(No Model.) 3 Sheets—Sheet 1.

D. E. GRANT.

CALENDAR FOR TIME PIECES.

No. 451,042. Patented Apr. 28, 1891.

Fig. 1.

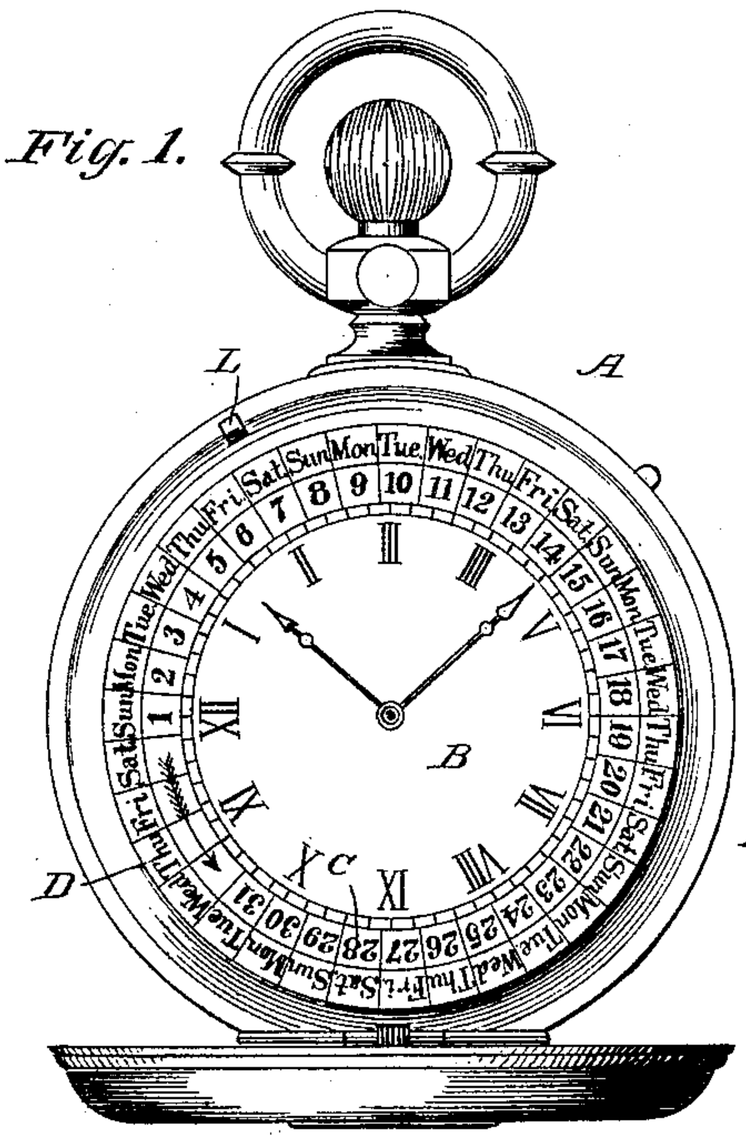


Fig. 2.

