

Sept. 10, 1968

H. SCHWARZER ET AL

3,400,510

CALENDAR CLOCK

Filed April 11, 1966

2 Sheets-Sheet 1

FIG. 1.

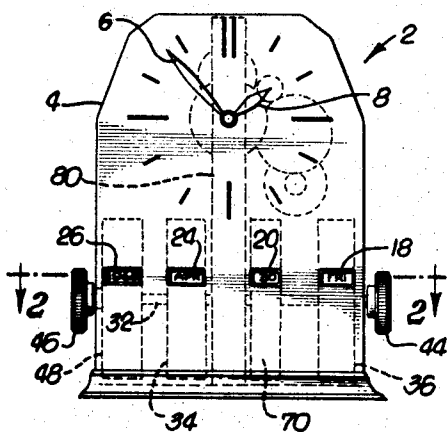


FIG. 2.

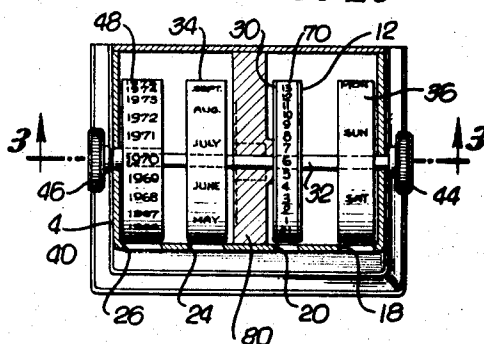


FIG. 3.

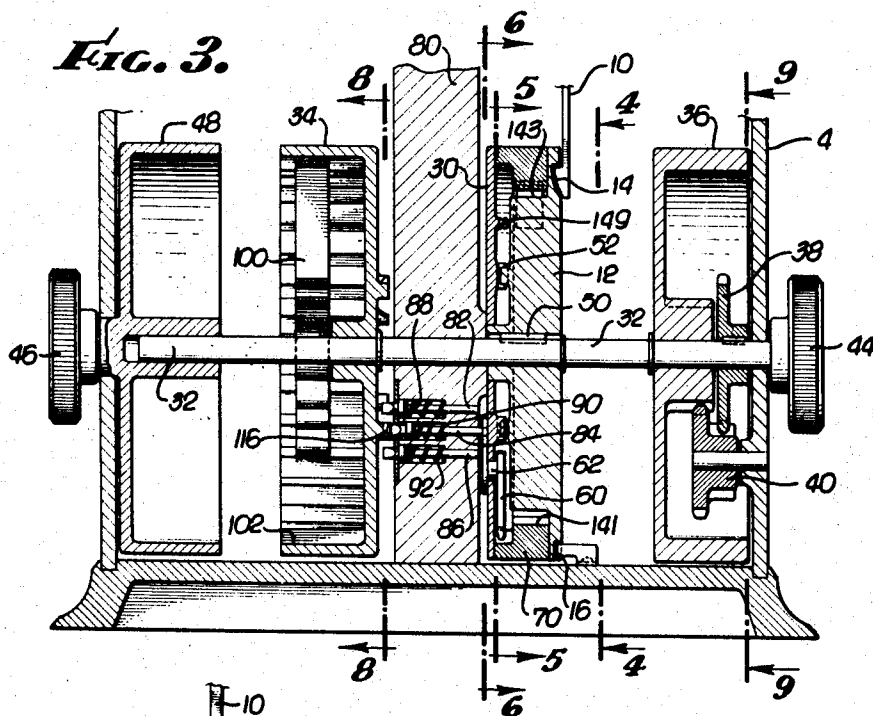
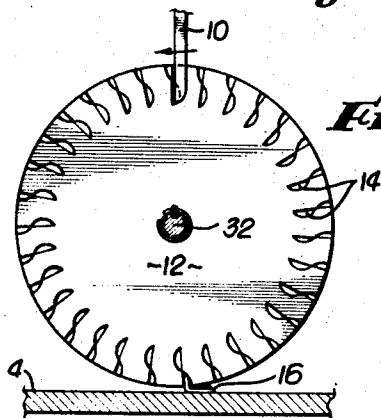


FIG. 4.



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FIG. 5.

