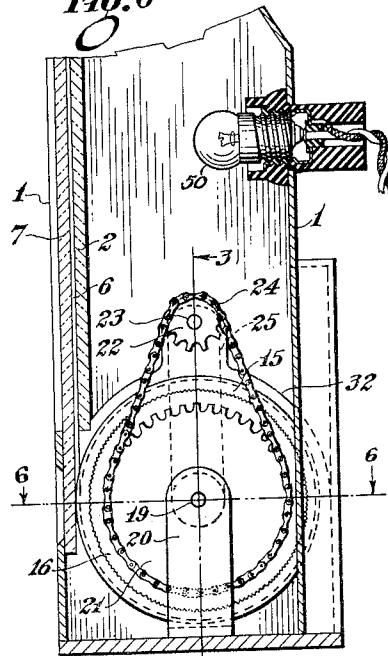
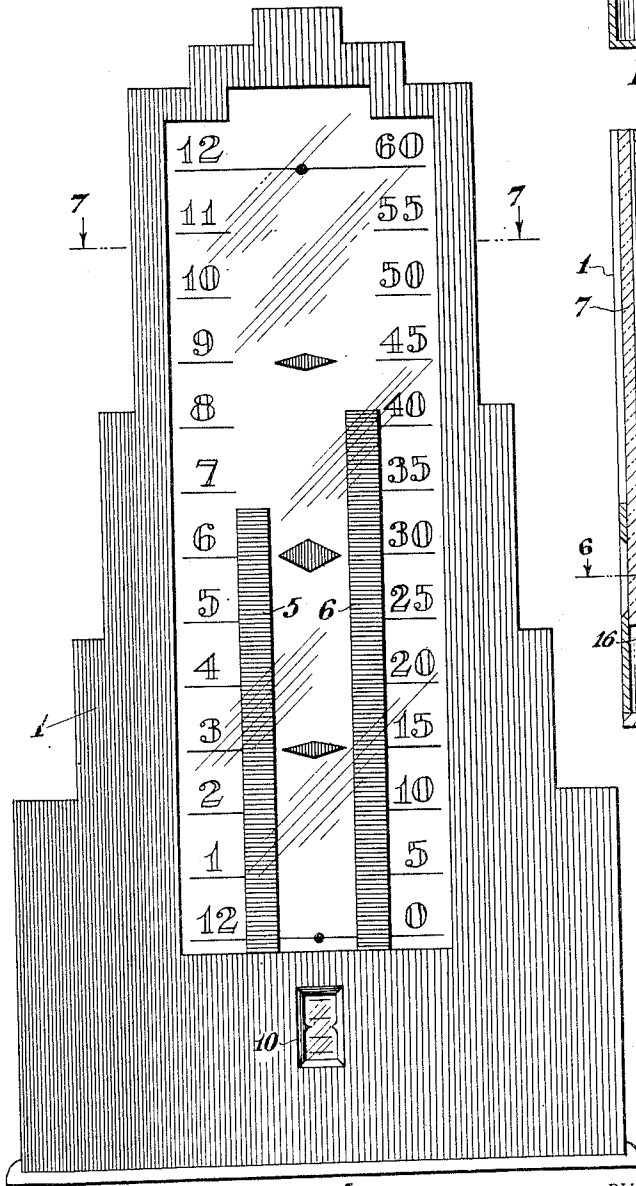
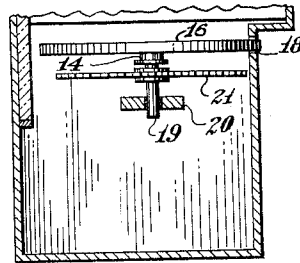
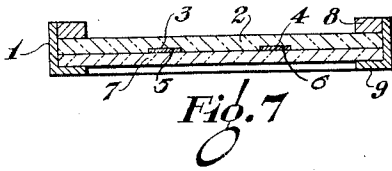


