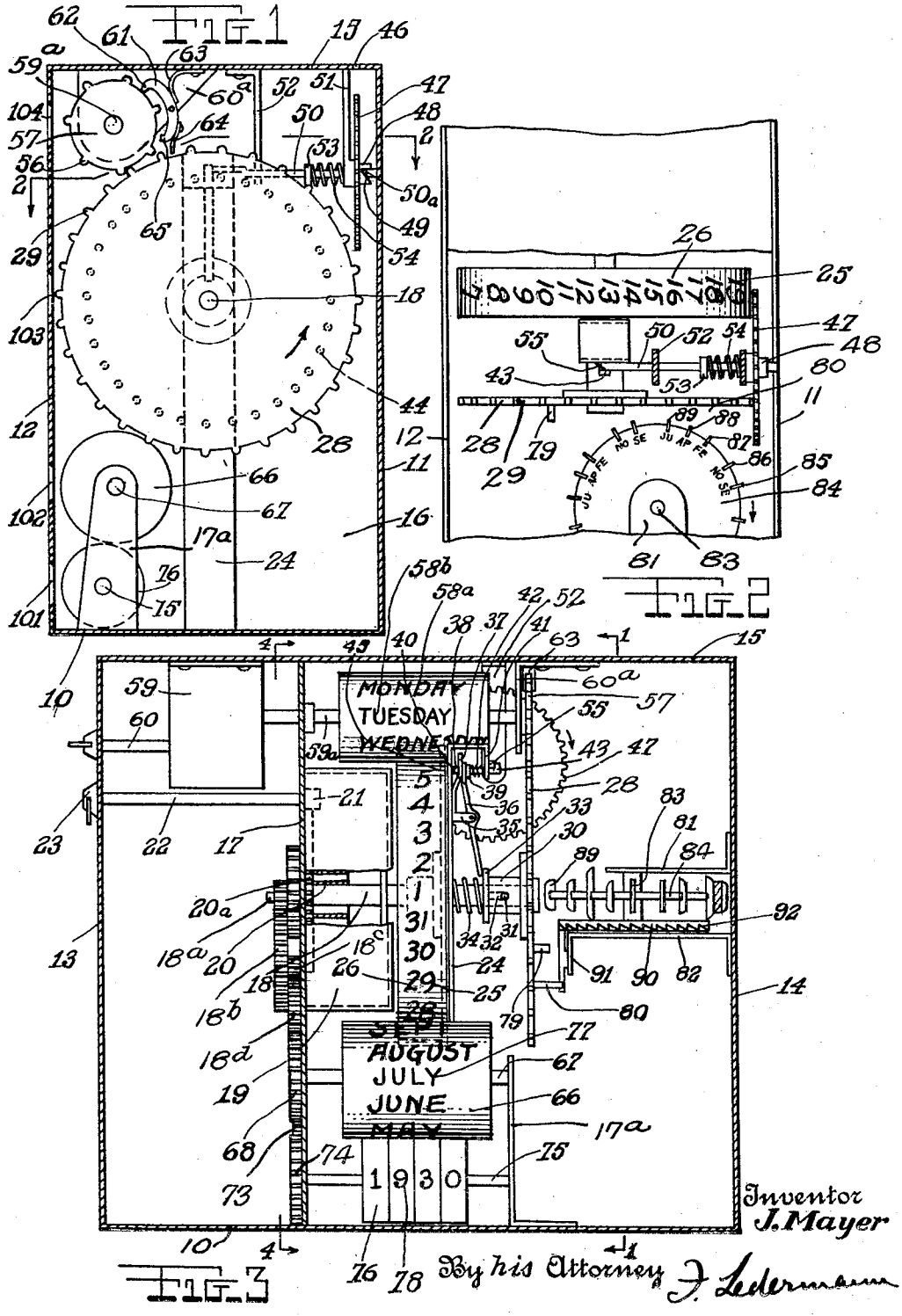
Nov. 8, 1932. J. MAYER 1,886,568

MECHANICAL CALENDAR

Filed Sept. 8, 1930 2 Sheets-Sheet 1



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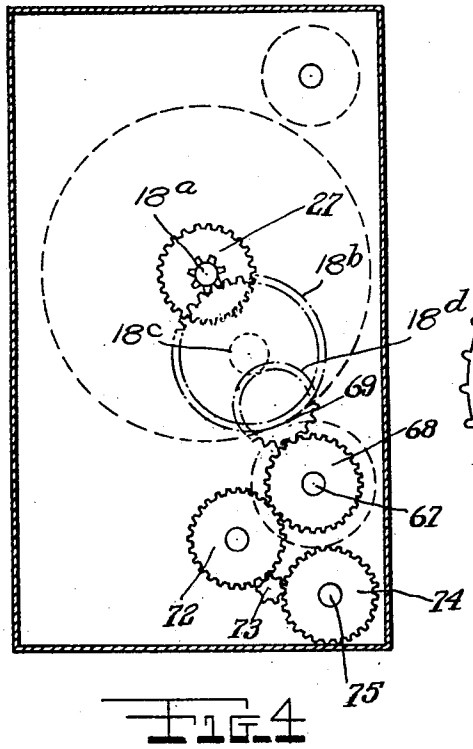


FIG. 4

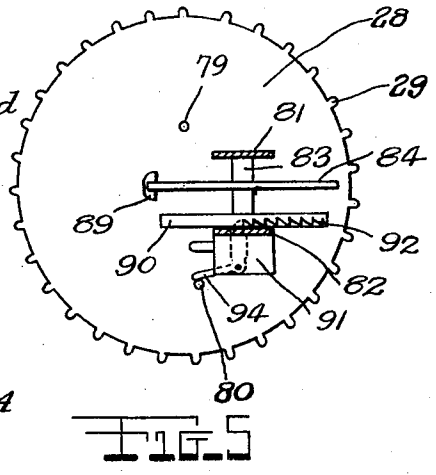


FIG. 5

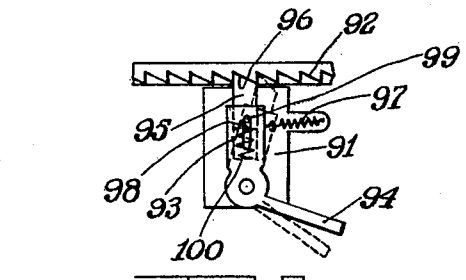


FIG. 6

