(No Model.) 3 Sheets—Sheet 1.

C. I. FOWLER.

CALENDAR CLOCK.

No. 543,236. Patented July 23, 1895.

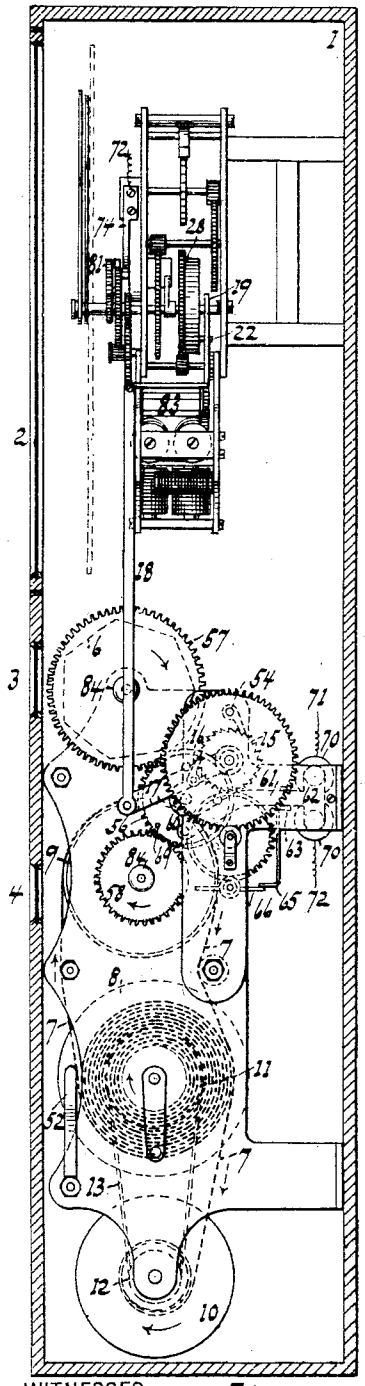

Fig. 1.

