United States Patent

[11] 3,587,222

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[54] **LINEAR CLOCK**
6 Claims, 5 Drawing Figs.

[52] **U.S. Cl.** **58/2,** 58/127
[51] **Int. Cl.** **G04b 45/00**
[50] **Field of Search** ..... 58/1, 2, 125 (C); 116/116

[56] **References Cited**

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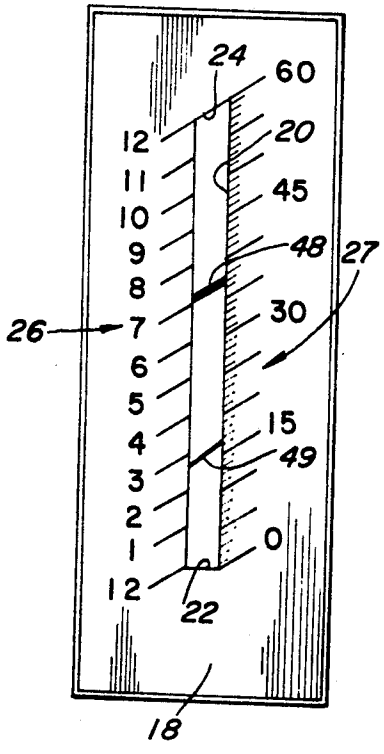
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Attorney—David D. Kaufman

ABSTRACT: A clock face employs a linear scale alongside an elongated slot. The face is positioned over one or a pair of helixes so that only a short, straight-line segment is visible therethrough. As the helix or pair of helixes is rotated by the clock movement, the visible segments travel longitudinally of the slot and indicate the time.



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FIG - 1

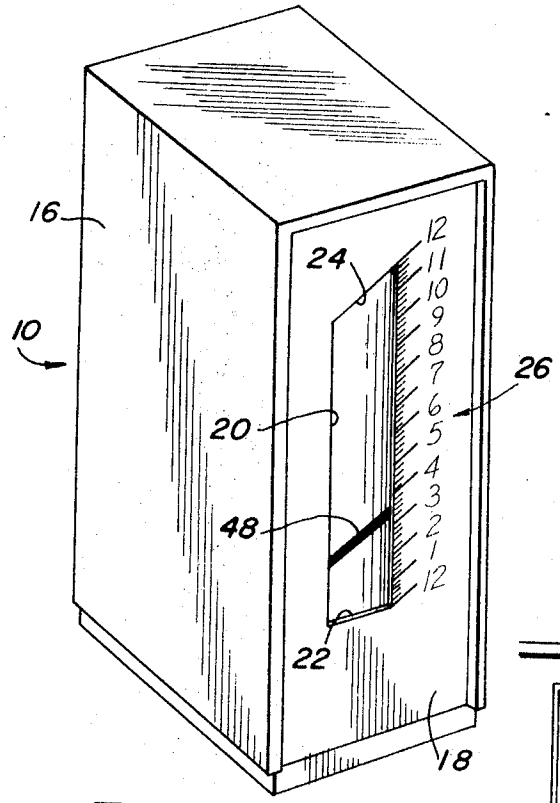
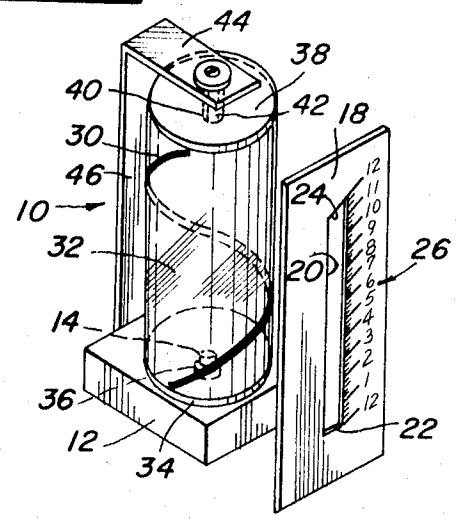