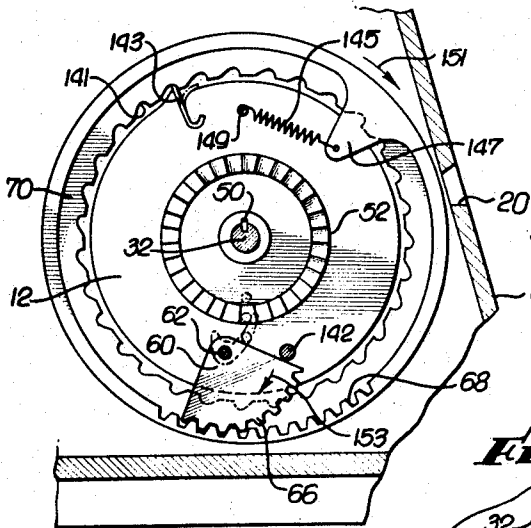


FIG. 6.

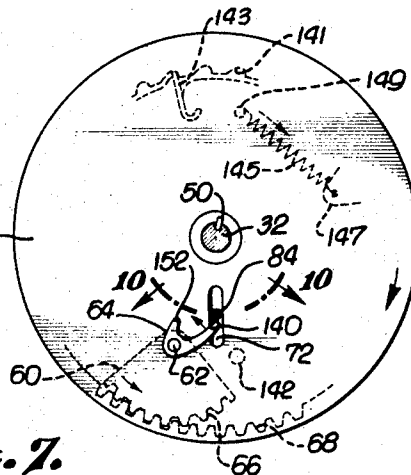


FIG. 7.

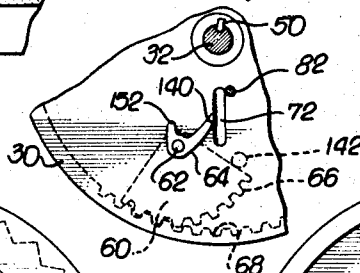


FIG. 8.

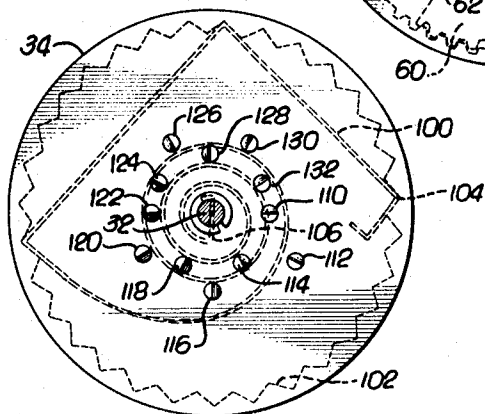


FIG. 9.

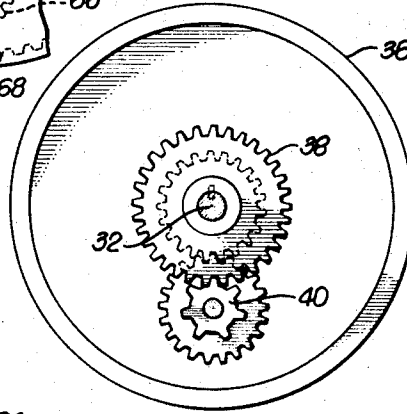


FIG. 11.

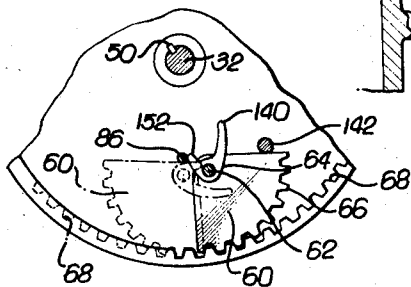
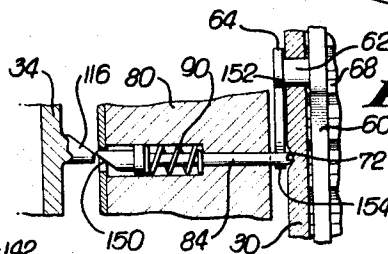


FIG. 10.



