HANDLESS PENDULUM DRIVEN CLOCK
James Philip Scherz, 1473 Carver St., Madison, Wis. 53713
Filed Apr. 27, 1967, Ser. No. 634,211
Int. Cl. G04b 45/00

U.S. Cl. 58—2

3 Claims

ABSTRACT OF THE DISCLOSURE
Clock comprising a gear train wherein the numeric indicia indicating time are displayed directly on the gears of the train and the indicia indicating any given time are displayed respectively at three laterally spaced apart positions.

Background and summary
This invention relates to a clock and more particularly to a clock which has no hands but wherein indicia indicating time are displayed directly on the gears of the train, and wherein at a glance the time can be read on the clock face or housing.

It is known in the art to provide a clock which has no hands and wherein one or more portions of the indicia to indicate a given time are provided on dials or on notched or Geneva-type gears. The indicia may be displayed through apertures or "windows" in a clock face or housing. (See U.S. Patents: 349,878, 402,823, 436,051, 444,455, 615,719, 914,534, 1,131,244, 1,921,832 and 2,633,696.)

It is also known to provide other types of time keeping devices wherein such indicia is presented at apertures or "windows" in a dial or clock face. (See U.S. Patents: 309,306, 312,754, 359,227, 1,086,268, 1,626,998, 2,138,873, 2,287,679, and 3,220,174.)

However, it is believed to have been herefore undisclosed to provide the combination set forth in the claims.

In accordance with the invention, a clock is provided which may consist of, apart from the driving means, a base and only five or six rotatable or oscillatable parts mounted thereon.

Accordingly, a clock in accordance with the invention may be simple in construction and may be easily constructed from materials such as plastic, wood or plywood.

A clock in accordance with the invention has significant esthetic value in both appearance and in the emission of a pleasant sound when running and made from suitable materials.

Because no moving hands are provided and a minimum of parts may be utilized, a clock in accordance with the invention may be economically provided because an absolute minimum of parts may be used. Because of such reduction in the number of moving parts, a device in accordance with the invention may have minimal friction loss and consequently the moving parts can be made with greater tolerances than required for clocks described heretofore. Further in consequence of such reduction of friction, dust has less affect on the motion of the parts and thus the parts of the clock may be allowed to be exposed.

Objects
Objects of the invention include providing all of the desirable attributes as set forth above.

Other objects will become apparent from the drawings and from the following detailed description in which it is intended to illustrate the applicability of the invention without thereby limiting its scope to less than that of all equivalents which will be apparent to one skilled in the art. In the drawing, like reference numerals refer to like parts and:

FIGURE 1 is a plan view of a preferred embodiment of the invention.

FIGURE 2 is a front elevation of the embodiment of FIGURE 1.

FIGURE 3 is an elevation of an escapement which may be utilized in the invention.

FIGURE 4 is an elevation of an escapement which may be applied to four of the wheels in the embodiment of FIGURES 1 and 2.

FIGURE 5 is a perspective view of a modification of the wheel of FIGURE 4 which may be applied to four of the wheels in the embodiment of FIGURES 1 and 2.

Description
Referring now to FIGURES 1, 2 and 4, there may be provided a base 5 which may have rigidly attached thereto and extending therefrom pins or shafts 6, 7, 8, 9, 10 and 11. Rotatably received on pins 6, 7, 8, 9, and 11, there may be provided hour wheel 12, minute wheel 13, fourth or intermediate wheel 14 and second wheel 15. A suitable escapement may comprise star wheel 16 rotatably received on pin 10 and fork or anchor 17 oscillatarily received on pin 11 and having rigidly attached thereto pendulum arm 18. Slidable received on pendulum arm 18, there may be provided a large weight 19 and a small weight 20, each of which may be secured by means (not shown for simplicity) to retain it at any suitable desired distance from pin 11. The large weight, of course, may be used for rough or general adjustment of the setting of the rate of the clock and the small weight may be used for fine adjustment. Wheel 12 may consist essentially of a large spur gear 12' as shown which, if desired, may have attached thereto drum 21 on which there may be wound a string; wire or other flexible member 22 which may terminate in weight 23. Wheel 13 may consist of a large spur gear 13' and a pinion 13" (which may be a small spur gear as shown) and, if desired, may also comprise drum 24 around which flexible member 25 may be wound. In an embodiment now shown, flexible member 25 may extend downward and terminate in weight 26, but in the embodiment shown, flexible member 25 preferably extends upwardly and then over pulley 27 which may be mounted on a projecting member 28 extending from base 5 and thence downwardly to weight 26.

Wheel 14 may comprise a large spur gear 14' and a pinion 14" (which may be a small spur gear as shown). Wheel 15 may comprise a large spur gear 15' and a pinion 15" (which may be a small spur gear as shown). Wheel 16 may comprise a large star gear 16' and a pinion 16" (which may be a small spur gear as shown).

As shown, the following large and small spur gears are respectively engaged with each other: 12' and 13', 13' and 14', 14' and 15', 15' and 16'. Star gear 16' is, of course, engaged with anchor 17 in the escapement.

Although the pinions are shown as small spur gears in FIGURES 1, 2 and 4, each pinion may consist of a pin gear as shown in FIGURE 5 wherein pin gear 13" is substituted in wheel 13 for small spur gear 13". Generally the use of pin gears for the pinion is preferred.