FIG - 2



TRANSPARENT CYLINDER 32

FIG - 4

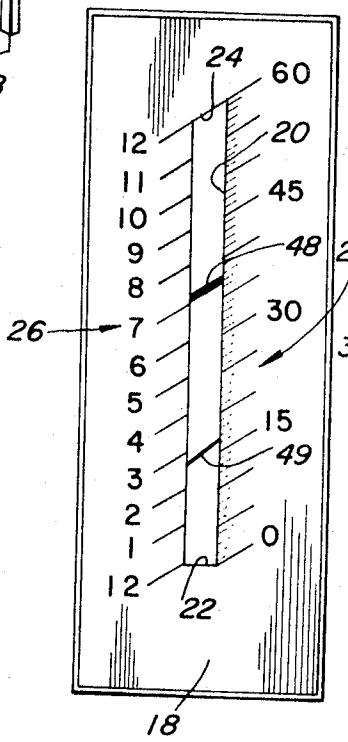


FIG - 3

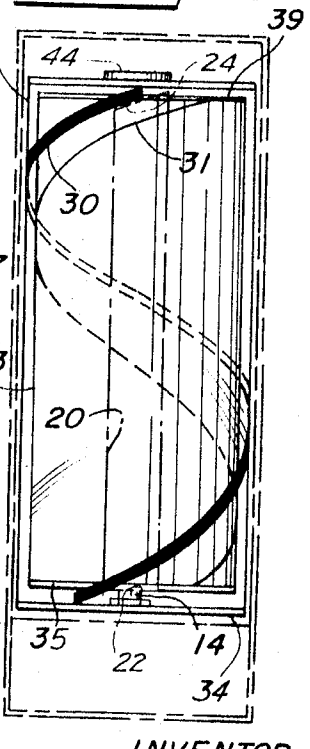
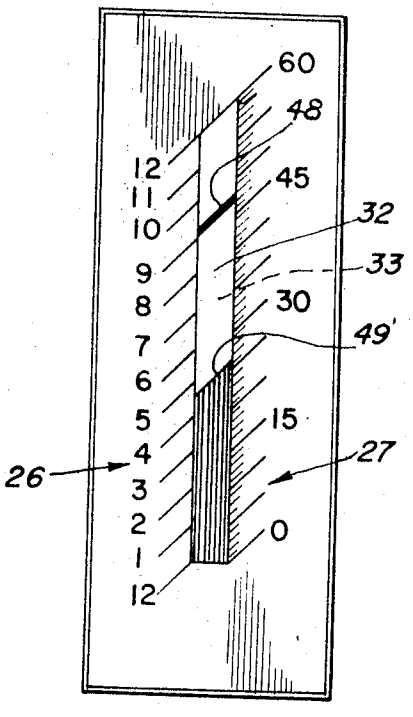


FIG - 5



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LINEAR CLOCK

This invention relates to clocks, and more particularly to the faces or time indicating means of clocks.

Efforts to depart from the conventional clock face, wherein the time is indicated by hands or pointers moved through a circular path by the clock movement, have been numerous and varied. Among the previous suggestions have been arrangements in which the numbers were carried on the surface of a rotating drum. There have also been linear arrangements in which a pointer or other indicator moves longitudinally of an elongated scale. Generally, prior clocks with time indicating means of the type described have met with very limited acceptance because of one or more inherent undesirable features.

Some of the shortcomings of the prior clocks might be attributed to their comparative illegibility and the difficulty encountered in reading the time accurately. For example, one prior construction employed a pair of superposed drums on which were imprinted a plurality of hour and minute numerals arranged in parallel individual helixes, and a pair of reference helixes, so that the viewer was required to look to two separated rather heavily marked drums in order to tell the time. Another prior construction employed a drum bearing 12 stepped index marks which cooperated with an hour scale positioned along an elongated slot in such a manner that the user was required to estimate the radial fraction of the slot subtended by an index mark in order to estimate the minute reading. Further problems encountered were high cost, complexity of structure, difficulty of associating the faces with standard clock movements, and undesirable limitations of clock size and design imposed by the time indicating means.

It is therefore a principal object of this invention to provide a clock having linear time indicating means which successfully overcomes all of the problems described hereinabove.

Another object is to provide a linear clock of the character described which is extremely simple in construction and unmistakeably legible in its readings.