Fig. 1

Fig. 2

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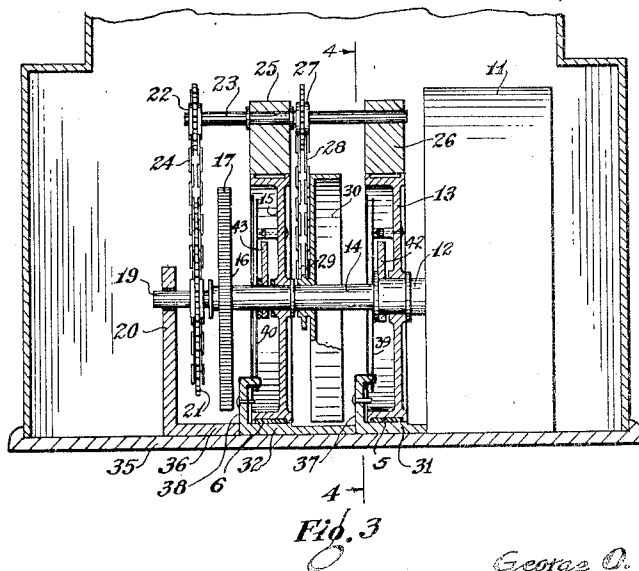
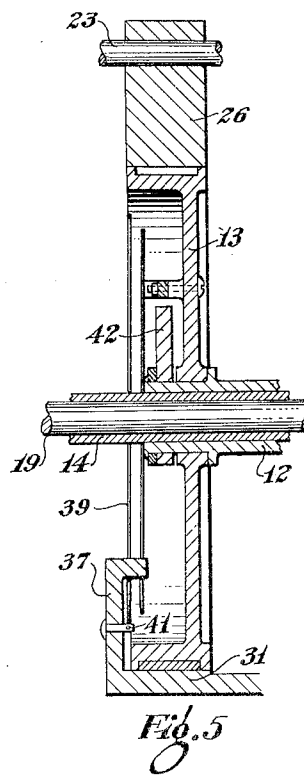
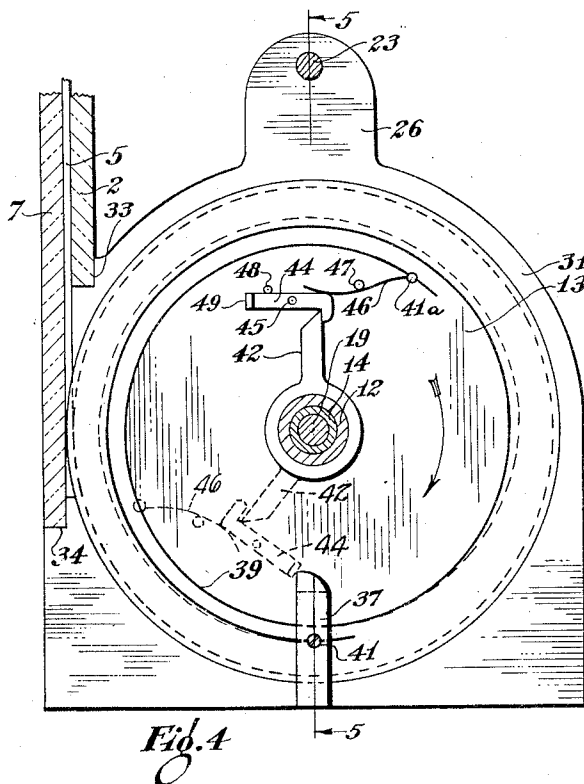
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2,065,491

CLOCK

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2 Sheets-Sheet 2



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2,065,491

CLOCK

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6 Claims. (Cl. 58—2)

My invention is an improvement in clocks, and relates more particularly to electric clocks and to novel mechanism for and manner of displaying the time.

5 It has been the common practice, heretofore, to arrange numerals or other indicia for indicating the time, in a circular series about the face of a clock or watch, and providing suitable pointers or hands which are adapted to be re-
10 volved over the face by means of suitable mechanism to indicate the time. In these instruments it is necessary that the second, minute and hour hands be mounted on shafts which
15 protrude through the face of the instrument and which must be freely rotatable through the opening in the face and spaced from the walls thereof. While such an instrument and the manner of indicating the time thereon is more or less the conventional style, I have, by my
20 invention, produced a clock having an imperforate face bearing suitably arranged indicia, thereby eliminating the passage of dust through the face and into the interior of the clock mechanism, and increasing the ease in quickly
25 observing the time.

It is, therefore, one of the objects of this invention to construct a clock having a face whereon the hours and minutes are displayed in separate linear series of indicia.