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CALENDAR CLOCK

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5 Claims. (Cl. 58—4)

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This invention relates to clock mechanisms. More particularly, this invention relates to a calendar clock mechanism which is mechanically actuated so as to indicate the day of the month, the month and the particular day of the week and which compensates for the varying number of days in the various months of the year.

There have been many attempts in the past to provide a workable, efficient calendar clock which indicates the day of the month and the month of the year. This necessitates complicated mechanisms for indicating the different number of days in the various months of the year. These mechanisms suffer from the disadvantages of complexities, expense or are unreliable.

This invention obviates the disadvantages of the prior art in providing a simple mechanical device which automatically compensates for the varying number of days in the various months of the year.

Briefly, the invention comprises a shaft which has various circular plates mounted thereon and which are rotated on the shaft. A first wheel is keyed to the shaft and is driven by means such that the shaft and the first plate are both rotated at the rate of $\frac{1}{31}$ of a revolution per day. Associated with the first wheel is a second plate which is driven thereby in the direction of rotation thereof which is free to rotate at a speed faster than the first wheel but is prevented from rotating slower than the first wheel. An actuating mechanism is provided on the second wheel which when driven by a pin coming through a fixed plate is adapted to rotate an indicating means so as to indicate the day of the month. When days of the month shorter than 31 are encountered, the indicating means are rotated, for example, from the day 28 in the case of February to day 1 in March which skips three days. Actuating pins are also provided in the fixed plate such that a month indicator is actuated upon the indicating means reaching the number 1 so as to start a new month. Also associated with the shaft is a gearing arrangement such that upon the passage of one day, $\frac{1}{7}$ of a revolution occurs so as to, for example, change the day from Sunday to Monday so as to indicate the day of the week.

The objects of the invention will become apparent as this description proceeds taken in conjunction with the drawings in which:

FIGURE 1 is a front view of the apparatus as installed in a casing;

FIGURE 2 is a view looking along the line 2—2 of FIGURE 1;

FIGURE 3 is a view partially in cross section as viewed along the line 3—3 of FIGURE 2;

FIGURE 4 is a view of the mechanism as shown along line 4—4 of FIGURE 3;

FIGURE 5 illustrates a portion of the apparatus as viewed along the line 5—5 of FIGURE 3;

FIGURE 6 is a portion of the apparatus as viewed along the line 6—6 of FIGURE 3;

FIGURE 7 is a portion of the apparatus cut away;

FIGURE 8 illustrates a portion of the apparatus as viewed along the line 8—8 of FIGURE 3;

FIGURE 9 illustrates a portion of the apparatus as viewed along line 9—9 of FIGURE 3;

FIGURE 10 is a cross-sectional view broken away for clarity as viewed along the line 10—10 of FIGURE 6; and

FIGURE 11 is illustrative of various positions of portions of the apparatus.

Referring to FIGURE 1, the calendar clock according to this invention is illustrated generally at 2. Included is a casing structure 4 which has mounted therein a clock with minute hands 6 and hourly hands 8. This clock may be driven by any conventional means and forms no part of this invention. However, associated with this clock is a gearing arrangement whereby a pawl 10 (see FIGURE 4) is driven so as to rotate a first wheel 12 $\frac{1}{31}$ of a revolution every 24 hours. The pawl 10 is shown in FIGURE 3 and FIGURE 4. Note that there are 31 ratchet portions. A locking mechanism 16 is provided to prevent the first wheel 12 from rotating backwards when pawl 10 moves backwards.

Referring again to FIGURE 1, slots 18, 20, 24 and 26 are provided so as to allow the various indicators on the various wheels to be viewed exteriorly of casing 4.

Referring to FIGURES 2 and 3, a first wheel 12 is shown. A second wheel 30 is shown more clearly in FIGURE 3 and its relationship to first plate 12 will become apparent as this description proceeds. An indicating wheel 70 is associated with wheels 12 and 30.

Mounted on shaft 32 is a third wheel 34 which has means thereon indicating the particular month of the year. Likewise, the operation of this wheel will become apparent as the description proceeds. A fourth wheel 36 is geared by means of gears 38 and 40 to shaft 32 so as to rotate relative to shaft 32 at a ratio of 31:7. That is, for every $\frac{1}{31}$ of a revolution that shaft 32 rotates, the wheel 36 will move $\frac{1}{7}$ of a revolution. For example, as pawl 10 actuates ratchet 14 seven times, wheel 36 will rotate $\frac{1}{7}$ of a revolution so as to change from, for example, Sunday to Monday.