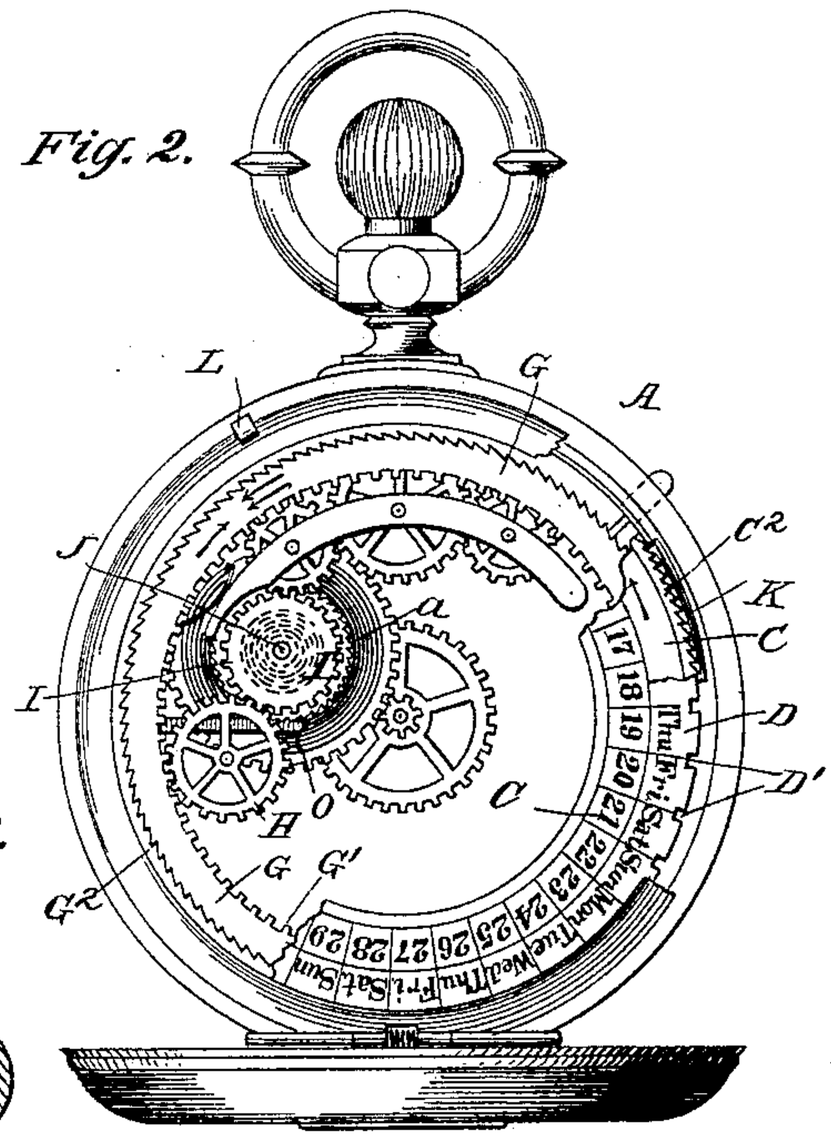


Fig. 3.

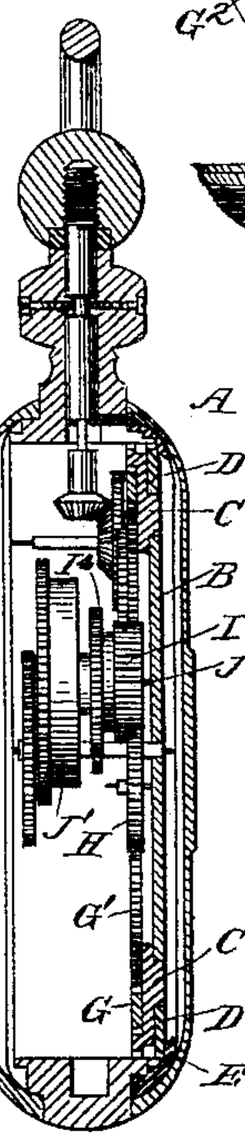


Fig. 4.

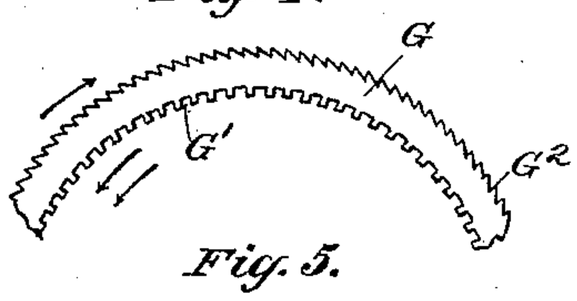


Fig. 5.

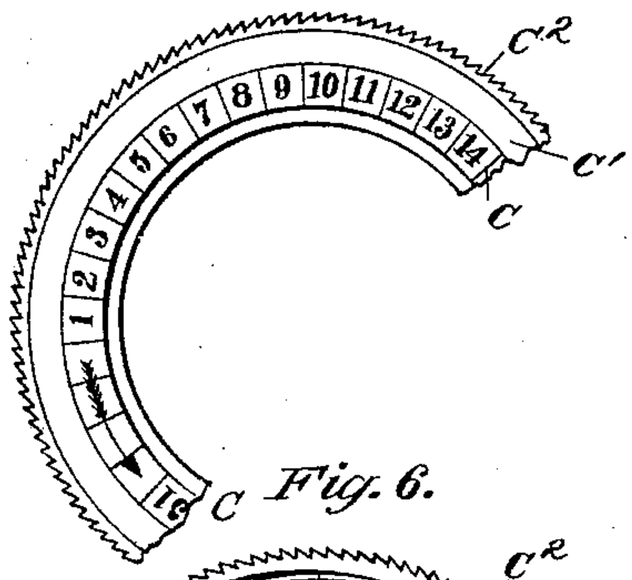


Fig. 6.