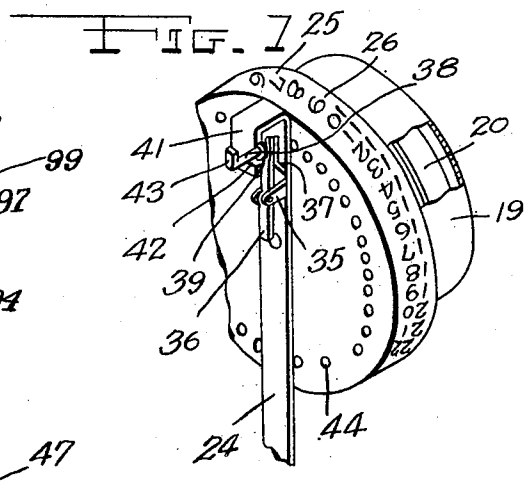


FIG. 7

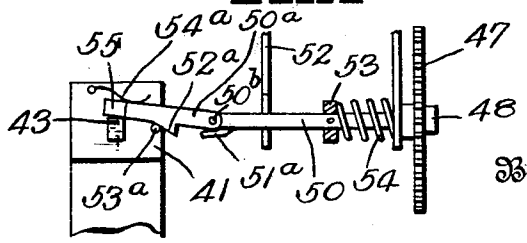


FIG. 8

Inventor
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1,886,568

UNITED STATES PATENT OFFICE

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MECHANICAL CALENDAR

Application filed September 8, 1930. Serial No. 480,335.