To rotate shaft 32 manually, knurled wheel 44 is provided at one end thereof. Knurled wheel 46 is provided at the other end to change the yearly indicator wheel 48 manually. Shaft 32 rotates within knob 46 which acts as a bearing.

As the description of this invention proceeds, it is understood that for reference purposes the direction of rotation of shaft 32 is counterclockwise when the apparatus is viewed from the right. However, it is apparent that other directions of rotation can be used if desired. First wheel 12 is attached by means of a key and spline arrangement 50 to shaft 32 so as to be rotatable therewith. Thus, wheel 12 will make one complete revolution every 31 days. Associated with wheel 12 is second wheel 30 which is driven by wheel 12 in the same direction as wheel 12. This is accomplished by ratchet means 52 which allow wheel 30 to be rotated by wheel 12. This ratchet and pawl mechanism forces second wheel 30 to move with wheel 12 yet allows wheel 30 to rotate ahead of wheel 12.

Extending through second wheel 30 is a bracket mechanism 60 which is attached by means of pivot pin 62 to turning member 64. Teeth 66 are provided on bracket member 60 so as to engage feet 68 on day indicator 70. As shown in FIGURE 7 and more clearly in FIGURE 10, second wheel 30 has located therein a groove 72. The purpose of this groove will become apparent as the description proceeds. Extending through fixed plate 80 are apertures for accommodation of pins 82, 84 and 86. These pins are normally biased toward the left by means of springs 88, 90 and 92, respectively.

Third wheel 34 surrounds the shaft 32 and when allowed to do so will rotate therewith. A spring 100 (see FIGURE 8) engages teeth 102 at one end thereof as shown at 104 in FIGURE 8, with the other end 106 keyed to shaft 32. Thus, as shaft 32 rotates, spring 100 will tend to bias rotation of third wheel 34 in the same direction as shaft 32. Since, however, pins 82, 84 and 86 are biased to

the left, they will engage a series, or at least one boss, depending upon the position thereof on wheel 34 preventing movement. The position of these bosses are more clearly brought out with reference to FIGURE 8. Boss 110 represents January and boss 112 is February. March is shown at 114 with April at 116. Thus, May, June, July, August, September, October, November and December are represented by bosses 118, 120, 122, 124, 126, 128, 130 and 132, respectively.

When one of the pins 82, 84 or 86 engages a boss member on third wheel 34 and shaft 32 rotates relative thereto, tension builds up by means of spring 100 which is sufficient to overcome the bias of springs 88, 90, and 92. This bias will tend to force the respective pins to the right as viewed in FIGURE 3. However, under normal operation, movement of these pins is prevented because of the surface of second wheel 30. However, upon alignment with groove 72 (see FIGURE 7), the respective pin is allowed to move to the right thus engaging the pin with the boss on third wheel 34 as more clearly brought out in FIGURE 10.

Referring now to FIGURES 5, 8, 10, 11, the structure for moving indicator 70 is shown in more detail. Normally, assuming a 31 day month, rotation of wheel 12 will by means of ratchet mechanism 52 rotate second wheel 30. Bracket 60 will rotate day indicator 70. Thus assuming a normal month of 31 days, day indicator 70 will indicate a new day once every 24 hours. However, it is desirably for example, when a month not having a full 31 days occurs to have day indicator 70 rotate, for example, in the month of February from day 28 to day 1 as the month indicator 34 changes the month indication.

Since there are 12 months in a year, each of the bosses 110-132 are spaced 30° from an adjacent boss. Accordingly, spring 100 is adjusted so as to be able to rotate third wheel 34 forward (counterclockwise) when one of the pins 82, 84, or 86 are released from the holding boss.