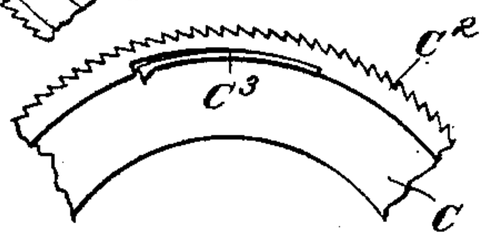


Fig. 7.

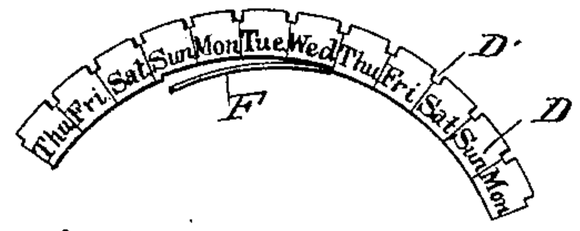


Fig. 8.

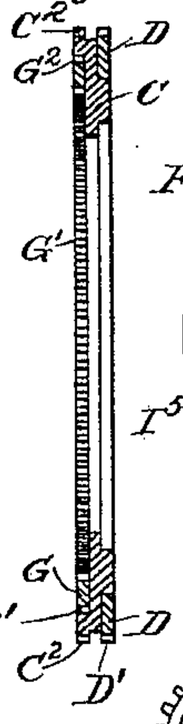


Fig. 9.

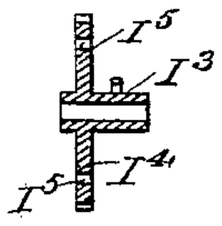


Fig. 10.

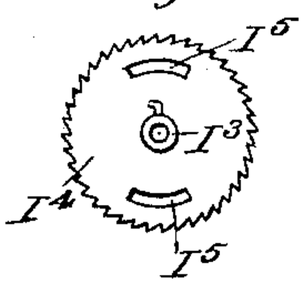


Fig. 11.

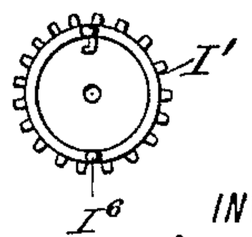


Fig. 12.

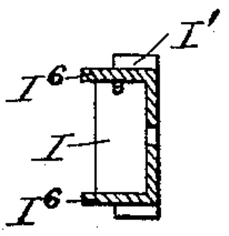
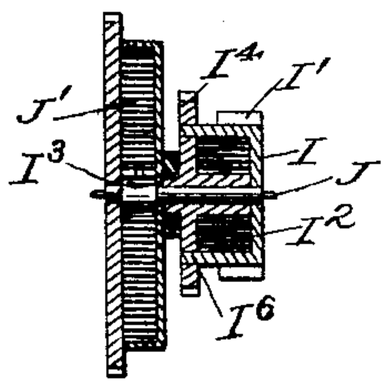


Fig. 13.



WITNESSES:

J. A. D. Griswell

C. Sedgwick

INVENTOR:

D. E. Grant

BY Munn & Co

ATTORNEYS.

(No Model.) 3 Sheets—Sheet 2.

D. E. GRANT.

CALENDAR FOR TIME PIECES.

No. 451,042. Patented Apr. 28, 1891.

Fig. 14.