The main object of this invention is to provide a mechanically operated device which automatically and visibly indicates the current date, the current month, the day of the week, and the current year.

Another object of the invention is to provide a mechanical calendar which indicates chronological continuity correctly for a period of four hundred years.

Still another object of this invention is to provide a mechanical calendar which is actuated by a time telling chronometer and is equipped with a mechanism which compensates for the variation of the numerical days of the month.

The above and other objects will become apparent in the description below in which characters of reference refer to like-named parts in the drawings.

Referring briefly to the drawings, Figure 1 is a cross sectional view through the calendar taken on line 1—1 of Figure 3.

Figure 2 is a sectional plan view through the calendar taken on line 2—2 of Figure 1.

Figure 3 is a sectional front elevational view showing the calendar with the cover removed therefrom to illustrate the mechanism therein.

Figure 4 is a sectional elevational view through the casing taken on line 4—4 of Figure 3 showing the train of gears actuating the various shafts.

Figure 5 is a sectional elevational view of the odd day releaser mechanism.

Figure 6 is an enlarged fragmentary elevational view of the odd day actuater mechanism.

Figure 7 is a persepctive view of the drum locking mechanism.

Figure 8 is an enlarged view showing the mechanism for tripping shaft 50 after the latter has performed its function.

Referring in detail to the drawings, the numeral 10 indicates the bottom of a substantially rectangular casing. This casing is provided by constructing a rear wall 11, a front wall 12, side walls 13 and 14 and a roof 15. Within the compartment 16 formed by the various walls, the mechanism is located. The casing is subdivided by a dividing wall 17 into two chambers. The dividing wall serves as a support for one end of a rotatable spindle 18 which has mounted therein a drum 19 in which a spiral spring 20 is housed. The spiral spring has one end secured to the spindle while the opposite end is secured to the drum 19. A gear 20^a mounted on the spindle 18 is engaged by a pinion 21 which is mounted upon a winding shaft 22 having a wing nut 23 secured to its end for purposes of winding the spiral spring 20 to tensed condition.

The intermediate portion of the spindle 18 is again journalled in a plate support 24 situated between the wall 14 and the dividing wall 17. A numeral date drum 25 is rigidly mounted on the spindle 18. This date drum is provided with radially spaced apart numerals 26 whose aggregate is equivalent to the number of days in the longest month of the year or thirty-one days. The face 45 of the drum is provided with a series of spaced apart arcuate perforations 44. These perforations are the same in number as the numerals 26 on the rim of the drum 25, that is 31 perforations, each perforation being in line radially with one of the sets of numerals 26. One end of the spindle 18 projects beyond the dividing wall 17, and has a small spur gear 27 secured thereto. The spindle projects also beyond the plate support 24, and has mounted upon this projecting end a disc 28. This disc 28 is provided with a plurality of lugs 29 which extend radially from the periphery thereof and are equal in number to the numerals 26 on the face of the drum 25. This disc is mounted integral with a collar 30 and is secured slidably on the spindle 18 by providing a pin 31 which is anchored in the collar 30 and is slidable longitudinally upon the spindle through the medium of diametrical slot 32 in the spindle. The collar 30 is provided with a flange 33 upon which is seated one end of a coil spring 34 wound about the spindle 18.

The support plate 24 has a pair of spaced apart trunnion lugs 35 mounted thereon. These trunnion lugs support pivotally a lever 36 intermediate its length. The lever depends from the lugs 35 and its lower end engages

and rides upon the flange 33. At the extreme upper end of the support plate 24 a U-shape formation is provided and beneath this U-shape formation a guide ear 37 is mounted. The guide ear has a square opening therein to receive the blunt end of a drum stop pin 38. The stop pin has a collar 39 formed thereon intermediate its length upon one side of which the forked upper end 40 of the lever 36 rests. A depending plate 41 forming part of the upper end of the plate support 24 has the stop pin 38 passing slidably therethrough, and between the collar 39 and dependent ear 41 a yieldable expansion spring 42 is mounted. The stop pin 38 extends beyond member 41 and has an upright projection 43 thereon. This projection is adapted to be engaged by a member which will be more fully hereinafter described in order to extract the opposite end of the pin 38 out of any one of the relatively small openings 44 formed in the face 45 of the drum 25.