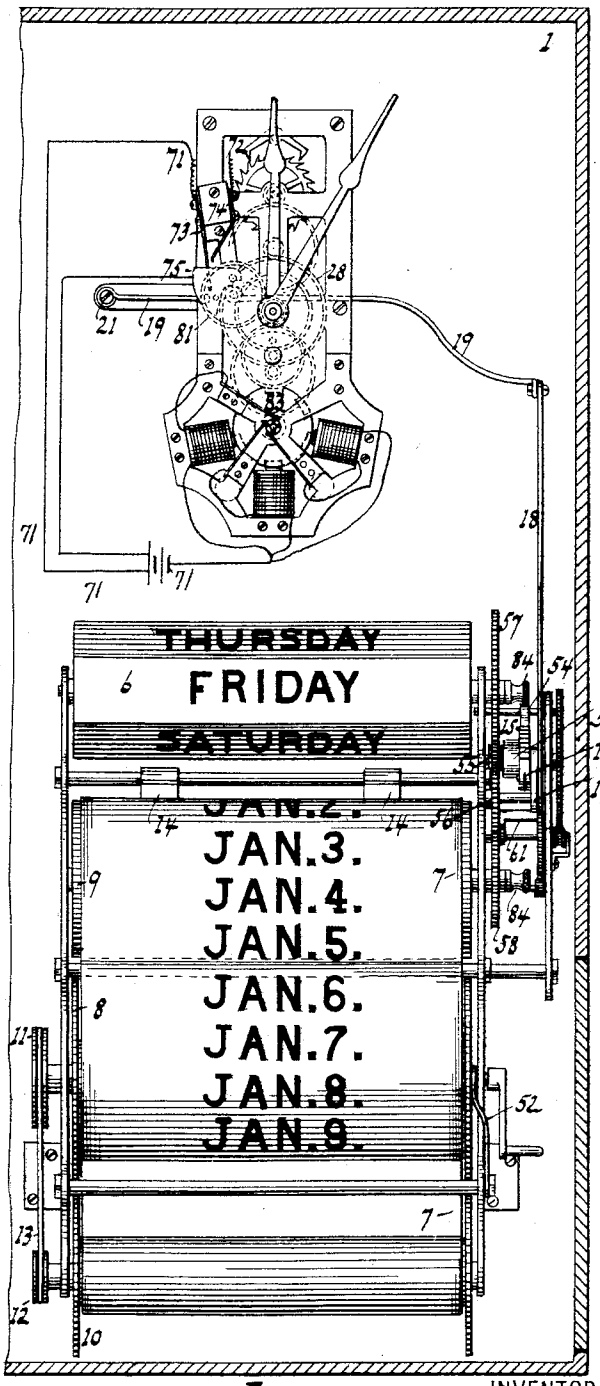

Fig. 2.

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(No Model.) 3 Sheets—Sheet 2.

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Fig. 3.

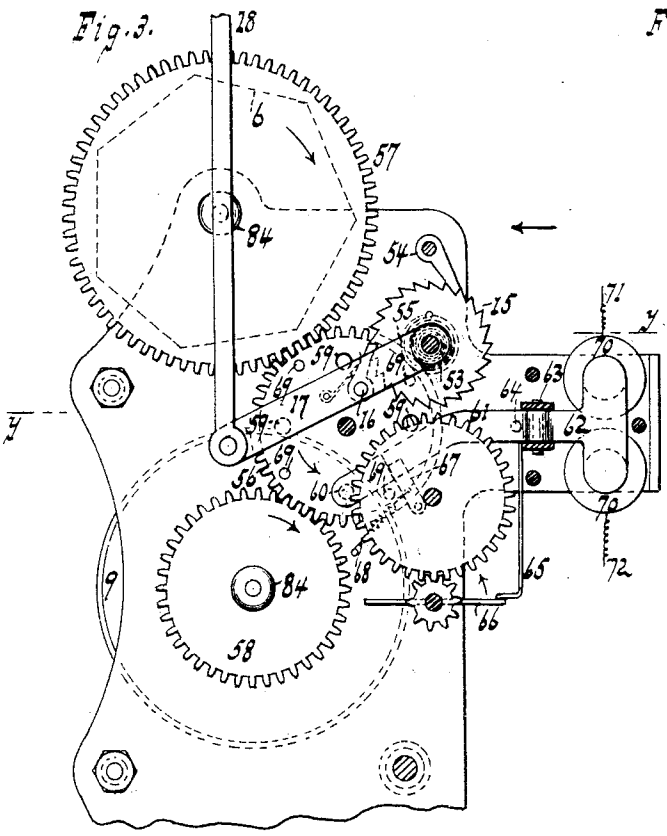

Fig. 4.

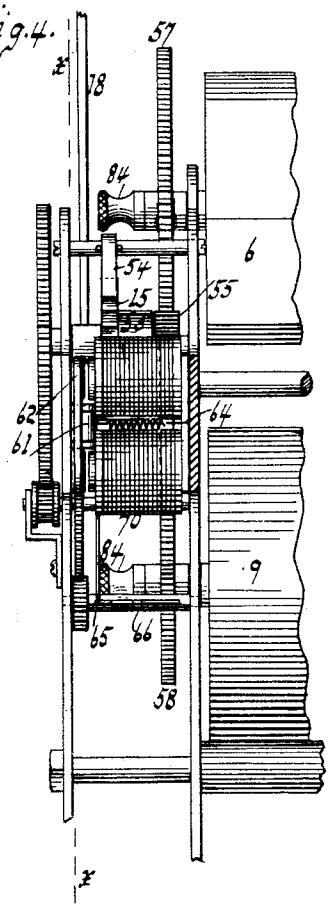

Fig. 5.