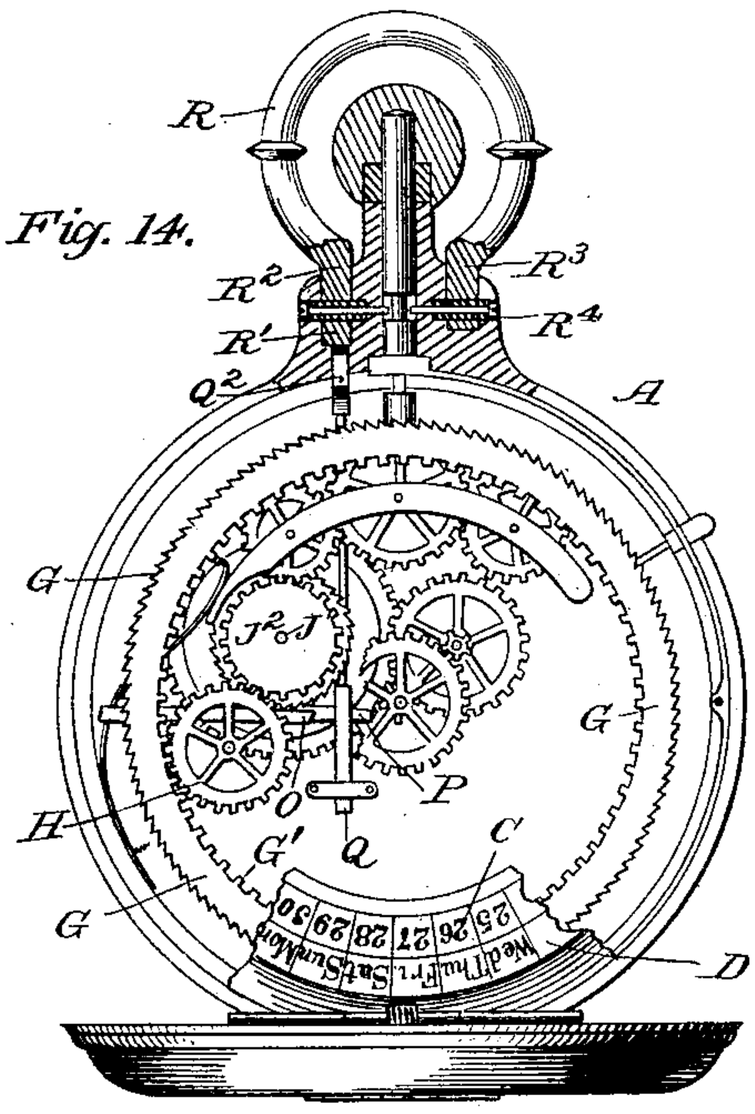


Fig. 15.

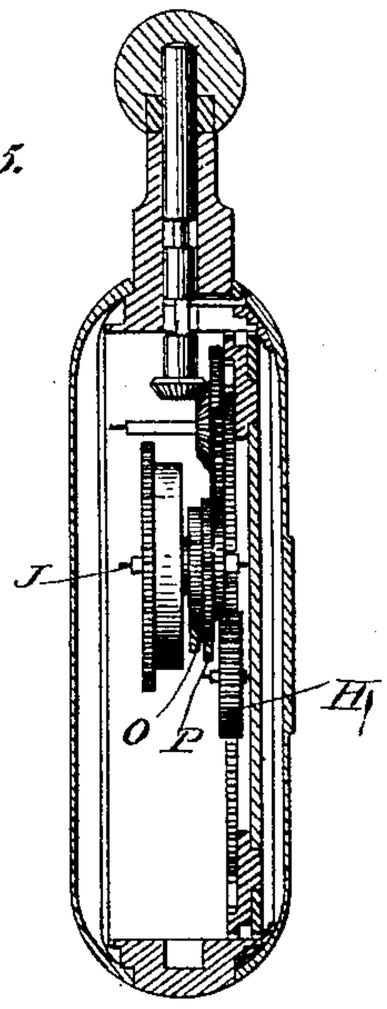


Fig. 16.

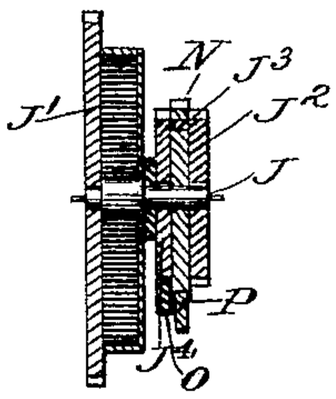


Fig. 17.

Fig. 18.

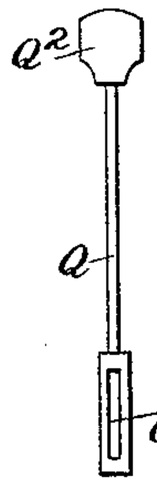


Fig. 19.

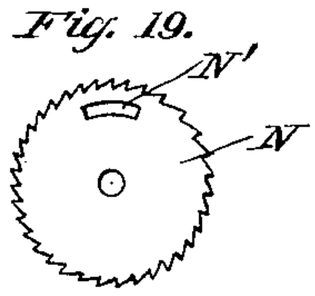


Fig. 20.

Fig. 21.

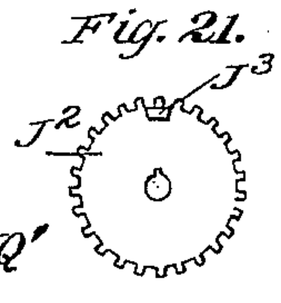


Fig. 22.

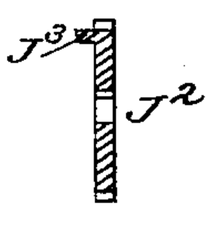


Fig. 23.