The upper wall 15 or top of the casing is adapted to have a watch movement thereon. This movement is preferably provided with a train of gears which project from the bottom thereof. The lowermost projecting gear of the timepiece is to extend through a slot 46 in the roof 15 of the casing, and the teeth thereof are adapted to mesh with the teeth on the periphery of a relatively large gear 47 which is timed so that it will make one revolution daily. The gear 47 is provided with a hub 48 in the wall of which is a radially inclined cam surface 49. This cam surface is preferably not longer than 90 degrees of arc of the hub so that whatever movement is desired may be made during the duration of a quarter of a day or six hours. The gear wheel 47 is loosely mounted upon a longitudinal shaft 50 which is journalled in arms 51 and 52, the latter depending from the roof 15 of the casing. Between these bracket arms 51 and 52 a collar 53 is mounted upon the shaft. A coil spring 54 wound about the shaft 50 has its end seating upon the support arm 51 and the face of the collar 53, and is adapted to urge the shaft 50 in a lateral direction so that a cam pin 50*a* will be caused to constantly ride upon the face of the hub 48, and at the same time move said shaft in from the gear hub 48 in order to permit its tapered wedge 55 on the end of the hinged extension 50*a* to engage the projection 43 when the mechanism is to extract the square pin 38 out of the opening 44 in which it finds itself. The shaft 50 has a hinged extension 50*a* continuing therefrom. The extension swings about a pivot pin 50*b*. A ledge 51*a* on the shaft 50 is adapted to normally retain the extension in aligned position with the shaft. On the bottom of the extension 50*a* a riser cam 52*a* is located and rides upon a stud 53*a*, which latter is mounted on the side of the bracket 24. The end of the extension is formed into a wedge 55 and is urged downwardly by a resilient finger 54*a*. By means of this structure the extension 50*a* of the articulated shaft 50 is raised and tripped by the cam 52*a* after the latter has performed its rotational function, so that rotation of the disk 28 is automatically and instantly checked when the proper opening has been reached.

The disc 28 provided with the lugs 29 engages the teeth 56 mounted upon a second smaller disc 57. This smaller disc is equipped with seven teeth, one for each day of the week, and is mounted upon a week spindle 59A which is journalled in a bracket 60A on one side and in the dividing wall 17 on the opposite side. This week spindle extends into a drum 59 which has the same mechanism such as a spiral spring, gear, and pinion as indicated by the numerals 20, 20*a* and 21 enumerated hereinbefore as located in the spring drum 19. This spring drum 59 imparts rotation to the spindle 59A. The pinion gear and spiral spring are not shown in the drum 59 for purposes of clarity. These members are actuated by a winding shaft 60 which is accessible from without the casing. A bell crank 61 in curved formation is anchored on the bracket 59, and is so constructed as to engage the nearest tooth of the disc 52 when the disc has moved a distance equivalent to one-half the arcuate distance between successive teeth. This bell crank is caused to have its upper tooth 62 in constant engagement with the periphery of the disc 52 by a curved resilient finger 63 until a contact finger 64, also resilient, engages and rides over the lugs 29 of the disc 28 at which time the bell crank 61 is arcuately shifted and causes the lower tooth 65 on the bell crank to then engage the nearest oncoming tooth of the disc 57.

The spindle 59*a* is provided with a roller 58*a*. This drum is provided with literal characters representing the days of the week such as indicated by the numeral 58*b*.