30 It is a further object of my invention to provide a novel means or method of indicating the time which includes one or more members slidable along the face of the clock adjacent the linear series of indicia.

35 It is another object of my invention to construct a clock including a simple drive mechanism for a time indicating means of the type referred to.

40 A still further object of my invention is to simplify the construction of electric clocks and to improve the appearance of the same by eliminating shafts or other driving means passing through the clock face for indicating the hour and minute of the day or night.

45 Other objects and advantages of my invention will become more apparent from the following description of an embodiment thereof, reference being made to the accompanying drawings in which like reference characters are employed to designate like parts throughout the same.

In the drawings:

55 Figure 1 is a front elevation of a clock embodying my invention;

Figure 2 is a vertical section of the lower fragment of the clock;

Figure 3 is a section through the lower portion of the clock and is taken on a line 3—3 of Figure 2;

Figure 4 is an enlarged section taken on line 4—4 of Figure 3 and shows in dotted lines the positions of the parts at the beginning of movement of one of the indicator strips upwardly of the clock face;

Figure 5 is a section taken on line 5—5 of Figure 4;

Figure 6 is a section taken on line 6—6 of Figure 2; and

Figure 7 is a section taken on line 7—7 of Figure 1.

By means of my invention the observer will be able more readily to determine the time of day or night. This is primarily due to the particular arrangement of the indicia on the face of the clock and the sliding indicator operating adjacent each linear series of indicia. It is to be understood that while I have shown the present embodiment as applied to an electric clock, the invention is equally well adapted to mechanical clocks driven by a spring motor or other means, and to watches.

In carrying out my invention as applied to the embodiment shown in the accompanying drawings, I provide a clock casing 1, which is preferably of an ornamental type or design and which is provided with a vertical, elongated opening for displaying the clock face insertable in the casing. The clock face comprises an oblong piece of glass or any other suitable material 2 either opaque or transparent and carries spaced linear series of indicia representing the hours and minutes over a twelve hour period. The outer surface of the piece is grooved or recessed as at 3 and 4 to receive and guide the indicator strips 5 and 6, respectively, as they slide over the face adjacent the respective series of indicia on the face. An outer plate 7, which is preferably transparent is superimposed upon the plate 2, and the plates 2 and 7 fit between the frame members 8 and 9 of the clock body as illustrated more particularly in Figure 7. A window 10 may also be provided in the lower clock casing for purposes which will be more fully described hereinafter.

According to my invention I have provided a simple mechanism for sliding the indicating strips 5 and 6 progressively upwardly over the face of the clock to indicate respectively the hour and minute of time. I have also provided an

automatic return for the indicating strips when they have respectively reached the upward limits of their movement over the face of the clock over a period of twelve hours so that the cycle of operation may proceed over succeeding periods of similar duration.

A suitable synchronous motor and gear reduction means are housed within the casing 11 in the base of the clock, the motor being connected to a source of electrical energy (not shown) and deriving power therefrom for its operation. Extending from the casing 11 is a hollow shaft 12 which revolves at the rate of one revolution every twelve hours. This hollow shaft 12 extends forwardly of the casing 11 and supports the hour drum 13 which is operated by this shaft. Another hollow shaft 14 concentric within the hollow shaft 12 also extends forwardly of the casing 11 and beyond the end of the shaft 12 to support the minute drum 15. This other shaft 14 revolves at the rate of one revolution per hour and operates the minute drum at this rate. Also carried on this other shaft 14 is a disc 16, the periphery of which is serrated or roughened as at 17. This disc is fixed to the shaft 14 and, as shown in Figures 2 and 6, projects through an opening to the rear of the clock casing, as at 18, where it is easily accessible to the user for purposes of setting the positions of the hour and minute drums 13 and 15, and, of course, the indicating strips operated by these drums. In this way the clock can easily be set to the correct time.

A shaft 19 concentric with the hollow shafts 12 and 14, and operating within the shaft 14 extends forwardly from the casing 11, its outer end operating in a bearing bracket 20 as shown in Figure 3. The shaft 19 also revolves at a rate of speed sufficient to visibly observe that it is operating, and has fixed thereto a sprocket wheel 21 having a driving connection with the sprocket 22 on the shaft 23, through the medium of a belt or chain 24.