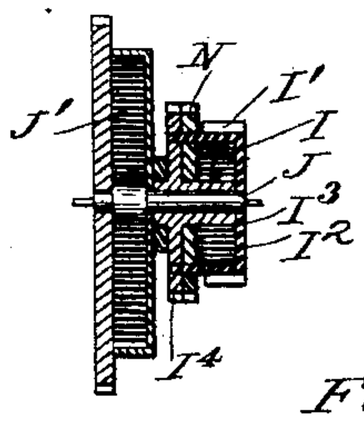


Fig. 24.

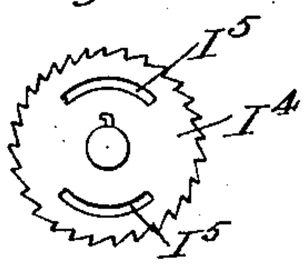


Fig. 25.

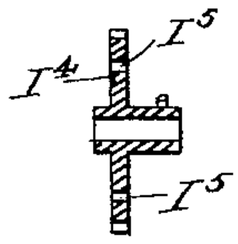


Fig. 26.

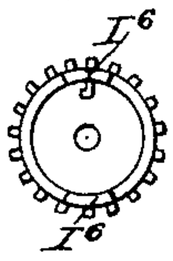


Fig. 27.

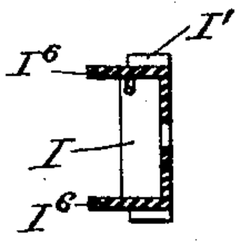


Fig. 30.

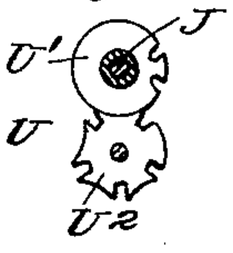


Fig. 29.

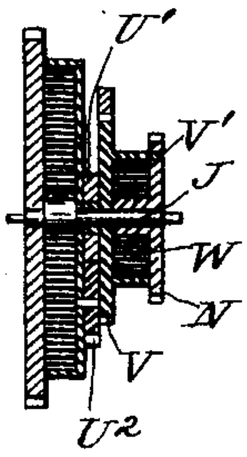


Fig. 28.

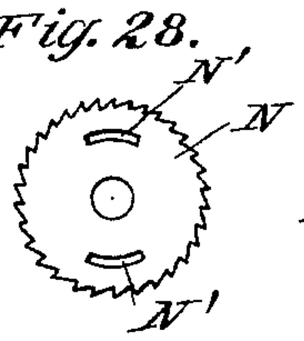


Fig. 33.

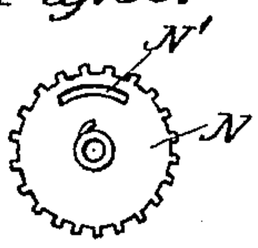


Fig. 34.

Fig. 31.

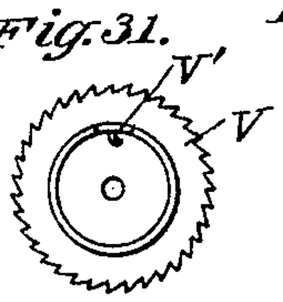
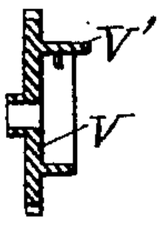


Fig. 32.



WITNESSES:

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C. Sedgwick

INVENTOR:

D. E. Grant

BY

Munn & Co.

ATTORNEYS.

(No Model.) 3 Sheets—Sheet 3.

D. E. GRANT.

CALENDAR FOR TIME PIECES.

No. 451,042. Patented Apr. 28, 1891.

Fig. 35.