A further object is to afford a linear clock of the character described which may be readily and inexpensively associated with available standard clock movements.

Still another object is to provide a linear clock of the character described which may be fashioned in any desired size and is readily adaptable for incorporation in a wide variety of attractive designs.

With the foregoing and other objects in view which will appear as the description proceeds, the invention comprises a helix connected to the hour output shaft of a clock movement. A face having an elongated slot is positioned over the helix so that only a relatively short segment thereof is visible. As the helix rotates, the segment appears to travel longitudinally of the slot and indicates the time on a scale positioned alongside the slot. Due to a definite geometric relationship between the length of the slot and the pitch of the helix, a short segment is always visible to indicate the time and the time cycle of the face (viz. 12 or 24 hours) is constantly repeated. In another embodiment of the invention, a second helix of distinguishing color or form is connected to the minute output shaft or sleeve of the clock movement and the scale bears markings for minutes as well as hours. As the two helixes rotate, the visible segments thereof give direct and accurate time indications.

For the purpose of facilitating an understanding of the invention, the same is best described in connection with the accompanying drawing, wherein the same reference characters are employed to indicate corresponding or similar parts throughout the several figures, and in which:

FIG. 1 is an isometric view of a linear clock embodying the principles of the invention;

FIG. 2 is a similar view with the housing removed to illustrate the cooperating time indicating means;

FIG. 3 is an elevational view of another form of time indicating means employing a pair of concentric helixes, and with other parts in phantom line to better illustrate the geometric relationship between the time indicating elements;

FIG. 4 is an elevational view of a face panel of the type adapted to cooperate with the clock of FIG. 3; and

FIG. 5 is a similar view showing another variation of the time indicating means wherein one of the helixes appears as a segment of a filled-in geometric figure.

Since the invention is directed specifically to the time telling or dial portions of a clock, the remaining customary portions of clocks such as, gear trains, motors, escapements, winding mechanisms, and the like, have not been illustrated and will not be described in detail. However, as already indicated, it will be apparent that the invention is readily adaptable for use with substantially all standard escapements without modification.

Referring now to FIGS. 1 and 2 of the drawing, the reference character 10 indicates generally a clock made according to the principles of the invention. Clock 10 comprises a base 12 which contains a clock movement of any desired type such as, electric or manually wound. As is customary, the clock movement has an output shaft (or shafts) 14 for driving a typical clock hand or hands. Associated with the base 12 is a housing 16 which may be removably connected thereto for purposes of service or repair.

At least one side or wall of the housing 16 serves as a dial or time-indicating face 18, and this side is formed with an elongated slot 20 which extends longitudinally from a point 22 above the top of the base 12 to a point 24 adjacent the opposite end thereof. A time indicating scale 26 is imprinted or otherwise positioned on the face 18 along one edge of the slot 20, and in the embodiment illustrated the scale consists of equally spaced markings and numerals from 12 to 12 (one half day), although the same could read from 24 to 24 (a full day) if desired.

A spiral or helix 30 is connected to the hour shaft 14 and thus rotates therewith. In the embodiment illustrated, the helix 30 comprises a narrow tape adhered to the outer surface of a lightweight cylinder 32 made of a transparent plastic such as celluloid, and the cylinder 32 is connected to the shaft 14 by means of a web 34 and a suitable connector 36. At its opposite end, the cylinder 32 carries a second web 38 which is rotatably connected as at 40 to a bearing member or pin 42 depending from the arm 44 of a support member 46. Since only the helix 30 itself is essential for the time indicating function of the invention, the same may alternatively comprise a structurally independent member such as wire or sufficiently rigid plastic, thereby dispensing with the cylinder 32.

When the housing 16 is operationally positioned, the helix 30 is completely concealed save for the small segment 48 which is visible through the relatively narrow slot 20 and thus appears as a straight line. As the helix rotates with the clock escapement, the visible line segment 48 appears to travel longitudinally of the slot and indicates the time directly on the scale 26. In FIG. 1, for example, the time indicated is 3:36.