The shaft 23 operates through suitable openings in the bearing blocks 25 and 26 of the minute and hour revolving units. The bearing blocks 25 and 26 are formed as a part of the respective stationary casings of the minute unit 15 and the hour unit 13. The shaft 23 drives a sprocket 27 fixed thereon which in turn has driving connection by means of the belt or chain 28 with a sprocket 29 formed as a part of the second drum 30 which revolves freely on the hollow shaft 14 and which is provided about its periphery with markings which may indicate seconds of time. The periphery of the drum 30 may also be decorated to produce various effects when viewed through the window 10 provided in the lower portion of the clock case.

The hour and minute drums 13 and 15 are rotatable within the housings 31 and 32 respectively which fit the respective drums substantially throughout their peripheries as illustrated in Figures 2 and 4, except for a restricted portion to permit the respective strips 5 and 6 to pass tangentially from the drum peripheries into the respective guiding grooves 3 and 4 of the clock face. It will be noted that the construction is quite compact and that the plate or face 2 is supported in the seats 33 provided in the housings 31 and 32. The outer or cover plate 7 is likewise supported at 34. Each of the housings is constructed as a unit as indicated in Figure 3 and is supported on the clock base 35 in the position shown, the bearing bracket 20 having a base por-

tion 36 abutting the housing 32. The housings are formed to provide spring supports and stops 37 and 38, comprising upwardly projecting members having their upper ends turned inwardly toward the hubs of the drums housed therein.

To each of the respective brackets or supports 37 and 38 is attached an end of a spiral spring 39 and 40 respectively, as at 41 the opposite ends of the springs being attached to the respective drums 13 and 15 as at 41a. These springs are provided for the purpose of automatically returning the respective drums 13 and 15 to their normal positions, that is, so that the indicating strips 5 and 6 will return to their lowermost positions opposite the respective linear series of indicia, after said strips have reached the uppermost positions opposite the series. Each drum 13 and 15 is freely rotatable on its respective shaft to permit the return movement.

Arms 42 and 43 are fixed to the respective shafts 12 and 14 and rotate therewith to impart motion to the drums 13 and 15 respectively. These arms engage similar latches 44 pivotally carried on each of the said drums as at 45. Springs 46 are fixed to the drums at 41a and are held in compression against the latches by means of the pins 47 so that positive engagement of the latches with the arms is obtained. Pins 48 limit the movement of the latches during the period of release and return of the drums to normal position.

The end of each latch is bent outward at 49 so that when the drums revolve they will contact the stops 37 and as the movement continues, the ends 49 of the latches 44 will be depressed releasing the opposite ends from contact with the end of the arms 42 and 43 respectively. The spiral springs then become effective to return the drums in a counter-clockwise direction in Figure 4 and thus rewind the strips upon the drums. The arms 42 and 43 continue their rotative movement uninterrupted and again engage the latches 44 to repeat the cycle of operation.

I have described above the construction and operation of both the hour and minute units, but, as has been pointed out hereinbefore, it will be observed that each unit operates independently of the other because of the different speeds of the relative shafts 12 and 14.

When the face is made of transparent or translucent material and the indicia are opaque, or vice versa, a source of illumination such as an electric lamp 50 may be provided in a suitable position in the clock casing 1, and when energized will uniformly and adequately illuminate the entire face of the clock or the indicia as the case may be.

I will now describe one complete cycle of operation of the clock equivalent to a twelve hour period of time, since by the particular design shown the hour indicator must traverse the hour scale twice in twenty four hours. It is to be understood that while I have shown a twelve hour scale, a twenty-four hour scale may be substituted for it, and the speed of the shaft 12 reduced by one half.

Assuming that the strips 5 and 6 are at the starting point on the clock face, that is, the hour strip 5 is opposite the lower hour marked "12" on the scale, and the minute strip is opposite the 0 in the minute scale, the synchronous motor is caused to operate by connecting it with a source of electrical energy of the proper frequency for which the clock is built. Of course

this is also assuming the clock is started operating precisely at twelve o'clock noon or twelve o'clock midnight.

The shafts 12, 14 and 18 are caused to rotate continuously in one direction, but at different speeds, by virtue of the gear reduction unit, the shaft 12 rotating at the rate of one revolution in twelve hours, the shaft 14 at the rate of one revolution per hour and the shaft 18 preferably at a rate fast enough so that the markings on the drum 30 will be visible behind the window or opening 10 to show that the clock is in operation.