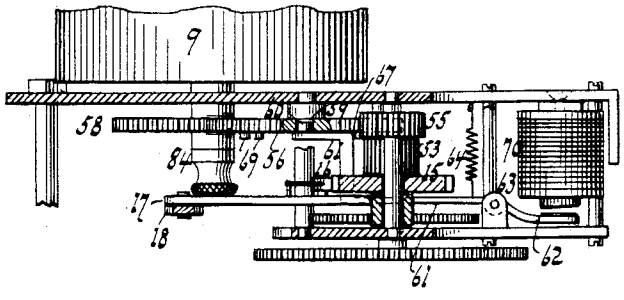

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Fig. 6.

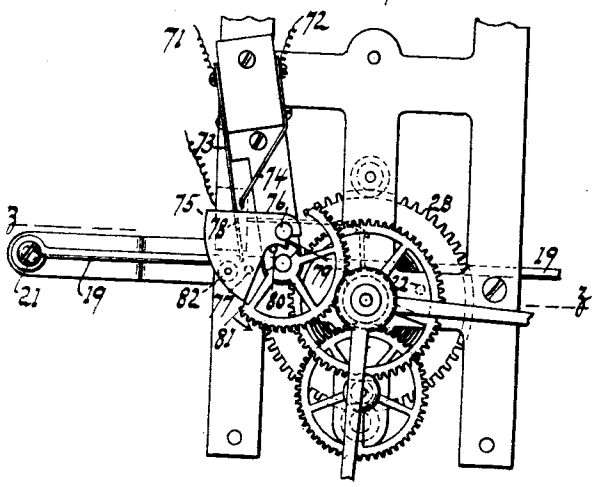


Fig. 7.

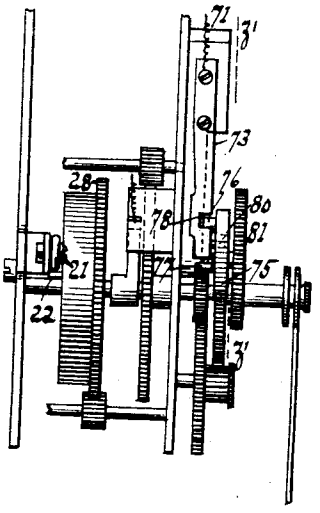


Fig. 8.

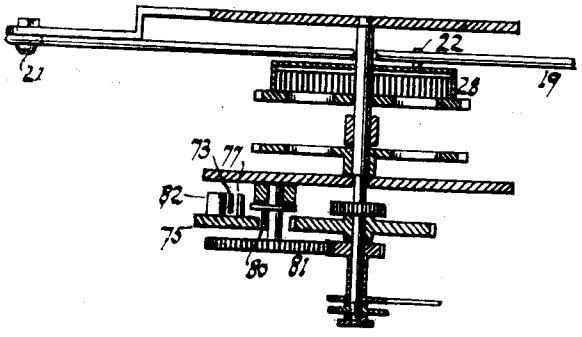


Fig. 9.

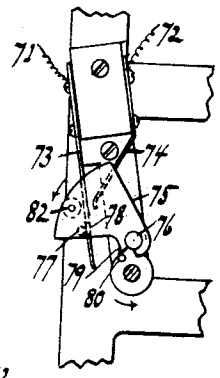


Fig. 10.

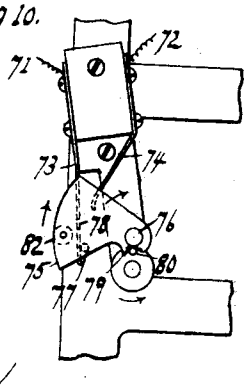
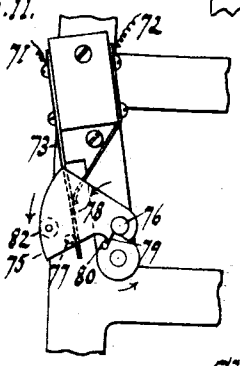


Fig. 11.



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UNITED STATES PATENT OFFICE.

CHARLES I. FOWLER, OF NEW YORK, N. Y.

CALENDAR-CLOCK.