It should be noted that there exists a definite relationship between the dimensions of the helix 30 and the length of the slot 20. As seen in FIGS. 2 and 3, there is a slight overlap of the end segments of the helix 30 or, in geometric terms, the helix consists of a single coil plus a short segment of a second coil. The length of the slot 20 is however substantially equal to the height or pitch of the helix. It will thus be appreciated that as the helix segment 48 disappears from view under the slot edge 24, it reappears at the slot edge 22 so that there is always a single and readily legible indication of the time.

Turning now to FIGS. 3 and 4, there is illustrated a means of adding a separate "minute hand" in accordance with the invention. A second helix 31 is connected to the shaft 14, and more particularly to the faster rotating or minute indicating portion thereof. In this regard, it is of course well known that the output of a standard clock movement typically comprises a shaft and concentric sleeve, one being adapted to rotate a minute hand and the other an hour hand.

Helix 31 is positioned concentrically of helix 30 and is substantially identical in all respects with the latter. It will thus be seen that helix 31 is here carried by a cylinder 33 having webs 35 and 39 and that a straight line segment 49 thereof is visible through the slot 20. In order to distinguish the "minute" helix 31 from the "hour" helix 30 the two may be made in differing

thicknesses (as illustrated) or of different colors. Helixes **30** and **31** have the same pitch or height, but because the cylinder **33** bearing helix **31** is necessarily of a slightly smaller diameter than cylinder **32**, the inner helix will have a slightly different angle than the outer helix. This slight angular variance is advantageous in that it insures visibility of both helixes at all times including the moment in each hour when segment **49** would otherwise be in registry with and concealed by segment **48**.

Cooperating with the helixes **30** and **31** is a face **18** having a slot **20** with ends **22** and **24** and an hour scale **26**. Additionally, however, the face **18** here carries a second scale **27** graduated in minutes. Quite clearly, then, the time indicated in FIG. **4** is 7:17.

Still another aid to legibility and ease of reading is illustrated in FIG. **5**. Here it will be seen that instead of simple helix **31**, the "minute" helix comprises the edge **49'** of a brightly colored solid geometric figure. By way of example, the embodiment shown comprises a black helix **30** on a transparent cylinder **32**, while the cylinder **33** is opaque and half white and half orange, the two colored areas being defined by the helical edge **49'**. It will be appreciated that such an arrangement affords a clock face of starkly contrasting colors which is unmistakeably legible and also interestingly attractive.

From the foregoing, it should be apparent that I have provided a novel clock which may be inexpensively associated with available standard clock movements. The linear time indicating arrangement permits the utilization of countless attractive housing designs, uses and orientations such as horizontal, triangular for mounting in a corner, or multifaced for suspension from an overhead support. In the latter regard, it will of course be appreciated that more than one time indicating face such as **18** may be employed, it being necessary only to add an additional portion of a second coil to the helix and stagger the slots **20**, or transpose the figures of the scale **26** to compensate for the shift along the helix of each of said faces.

I claim:

1. A clock comprising:

a base;

a housing mounted on said base and having an elongated slot formed therein;

a pair of helixes having at least one complete coil of substantially the same pitch mounted concentrically on said base so that a straight-line segment of each is visible through said slot;

means connected to said helixes for rotating them in the same direction;

the length of said slot being substantially equal to said pitch so that each of the straight-line segments of the rotating helixes periodically disappears at one end of the slot and simultaneously reappears at the opposite end thereof;

a first scale calibrated in hourly units on said housing extending longitudinally of said slot; and

a second scale calibrated in minute units on said housing extending longitudinally of said slot, said straight-line segments indicating the time on said scales.

2. The clock of claim **1** in which one helix has a slightly different angle than the other helix so that the straight-line segments thereof are never entirely coincident.

3. The clock of claim **1** in which said helixes are of differing thicknesses and thereby readily distinguishable as hour and minute indicators.

4. The clock of claim **1** in which said helixes are of different colors and thereby readily distinguishable as hour and minute indicators.

5. The clock of claim **1** in which each of said helixes comprises a band carried by a cylinder the outermost one of which is transparent, said cylinders being rotatably mounted on said base.

6. The clock of claim **1** in which the outer helix comprises a band carried by a transparent cylinder and the inner helix comprises the line between two differently colored surface areas of a second cylinder, said cylinders being rotatably mounted on said base.