The bracket 17A is mounted upon the floor 10 of the casing and supports one end of a spindle 67 upon which a cylinder 66 is rigidly secured. The spindle 67 projects out of the dividing wall 17, and this projecting end has mounted thereon a gear 68. The latter meshes with an idler gear 72 and a small idler pinion 69. The second idler gear 70 meshes with the pinion 69. The shaft 18 also projects beyond the dividing wall 17 and has secured thereto a gear 27 which meshes with an idler gear 71, the latter in turn meshing with gear 70. The idler gear 72 engages a pinion 73 which in turn is meshed with a gear wheel 74, the latter being mounted upon an axle 75 upon which a cylinder 76 is mounted. A shaft 67 also has a cylinder 66 thereon upon which a series of twelve characters 77 representing the months of the year are radially spaced

apart. The cylinder 76 mounted upon the axle 75 has a series of numerals 78 thereon which indicate the years, and this cylinder may be equipped with a mechanism similar to a speedometer to permutatively change the readings of the years in order to make it possible for the mechanical calendar to operate without error.

The train of gears indicated by the numerals 27, 18*a*, 18*b*, 18*c*, 18*d* 68, 72, 73 and 75 are all mounted upon the dividing wall 17, and are adapted to rotate the spindle 18 once a month, the spindle 67 one-twelfth of a revolution a month, and the axle 75 forming part of a speedometer-like mechanism, not shown, is adapted to rotate the digit drum thereof a distance between successive digits once a year so that a change of the numerals upon the periphery of the cylinder 76 may be had.

From one face of the disc 28 a shifter pin 79 is mounted at a position radially removed from the axis of the disc. A second pin 80 also projects from the same side of the disc. These pins and their operation will be more fully hereinafter described. Mounted upon the side wall 14 of the casing are a pair of L-shaped brackets 81 and 82. These brackets are spaced apart from each other and are vertically aligned. The brackets rotatably receive the ends of a stud 83 upon which a circular disc 84 is axially mounted. The face of the disc is preferably in manufacture divided into quadrants, each quadrant representing one year, and the quadrants are divided into twelve radial divisions to represent the month of that year. All of the months having thirty days are influenced by the rotation of this disc. Those months having thirty-one days are not influenced by the rotation of this disc. To bring about a shifting of the disc 28 so that this movement retracts the stop pin 38 from the drum member 45, the divisions upon the quadrants representing the months of thirty days' duration are provided with a plurality of fins. The months known as June, April, November and September are of thirty days' duration, while the month of February is of twenty-eight days' duration. The months of September, November, April and June of the year are indicated by the numerals 85, 86, 88 and 89 respectively and jut outwardly from the periphery of the disc the same distance. These fins representing the months of June, April, November and September all have the same longitudinal length. The month of February is slightly longer, and this fin is indicated by the numeral 87. This disc 84 is adapted to be rotated one revolution every four years, consequently there are twenty fins thereon, five fins of each quadrant, each quadrant representing one year. All of the fins except those indicated by the numeral 87 are of the same length while three of the fins indicated by the numeral 87 are of identical slightly larger length, but the fourth fin indicated by the numeral 87 is slightly shorter than the remaining fins indicated by this numeral in order to compensate for the leapyear falling at that particular chronological cycle.

A ratchet wheel 90 is mounted axially upon the stud 83 and has ratchet teeth 92 formed on its face for purposes which will be more fully hereinafter described. The ratchet wheel 91 is cooperated with by a bell crank 93 mounted upon an ear 91 which latter forms part of the anchoring bracket 82. An arm 94 forming part of the bell crank extends angularly downward from the body 93 of the bell crank, and is adapted to engage and be swung by the pin 80 as the latter revolves with the disc 28 a distance sufficient to move the ratchet wheel 90 an arcuate distance equivalent to one tooth, it being noted that the ratchet wheel is provided with 48 peripheral teeth, each tooth representing the duration of one month or one-twelfth of a year. A yieldable plunger 95 having a tapering upper end 96 is slidably mounted in the hollow portion of the bell crank body 93 which latter is urged normally to the position indicated in broken lines in Figure 6 by a coil spring 97. The body 93 is as previously noted hollow and slidably receives the plunger 95 which has a pin 99 projecting from its sides registering in a longitudinal slot 98 in the body of the bell crank, and is supported upon a spring 100.