SPECIFICATION forming part of Letters Patent No. 543,236, dated July 23, 1895.

Application filed February 19, 1895. Serial No. 538,998. (No model.)

To all whom it may concern:

Be it known that I, CHARLES I. FOWLER, a citizen of the United States, residing at New York, in the county and State of New York, have invented new and useful Improvements in Calendar-Clocks, of which the following is a specification.

By means of this invention I attain the benefits of a calendar-movement having a spring-motor without necessity of winding said motor, the latter being what may be called "self-winding" or "automatic," and the construction of the calendar-movement is such that it is readily applicable to various kinds of clocks; and the invention resides in the novel features of construction set forth in the following specification and claims, and illustrated in the annexed drawings, in which—

Figure 1 is a side elevation of the calendar-clock, the case being sectioned open for exposure. Fig. 2 is a front elevation of Fig. 1, the case sectioned open as before. Fig. 3 is a side elevation of calendar-driving mechanism sectioned along *x x*, Fig. 4. Fig. 4 is a side elevation of Fig. 3. Fig. 5 is a section along *y y*, Fig. 3. Fig. 6 is a face elevation of a clock-movement. Fig. 7 is a side elevation of Fig. 6. Fig. 8 is a section along *z z*, Fig. 6. Fig. 9 is a detail view of a contact mechanism. Figs. 10 and 11 show different positions of contact-operating mechanism.

The casing 1 has three windows or sight-openings 2 3 4. Through window 2 the clock dial and hands are exposed to view. Through window 3 the day of the week is exposed, the week-days being noted on the faces of the heptagonal roller 6. Through window 4 the date or day of the month is exposed, these dates being noted on date-strip 7, which is drawn or rolled off from delivery-roller 8 by the friction or propelling roller 9 onto take-up roller 10. The pulleys 11 and 12, with belt 13, cause the take-up roller 10 to rotate with delivery-roller 8.

The pulley-and-belt connection 11, 12, and 13 is such that the take-up roller 10 has always a tendency to rotate faster than the delivery-roller 8, so as to take up any slack in strip 7; but said roller 10 is never allowed to draw any portion of the strip from the delivery-roller, as irregularities might thus occur in consequence of the constantly-varying diameters of the rolls on rollers 8 and 10. The belt 13 is therefore made so slack or of such springy or elastic material and the pulleys 11 and 12 are so smooth that any motion in excess of that required to make roller 10 take up the slack of the date-strip is lost as regards said roller 10 by the pulley 11 slipping with relation to belt 13 or by said belt slipping with relation to pulley 12.

Pressure of a spring 52, Figs. 1 and 2, on delivery-roller 8 will aid in preventing the improper rotation of rollers 8 and 10. The strip is thus taken from roller 8 in a uniform and proper successive step-by-step motion by the propelling-roller 9, the weighted arms 14, Fig. 2, causing the strip 7 to lie firmly part way about roller 9, to be securely gripped or propelled by the latter. For additional gripping the surface of rollers 9 may be sanded or roughened.

The day-roller 6 and driving-roller 9, as will presently appear, are driven by a spring or motor 53, Figs. 3 and 5, wound by ratchet and pawl 15 and 16, said pawl 16 being mounted on and actuated by arm 17, oscillated by link 18 and lever 19, Figs. 2, 6, and 8, fulcrumed at 21. This lever 19 extends transversely across a clock-movement and onto or into the path of a stud 22, (one or more,) carried by wheel or by spring-drum 28 of the clock-movement. As the studded wheel or drum 28 rotates to carry about the stud 22, the consequent rise and fall of lever 19 will oscillate arm 17 to wind the spring or motor 53, so that the winding of this motor 53 is accomplished automatically.