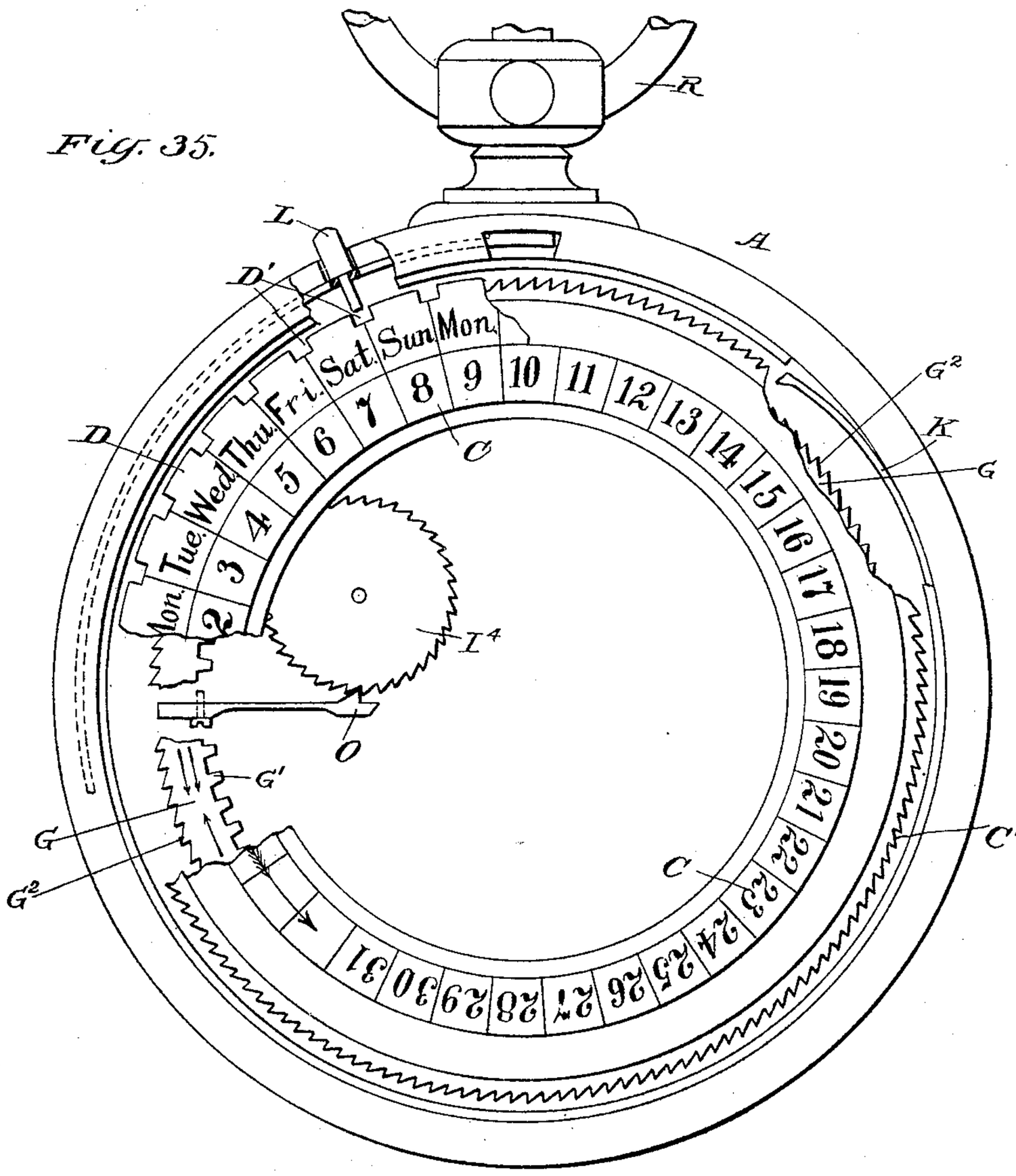
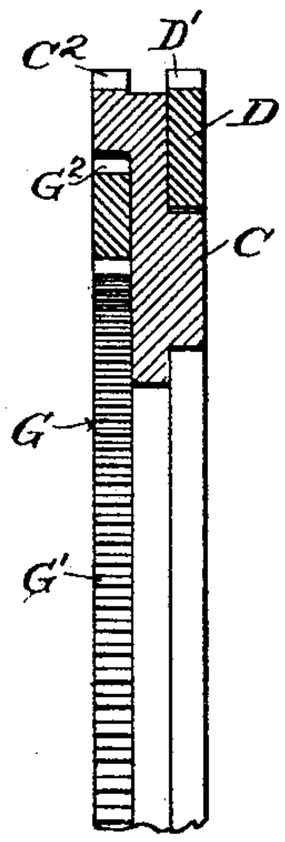


Fig. 36.



WITNESSES:

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UNITED STATES PATENT OFFICE.

DUNCAN E. GRANT, OF QUEBEC, CANADA.

CALENDAR FOR TIME-PIECES.

SPECIFICATION forming part of Letters Patent No. 451,042, dated April 28, 1891.

Application filed September 13, 1889. Serial No. 323,856. (No model.)

To all whom it may concern:

Be it known that I, DUNCAN E. GRANT, of Quebec, in the Province of Quebec and Dominion of Canada, have invented a new and Improved Watch and Clock Calendar, of which the following is a full, clear, and exact description.