In the front wall 12 of the casing in front of each of the drum 58*a*, drum 25 and cylinders 66 and 76, apertures are formed. The cylinder 76 has an aperture 101 which exposes a peripheral area of the cylinder 76 sufficient to read the numerals indicating the year. An aperture 102 above the first-named aperture exposes a peripheral area of the cylinder 66 so that the character 77 indicating the month of the year is visible. The third aperture 103 exposes a portion of the periphery of the drum 25 at a position which will indicate the numerical day of the month, and the last aperture 104 places in view that portion of the peripheral area of the drum 58 which will indicate the day of the week.

The drum 25 makes 1/31 of a revolution each day. This arcuate rotation of the drum is accomplished at the most convenient hour; that is, any time between midnight and dawn. This drum, however, is not capable of being rotated while the locking pin 38 is engaged in one of any of the perforations 44. Retraction of this locking pin 38 is accomplished by a clock movement mounted upon the roof 15 of the casing of the mechanism, one of the gears of the clock mechanism specifically a gear which will rotate the gear 47 in the mechanism one revolution in a period of 24 hours. Revolution of the gear 47 will cause its hub 48 to rotate therewith, the hub 48 being provided with an inclined cam surface 49 upon

which rests a pin 50[a] secured to a locking shaft. The locking shaft 50 is retracted while the gear 47 is rotated a few degrees of arc. Projection of this locking shaft 50 will cause the cam pin 55 to ride into the space between the upright projection 43 and the wall 41 of the stationary bracket 24, and will thereby retract the stop pin 38 out of its aligned perforation in the drum face 45, thereby releasing the drum so that it may be freely rotated. This action occurs once every twenty-four hours. The movement in the spring drum housing 19 will then begin to rotate the spring drum. By the time this movement has been completed the member 50 has again been retracted and the spring 42 on the stop pin 38 urges the latter into the next perforation, thereby establishing a new set of numerals which may be visible through the aperture 103, thus registering another day. A simultaneous movement of the drum 58[a] must be made at the same time. This is accomplished through the disc 28, which engages a toothed wheel 57, the latter being rigidly mounted upon the end of the spindle 59[a], upon which the drum 58[a] is secured. An escapement lever 61 controls the rotation of the toothed wheel 57 so that the drum will not rotate more than 1/7 of a revolution. After this drum 58[a] has rotated 1/7 of a revolution a new day of the week is visible through the aperture of 104. To compensate for the variability of the different months of the year between a month having 28 days and a month having 31 days, a mechanism is provided to cause the stop pin 38 to be released from engagement with the face 45 of the drum 25 at the end of a 28-day month after 29, 30, and 31-day has been skipped. To provide a mechanism accomplishing this function, brackets 81 and 82 are provided. These brackets hereinbefore named are spaced apart from each other and have journaled therein a shaft 83 upon which a 48-tooth ratchet wheel 92 is secured. This ratchet wheel is adapted to be moved 1/48 of a revolution, or one tooth each month. This is accomplished by providing a pusher pin 80 upon the face of the tooth disc 28. The tooth disc is located on the spindle 18, is slidable thereon, and rotates synchronously with the drum 25, thus during one rotation of the drum 25 the pin 80 passes a given point, and at a desirable position a bell crank 94 crosses the path of the pin 80. This arm will therefore be rotated a desirable arcuate distance and yieldably position plunger 94 in the bell crank which, in engaging one of the teeth 92 of the ratchet wheel, will rotate this ratchet wheel the distance equivalent to one tooth. This shaft 83, upon which the ratchet wheel is rigidly and axially mounted, has month-indicating disc 84 thereon, and all those months having 30 days and 28 days have an ear extending transversely upon the rim of the disc. These ears indicated by the numerals 89, 88, 87, 86, and 85, jut outwardly beyond the periphery of the disc a sufficient distance to permit the pin 79 upon the face of the tooth disc 28 to ride upon the edge of one of these ears, and in so doing slide the toothed disc 28 inwardly upon the spindle 18 against the tension of the spring 34. These ears mounted upon the disc 84 which is divided into 48 segments representing 48 months of time are placed upon the peripheral edge of the disc at varied positions. All those months having 30 days, such as June, April, November, and September, are represented by an ear upon this disc. The ears representing these months are reproduced four times, once in each quadrant of the disc. The month of February in three of these quadrants, which represents the ordinary 28-day month, is shorter than the ear representing February in the fourth quadrant, which indicates a month of 29 days. As the 30th day is registered and sighted through the aperture 103, the pin 79 finds itself a short distance above the horizontal axis of the disc 28. This pin in continuing its rotation will ride upon the outer edge of either of the ears, 89, 88, 87, 86, or 85, and will, in so doing, deflect the disc 28 side-ways against the tension of the spring 34. The flange 33 on member 30, which latter is integral with the disc 28, exerts a rotating pressure on the lever 36 which, having a bifurcated end engaging the pin 38, will release this pin from engagement with the face 45 of the drum 25, thus releasing the drum. This drum will have sufficient time to rotate and skip the next perforation 44 representing the 31st day, and at this instant the pin 79 has completely traversed the length of the ear on the disc 84 and will permit the disc to again assume its normal position so that the lever 36 also again assumes its normal position indicated in Figure 3.