The lock-pawl 54 preserves the tension or energy of the motor 53 until needed. This motor, by means of gear 55, Fig. 5, imparts motion to the driving-gear 56, Figs. 3 and 5 engaging the gears 57 and 58, secured to the shafts of rollers 6 and 9. The wheel 56 is held against rotation by having an eye or depression 59, Fig. 3, in its side engaged by a tooth 60 on arm 61 of the lever 61 62, fulcrumed at 63 to a suitably-applied frame-plate. The lever-arm 61, as seen in Fig. 5, is approximately **Z**-shaped for bringing the tooth 60 into proper position to engage into the eyes 59, as required. The spring 64, Fig. 5, tends to move lever-arm 61 into position for the tooth 60 to engage into an eye 59.

In addition to tooth or detent 60 the lever-arm 61 carries an arm 65, Fig. 3, which is adapted to act as a detent for the fly 66 of the calendar-moving train driven by motor 53. The lever 61 62, as will presently appear, is actuated at the suitable period or midnight against the force of spring 64 to release the detents 60 and 65, so that the calendar-moving train with the rollers 6 and 9 will move the next succeeding day and date into exposure, after which the detents 60 and 65 again come into arresting action.

The detent 60 should, of course, be held out of action until the wheel 56 has fairly started to carry the eye 59 just released by detent 60 out of reach or past said detent, so that the wheel 56 will give the rollers 6 and 9 the proper degree of movement. For this purpose a lock is provided for holding the detent 60, as well as detent 65, when released temporarily, out of action. This lock consists of an arm 67, Fig. 3, swung or drawn by spring 68 against a portion of lever-arm 61. Said arm 67 lies alongside the wheel 56, and as soon as arm 61 moves with the tooth 60 to releasing position away from wheel 56 said spring 68 will draw or snap the arm 67 in between the lever-arm 61 and the wheel 56, so as to hold the tooth 60 away from engagement until by the rotation of wheel 56 the eye 59 just released by tooth 60 has traveled out of reach of said tooth and one of the studs 69, projecting from a side of said wheel, has been carried against arm 67 to move the latter out of the way of arm 61, so that this arm is free to be moved by spring 64 back to engaging position for locking tooth 60 into the next succeeding eye 59. The eyes 59 are properly spaced with relation to the calendar-moving train, so that between a successive release and arrest by tooth 60 this train will move sufficiently to cause the rollers 6 and 9 to make an advance for a day and a date.

In the drawings, the wheel 56 is shown with four eyes 59 and four studs 69; but this number of eyes and studs can manifestly be varied as required by varied gearing or speeding of the calendar-moving train.

The arm 61, when moved to release or engage detent 60, will, of course, at the same time release or engage the fly-detent 65.

In the construction shown the release of detents 60 and 65 is effected by an electro-magnet 70, which, being vitalized for the proper instant, will attract lever-arm 62 against the power of spring 64. This magnet 70 is shown with conductors 71 and 72, through which circuit can be established by the contact or fingers 73 and 74. For convenience of description, let the side or face of the finger 73, lying toward finger 74, be known as the "contact" side, and the opposite side as the "outer" side of finger 73.

The weight 75, swinging on stud 76, when being carried up by the clock-movement from the position shown in Fig. 6 to the position shown in Fig. 9, will carry the stud 77 on said weight up along the contact side of spring-finger 73, as seen in Fig. 10, so as not to cause contact between fingers 73 and 74, or rather to press finger 73 away from finger 74. Said fingers are normally a slight distance apart or out of contact. When the weight 75 has been swung far enough upward to bring stud 77 opposite the slit 78, Fig. 7, in finger 73, said finger will spring toward finger 74, and the weight 75 being released will drop, and while dropping will slide or carry the stud 77 down along the outer side of finger 73, Fig. 11, to force the latter into momentary contact with finger 74, so as to close the ciricuits 71 and 72 and vitalize the magnet 70 for effecting the release-movement of lever-arms 62 and 61.