Rotation of the shaft 12 will cause the hour drum 13 to rotate in the same direction since the driving connection between the drum and the shaft is through the latch 44 and arm 42 in the position shown in the drawings. As this drum rotates, the strip 5 wound about its periphery and within the housing 31 is slowly unwound and pushed upwardly in the groove 3 of the clock face toward the next succeeding hours on the scale. When the free end of the strip reaches a point opposite the uppermost Figure "12" on this scale, the drum 13 will have made one substantially complete revolution. During this rotation the spiral spring 39 is placed under increasing tension until the latch 44 is released from its engagement with the arm 42 at the end of the revolution, thus permitting the drum to quickly rotate on the shaft 12 in the reverse direction to again engage the latch with the arm and re-establish the positive driving connection with the shaft 12. During this quick reverse rotation of the drum on the shaft 12 the strip 5, which is secured at one end to the periphery of the drum, is rewound on the drum and withdrawn downwardly in the groove 3 to its initial starting position. This operation is repeated as long as the motor is running.

The operation of the minute drum 15 is similar to that of the drum 13 except that its speed is increased to one revolution per hour, the strip 6 indicating minutes of elapsed time on the minute scale. As the drum rotates the strip 6 is pushed upwardly in the groove 4 of the face until it reaches its uppermost limit of movement opposite the marking "60" on the scale. At this point the latch is released and the spiral spring 40 rotates the drum quickly in a reverse direction to withdraw the free end of the strip toward the lowermost position opposite the marking "0" on the scale. At the same time this strip is wound upon the periphery of the drum 15. This operation is repeated as long as this motor is running.

When it is desired to set the strips to a predetermined hour and minute, as in starting the clock between twelve noon and twelve midnight, the operator turns the disc 16. This movement is imparted through the shaft 14 and the mechanism within the casing 11.

From the foregoing it will be seen that I have provided a very simple, compact and inexpensive mechanism for easily and quickly observing the time and elapsed time. It will be understood that while the strips 5 and 6 are shown as operating alongside the linear series of indicia, they

may be caused to overlie these indicia during their movement.

Various changes in the details of construction and arrangement of parts may be made without departing from the spirit of my invention or the scope of the appended claims.

I claim:

1. In a clock, a face, a linear series of indicia on said face, an indicator strip slidable over said face and adjacent said linear series of indicia, and means for imparting movement to said strip, said means including a driving motor, a shaft driven by said motor in but one direction, a drum freely rotatable on said shaft, one end of said strip being secured to the periphery of said drum, and means on said shaft and said drum for imparting intermittent movement to the latter in one direction.

2. In a clock, a face, spaced linear series of indicia on said face, indicator strips slidable along the face and adjacent said indicia, and means for sliding said members, said means including a driving motor, a plurality of shafts driven by said motor in but one direction at relatively different speeds, members freely rotatable on each of said shafts and means on each of said shafts and the respective rotatable members for imparting intermittent movement to the latter.

3. In a clock, a face, spaced linear series of indicia on said face, members slidable along the face and adjacent said indicia, and means for sliding said members, said means including a driving motor, a plurality of shafts driven by said motor in but one direction at relatively different speeds, members freely rotatable on each of said shafts and means on each of said shafts and the respective rotatable members for imparting intermittent movement to the latter.

4. In a clock, a face, spaced linear series of indicia on said face, members slidable along the face and adjacent said indicia, and means for sliding said members, said means including a driving motor, a plurality of shafts driven by said motor in but one direction at relatively different speeds, members freely rotatable on each of said shafts, a resetting member fixed to one of said shafts, and means on each of said shafts and the respective rotatable members for imparting intermittent movement to the latter.

5. A clock including a face scaled for hours and minutes of time and having guiding means along its outer surface adjacent the scaled portions, strips slidable in said means, and means for sliding said strips at relatively different speeds.

6. A clock including a face scaled for hours and minutes of time and having guiding means along its outer surface adjacent the scaled portions, strips slidable in said means, means for sliding said strips in one direction at speeds corresponding to elapsing hours and minutes of time, and means for quickly retracting said strips after they have reached their limits of movement in one direction.

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