It is to be noted that certain changes in form and construction may be made without departing from the spirit and scope of the invention.

I claim:

1. In a mechanical calendar, a drum having graduated thereon the days of the month, a drum having graduated thereon the days of the week, said first named drum having perforations thereon equal to the number of days of the longest month, means for rotating said first-named drum, a normally projecting locking pin adapted to be normally engaged in any one of the perforations in said first-named drum, a right angle projection on the end of said locking pin, a clock-actuated gear wheel, means cooperating with said gear and pin for releasing said pin from engagement with said first-named drum and means for jumping said drum from the 28th numeral to the 1st numeral, comprising a rotatable member having a plurality of fins of varying lengths peripherally mounted

thereon at right-angles to the plane of rotation and a plurality of pins of varying lengths projecting from said drum adapted to engage said fins.

2. In a mechanical calendar, a drum having graduated thereon the days of the month, a drum having graduated thereon the days of the week, said first-named drum having perforations thereon equal to the number of days of the longest month, means for rotating said first-named drum, a normally projecting locking pin adapted to being normally engaged in any one of the perforations in said first-named drum, a right angle projection on the end of said locking pin, a clock-actuated gear wheel, a hub on said gear, a pin adapted to be projected toward said projection on said locking pin, means on said hub for retracting said pin for causing engagement of said locking pin in any of said perforations when retaining said drum stationary and means for jumping said drum from the 28th numeral to the 1st numeral, comprising a plurality of pins of varying length projecting from the side of said drum, a plurality of peripherally arranged fins of varying lengths rotatably mounted, and a locking member cooperating with said fins and adapted to be tripped by engagement with one of said pins.

3. In a mechanical calendar, a drum having graduated thereon the days of the month, a drum having graduated thereon the days of the week, said first-named drum having perforations thereon equal to the number of days of the longest month, means for rotating said first-named drum, a normally projecting locking pin adapted to being normally engaged in any one of the perforations in said first-named drum, a right angle projection on the end of said locking pin, a clock-actuated gear wheel, a hub on said gear, a pin adapted to be projected toward said projection on said locking pin, a cam surface on said hub, a member on said pin riding on said cam surface of said hub, said clock-actuated gear being rotatively mounted on said pin, said gear being adapted to be rotated one revolution every 24 hours and when so rotated being adapted to retract said pin out of engagement with said projection on said locking pin and means for urging said locking pin into engagement with one of the perforations on said drum, comprising a lever pivoted intermediate its length contacting with said cam surface.

In testimony whereof I affix my signature.

JOSEPH MAYER.