There are at present in use only two classes of time-piece calendars. The first and most numerous class consists of those which are operated by the movement of the outer end of the mainspring transmitted through part of the train of wheels of the time-piece. The second class consists of those which are operated by power of hand during the process of winding up. Both these classes of calendars have defects which have prevented their coming into general use, the most prominent being the difficulty or inconvenience of setting or correcting them. In order to correct or set them, it is necessary to remove the glass which covers the time-piece dial and use a detached key or other instrument to shift the hands or dials of the calendar. Even then some of them can be corrected only by a person who thoroughly understands their mechanism, (which the average owner of a time-piece rarely does,) and consequently a watch-maker has to be employed to correct the calendar whenever from any cause it becomes deranged. The second class of calendars does not require setting at the end of the month; but if the time-piece be wound up on any occasion before it has run down to a certain point the calendar will fail to act, and if the time-piece be stopped for a day the calendar will become wrong to that extent, so that it also requires periodical correction, which can only be made by the inconvenient means referred to. It also has the defect, in common with all of the first class, (with one exception, perhaps,) that it does not show a full monthly calendar—that is, it does not give the name and date of every day in the month.

My invention provides a third method of moving the calendar, which is perfectly distinct in principle from those at present in use and is free from their defect of inconvenience.

A calendar constructed in accordance with my invention can be set by means of the winding-arbor by any person who knows nothing of the mechanism used as simply and as easily as the time-piece hands are set by the same winding-arbor. It also possesses the novelty that both name and date dials move daily, presenting the name and date of the current day to the eye in a convenient vertical position instead of their having to be read upside down or sidewise, as must for the greater part of the time be the case in calendars in which the dials are stationary and the current day is pointed out by a revolving hand.

The objects of this invention are to provide a simple and reliable calendar for use on watches and clocks which will not be affected by any variation of the periods which elapse between the windings of the time-piece or by any alteration of the position of the time-hands, to enable the owner of the time-piece when alteration of the calendar is required to adjust it at any time to the correct day by means of the winding-arbor as easily and as simply as he can by the same means change the position of the hands of the time-of-day dial, so as to do away with the necessity which exists in present calendars of removing the glass, employing a key or other instrument, or taking the time-piece to a watch-maker when the calendar requires alteration, and to provide a calendar which will indicate not only the name and date of the present day, as the existing calendars do, but will also show at the same time both the name and date of every day in the past and future of the current month. The name or date of some past or future day of the month is information for which reference to a calendar is required quite as often if not oftener than the name or date of the present day and is not afforded by any time-piece calendar at present in use.

The preferred form of the invention consists of an annular revolving dial indicating the names of the week-days for five weeks in succession and of a second similar dial concentric with the first and provided with numerals from 1 to 31 to indicate the date of any day in the month. Both dials move simultaneously and show the name and date of the present day over "12" of the time-dial and at the same time the name and date of every past or future day of the current month.

The invention also consists of certain parts and details and combinations of the same, as will be hereinafter fully described, and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a face view of the improvement as applied to an ordinary watch, the front cover of the watch being in an open position. Fig. 2 is a like view of the same with parts broken out and parts removed. Fig. 3 is a vertical transverse section of the same, the covers of the watch being closed; Figs. 4, 5, 6, 7, and 8, detail views illustrating the construction of the name and date dials and their ring. Fig. 9 is a cross-section of the ratchet-wheel and the spring mechanism. Fig. 10 is a face view of the same. Fig. 11 is a face view of the barrel for the spring mechanism. Fig. 12 is a transverse section of the same. Fig. 13 is a transverse section of the spring mechanism. Fig. 14 is a face view of the improvement as applied to a watch of different form, parts being broken out and parts in section. Fig. 15 is a vertical transverse section of the same. Fig. 16 is a transverse section of the spring mechanism for the same. Figs. 17 and 18 are respectively edge and side views of an arm-operating spring mechanism. Fig. 19 is a face view of a ratchet-wheel for the spring mechanism shown in Fig. 16. Fig. 20 is a transverse section of the same. Fig. 21 is a face view of the gear-wheel of the spring mechanism shown in Fig. 16. Fig. 22 is a transverse section of the same. Fig. 23 is a transverse section of a spring mechanism of modified form. Fig. 24 is a face view of a ratchet-wheel for the said spring mechanism. Fig. 25 is a transverse section of the same. Fig. 26 is a face view of the spring-barrel of the spring mechanism shown in Fig. 23. Fig. 27 is a transverse section of the same. Fig. 28 is a face view of another ratchet-wheel for the spring mechanism shown in Fig. 23. Fig. 29 is a transverse section of another spring mechanism of modified form. Fig. 30 is a face view of the Geneva stop. Fig. 31 is a face view of the ratchet-wheel and barrel for covering the auxiliary spring. Fig. 32 is a transverse section of the same. Fig. 33 is a face view of a gear-wheel for the modified form. Fig. 34 is a transverse section of the same. Fig. 35 is a face view on an enlarged scale to better show the dials C D, pawls K O, ratchet J, and latch L; and Fig. 36 is a detail section through dials C D and ring G.