As shown, pointers 29, 30 and 31 may be provided adjacent each of wheels 12, 13 and 15, respectively. Each of the pointers may extend upwardly from base 5, thence forwardly and thence downwardly to indicate a position (adjacent to teeth respectively of gears 12', 13' and 15') substantially directly above the center of each of said wheels as respectively indicated by pins 6, 7 and 9.

In place of the escapement described above, there may be utilized the escapement of FIGURE 3 wherein a fork or anchor 37 mounted on pin 11' acts directly against teeth on the outer edge of seconds wheel 35 which may be rotatably received on pin 9'. By using this embodiment, the number of moving (rotating or oscillating) parts is reduced from 6 to 5.

In operation wheel 12 is driven by the action of weight 23 and wheel 13 is driven by the action of weight 26.
Wheel 13 drives wheel 14, wheel 14 drives wheel 15 and wheel drives the escapement which regulates the rate of operation of the device. Either weight may be omitted but by providing two weights the clock may be wound without stoppage of the action of the clock. With respect to each weight, the clock is wound by merely lifting the weight and manually winding the flexible member associated therewith. Thus, while weight 23 is being wound and is not driving the clock, weight 26 drives the clock and similarly, while weight 26 is being wound, weight 23 drives the clock.

It is a feature of the device that a slot 32 or 32’ is provided in anchor 17 or anchor 37 so that the anchor and pendulum may be readily lifted from pin 11 to allow the clock to run freely to facilitate setting it. Rather than providing such a slot, similar movability may be provided simply by providing an enlarged hole in anchor 17 or 37 so that by merely slightly lifting the anchor the head of pin 11 or pin 11’ will pass therethrough and the anchor may be withdrawn from the pin.

Indicia is provided respectively on wheels 12, 13 and 15, near the teeth at the outer edge of each, to indicate respectively hours from 1 to 12, minutes from 1 to 60 and seconds from 1 to 60. As may be seen, the parts of the device are preferably so arranged that the indicia indicating the hour, the indicia indicating the minute and the indicia indicating the second at a given time are presented at positions laterally spaced apart from each other, these positions being respectively above the centers of these wheels as indicated respectively by pins 6, 7 and 9. Pointers 29, 30 and 31 point to these respective positions. It is a feature of the device that each of these three classes or groups of indicia are provided respectively directly upon a toothed wheel. It is another feature of the device that all of the indicia (with the exception of that portion of the indicia on wheel 13 obscured by wheels 12 and 14) are presented to the viewer at all times.

If desired, however, in accordance with an preferred embodiment of the invention (which therefore is not illustrated) a cover or housing may be provided wherein there may be provided apertures to allow the indicia indicating hours, minutes and seconds to be displayed through said apertures at the three laterally spaced positions above described.

The extreme simplicity of the device described herein makes it possible to provide an aesthetically pleasing display of the parts with their respective motions combining to provide an aesthetic display of the type sometimes referred to as "symphony of motion." Furthermore as pointed out above, the combination of elements in the device facilitates providing, by suitable choice of materials, an aesthetic and restfully pleasing sound when the clock is in motion.

It may thus be seen that the invention is broad in scope and includes such modifications as will be apparent to those skilled in the art.

Having thus described my invention, I claim:

1. In a time-keeping and display mechanism comprising an hour wheel, a minute wheel and a seconds wheel, an escapement acting on the seconds wheel and comprising a pendulum, and a weight driving one of said wheels, numeric indication the hour wheel indicating hours, numeric indicia on the minute wheel indicating minutes, and numeric indicia on the seconds wheel indicating seconds, said wheels disposed in a gear train with a fourth wheel interposed between the minute wheel and the second wheel, each of said wheels comprising a large spur gear and (except for the hour wheel) a pinion, the teeth of the large spur gear in each indicia-carrying wheel being observable adjacent the indicia on each of said wheels, the indicia on each wheel being disposed to indicate the time of observation when displayed above the center of the wheel, so that indicia indicating hours, minutes and seconds respectively at the time of observation are displayed respectively at three laterally spaced apart positions.

2. The device of claim 1 wherein said escapement comprises an anchor or fork and a pendulum rigidly attached together and received on a pin to provide for oscillation thereon, characterized by being so received on said pin as to be removable by manually lifting off of said pin to permit the wheels to run at a rapid uncontrolled rate to facilitate setting the device.

3. The device of claim 2 wherein the minute wheel comprises a drum and is driven by gravity acting on a weight which depends from a flexible member extending around said drum and the flexible member extends upwardly from said drum to a pulley and thence downwardly to said weight.

References Cited

UNITED STATES PATENTS

349,878 9/1886 Garcia 58—125
1,131,244 3/1915 Jeffreys, et al. 58—2
2,595,157 4/1952 Mayer 58—125

RICHARD B. WILKINSON, Primary Examiner
EDITH C. SIMMONS, Assistant Examiner

U.S. Cl. X.R.
UNIVERS STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,464,199 Dated September 2, 1969

Inventor(s) James Phillips Scherz

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 3, line 2, after "wheel" insert -- 15 --. Column 4 line 9, cancel "indication" and insert -- indicia on --.

SIGNED AND SEALED
DEC 23 1969

(SEAL)
Attest:
Edward M. Fletcher, Jr.
Attesting Officer

WILLIAM E. SCHUYLER, JR
Commissioner of Patents