As an example of the operation of this device, reference is made to FIGURES 5-8, 10 and 11. During the month of January, each 24 hours will have pawl 10 advance wheel 12 $\frac{1}{31}$ of a revolution. In turn, wheel 30 will be driven by wheel 12 through ratchet mechanism 52. Wheel 12 has a holding spring member 143 which engages teeth 141 on day indicator 70. This spring will drive indicator 70 but will fold clockwise to allow day indicator to rotate faster than wheel 12.

Bracket 60 is pivoted about pin 62 and through teeth 66 engages teeth 68 on day indicator 70. A pin 142 is provided on plate 12 to stop rotation of bracket 60. Pivot pin 149 is attached to wheel 30 and holds one end of spring 145 which is attached at the other end to day indicator 70 at bracket 147.

Returning again to the month of January, upon reaching the first day (of February) groove 72 will become aligned with pin 82. Due to tension in spring 100, pin 82 will move to the right allowing boss 110 to clear and wheel 34 will rotate $\frac{1}{12}$ of a revolution until boss 112 contacts pin 86. During the transition from the 28th day to the 29th day (representing February), pin 86 will be biased to the right and will engage leg 152 of bracket mechanism 60. This pivots bracket 60 clockwise about pivot pin 62 forcing day indicator 70 to skip $\frac{3}{31}$ of a revolution (3 days). Spring 143 will fold allowing teeth 141 to pass thereover. When pin 86 hits groove 72, boss 112 is released to allow wheel 34 to rotate $\frac{1}{12}$ of a revolution. Spring 145 will then rotate wheel 30 through ratchets 52 until bracket 60 contacts pin 142 and rotation is ceased. In a similar manner, when a 30 day month occurs, leg 140 will be contacted by pin 84 and day indicator 70 will rotate $\frac{1}{31}$ of a revolution ahead of wheel 12. FIGURE 11 is illustrative of the various positions assumed by bracket 60.

Due to the gear ratio as between gears 38 and 40, it can be seen that for every seven days which occur on indicator 70, fourth wheel 36 will rotate $\frac{1}{7}$ of a revolution thus indicating the day of the week. As to the fifth wheel 48, this is manually turned each year by knurled knob 46.

What is claimed is:

1. A calendar clock comprising:

a first wheel;

a shaft keyed to said first wheel;

means to rotate said first wheel and shaft at a rate of one revolution every 31 days;

a second wheel mounted on said shaft driven by said first wheel, said second wheel being adapted to rotate ahead of said first wheel, said second wheel having a groove therein;

a bracket means pivoted to said second wheel;

a peripheral day indication adapted to be driven by said bracket, said day indicator having the numbers 1 through 31 thereon;

a fixed plate adjacent said second wheel, said fixed plate having three pins therethrough adapted to engage said second wheel and said groove, said pins being normally biased away from said second wheel and said groove;

a third wheel having the months of the year thereon mounted on said shaft, said third wheel having a spring connected therewith and to said shaft whereby said third wheel is adapted to be biased so as to rotate with said shaft, said third wheel further having twelve equally spaced bosses thereon, said bosses being circumferentially and radially arranged on said third wheel whereby the radially inward bosses represent the months of April, June, September and November, the intermediate bosses represent January, March, May, July, August, October and December, and the radially outward boss represents February, each of said bosses being adapted to engage one of said three pins, said third wheel spring and bosses being adapted to bias said pins toward said second wheel, said pins when engaging said groove on said second wheel being adapted to disengage said boss to release said third wheel to allow rotation thereof until the next boss is engaged by a pin;

said bracket means being adapted to be engaged by the intermediate pin biased toward said second wheel to rotate said day indicator $\frac{1}{31}$ of a revolution ahead of said first wheel and $\frac{3}{31}$ of a revolution when said bracket means is engaged by the outer pin.

2. A calendar clock according to claim 1 wherein said means to rotate said first wheel comprises a clock.

3. A calendar clock according to claim 1 and further including a fourth wheel geared to said shaft so as to rotate $\frac{1}{7}$ of a revolution for each $\frac{7}{31}$ of a revolution of said shaft, said fourth wheel having the days of the week thereon.

4. A calendar clock according to claim 1 and further including a manually adjustable yearly indicator mounted on said shaft.

5. A calendar clock according to claim 1 and further including means to adjust the days, weekday and month manually.

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