The weight 75 has a nose 79 projecting into the path of finger 80, carried about by the rotation of wheel 81, Fig. 6, geared to a suitable part of the clock-moving train, so as to rotate once in twenty-four hours. When the finger 80 engages nose 79 the weight will be swung upward to carry the stud 77 up along the contact side of finger 73, as noticed, so that when the stud 77 has reached slit 78 and the finger 73 has sprung toward the finger 74 and the finger 80, in its onward rotation, has released or passed out of contact with nose 79, the weight 75, swinging down or dropping, will cause its stud 77 to effect contact, as stated. The weight 75 is shown provided with a supplemental weight 82, Figs. 8 and 9, so that the requisite overweighting is secured.

The battery or electric source for the circuit 71 and 72 is indicated in Fig. 2, and may also be used to drive an electric motor 83, Figs. 1 and 2, for automatically winding the clock in any suitable well-known manner. The mechanism for periodically starting and stopping motor 83 need not be described here, as it is no feature of this invention and is well known.

By mounting the stud or studs 22 on a train-wheel which rotates rapidly, say, for example, every hour, the lever 19 will be oscillated a corresponding number of times, so as to wind calendar-motor 53 by easy stages; or say the stud 22 is mounted on drum 28, wound every hour by motor 83, so that the strain of winding the calendar-motor will not detract from the energy expended in driving the clock-motor.

As in the example shown in Figs. 1 and 2, the periodically-acting winding-motor 83 will keep the clock-motor and, consequently, also the calendar-motor in action. The entire device is rendered automatic and need require no winding or attention.

The cylinders 6 and 9, Figs. 1 and 2, being secured to their gears 57 and 58 by screws 84, the loosening of said screws will enable the cylinders to be set as required while the gears remain at rest.

What I claim as new, and desire to secure by Letters Patent, is—

1. A clock movement, combined with a calendar movement, a motor for the calendar

movement, a detent for said motor, a release for said detent, an electro-magnet for actuating the detent, an electric-motor circuit for actuating the clock movement, and a circuit-closer for vitalizing the electro-magnet, comprising a pair of contact fingers normally out of contact and a studded oscillating weight alternately raised and dropped by the clock movement, said studded weight in its ascent being made to glide along the contact side, and when dropping being made to glide along the outer side of one of said fingers, so that in its descent it moves said last named finger into contact with the other finger, substantially as described.

2. A calendar movement and a driving gear and motor therefor, combined with a detent for the driving gear provided with an armature, an electro-magnet for said armature, a lock for holding the detent out of action, a release for the lock, carried by said driving gear, and a clock movement for winding said motor and for vitalizing the electro-magnet to attract said armature and release the detent, substantially as described.

3. A calendar movement and a motor therefor, combined with a ratchet and pawl for winding said motor, a lever for actuating said pawl, a clock movement having a driving spring drum, and an electric motor for winding said drum at stated periods during each day, said drum being studded and said lever being engaged by said studded drum so as to be actuated to wind the calendar motor by successive steps during each day substantially as described.

4. A clock movement, combined with a calendar movement, a motor for the calendar movement, a detent for said motor, a release for said detent, an electric magnet for actuating the detent, an electric motor circuit for actuating the clock movement, and a circuit closer for vitalizing the electro magnet substantially as described.

5. A clock movement, combined with a calendar movement, a motor for the calendar movement, an actuator or winding arm moved by the clock movement for winding the calendar motor, a detent for the calendar motor, a release for said detent and an electric motor circuit for actuating the clock movement and for releasing the detent substantially as described.

6. A clock movement, a spring for said movement, and an electric motor circuit for winding the spring, combined with a lever actuated by said spring, a pawl and ratchet actuated by said lever, a second spring wound by said pawl and ratchet, a calendar movement actuated by said second spring, and a release for said second spring actuated by the electric motor circuit substantially as described.

7. A calendar movement comprising a day cylinder and a date strip propelling cylinder, combined with driving gears for the cylinders, said cylinders being detachably secured to the gears so as to be capable of setting independently of the gears substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES I. FOWLER.

Witnesses:
WM. C. HAUFF,
E. F. KASTENHUBER.