In Figs. 1 to 13 and 29 to 34 the improvements shown are adapted equally for use on watches or clocks, while in Figs. 14 to 22 and 23 to 28 the calendar is adapted for use on watches only.

As shown in Figs. 1 to 13, inclusive, a watch A of ordinary construction is provided with a numeral-dial C, divided on its face into thirty-five spaces containing the numerals 1 to 31, four spaces being left blank. The numeral-dial C is surrounded by a ring-shaped dial D, Fig. 7, containing the names of the days of the week for five weeks, thus forming the same number of spaces—that is, thirty-five—as are contained on the dial C. The spaces containing the numerals on the dial C correspond with the spaces containing the names of the days of the week on the dial D, as is plainly illustrated in Figs. 1 and 35. The dial D rests upon the flat front face of an annular flange C′, formed on the dial C, said flange C′ having ratchet-teeth C^2 formed on its edge or periphery, as shown in Figs. 5, 6, 8, and 36. The dial C turns on a projection of the frame of the works and is locked in its place by the ordinary time-dial B, as shown in Fig. 3. The dial D, which turns on the face of the dial C, is held in place on the latter by a spring F, secured to the inner edge of the dial D, with its free end pressing against the periphery of the dial C, as shown in Fig. 7. When the dial C is turned the dial D turns with it, unless prevented from turning by a mechanism hereinafter described. Dial D is provided on the back of its flange C′ with a spring-pawl C^3, (see Fig. 6,) which is adapted to engage ratchet-teeth G^2, formed on the outer edge of a ring G, mounted to turn in the back of the dial C, Figs. 8 and 36. The inner edge of the ring G is provided with gear-teeth G′ to engage a gear-wheel H, in mesh with a gear-wheel I′, formed on the barrel I, containing the calendar-spring I^2. This calendar-spring I^2, which is coiled in the opposite direction to the mainspring J′, is secured by its outer end to the spring-barrel I and by its inner end to the hub I^3 of a ratchet-wheel I^4, fastened on the shaft J of the said mainspring I′, as represented in Fig. 13. The ratchet-wheel I^4 is provided with segmental slots I^5, into which project pins I^6, secured on the rim of the spring-barrel I, as is plainly shown in Figs. 11, 12, and 13. The gear-wheel I′ is connected in the usual manner with the winding mechanism of the watch, and the ratchet-wheel I^4 is engaged by the usual spring-pawl O. The ratchet-teeth C^2 on the dial C are engaged by a spring-pawl K, (see Fig. 2,) secured to the case of the watch A. The said teeth C^2 stand in the opposite direction to the teeth G^2 on the ring G, and the pawl K, engaging said ratchet-teeth C^2, prevents the dial from turning in the wrong direction. In the outer edge of the name-dial D are formed notches D′, placed the same distance apart as the spaces containing the names of the days of the week on the said dial, as is plainly shown in Fig. 7. The notches D′ are adapted to be engaged by a spring-latch L, held in the casing of the watch A. The operation is as follows: When the watch A is wound up, the calendar is moved one space or day. This is done as follows: The spring I^2 is somewhat stronger than the mainspring J′ when the

latter is fully wound up, so that when in winding up the watch the gear-wheel I′ is turned the spring I^2 in the barrel I, without itself bending, causes the shaft J to turn until it is arrested by the usual Geneva stop. The ratchet-wheel I^4 then also comes to a standstill; but the spring I^2, now yielding, permits the barrel I to continue its revolution until its pins I^6 have passed to the ends of the slots I^5 in the ratchet-wheel I^4, and the further forward movement of the gear-wheel I′, and consequently of the winding-arbor in the stem, is thereby prevented. During the winding the ring G turns in the direction of the single arrow in Figs. 2 and 4, its teeth G^2 riding over the pawl C^3 in the back of dial C, which latter is held against turning by means of the pawl K. When the winding of the watch has thus been completed, as above described, and the pressure of the hand on the key is removed, the barrel I moves backward by the reaction of the spring I^2 until the pins I^6 have returned to the ends of the slots I^5 in the ratchet-wheel I^4, from which they started. This backward motion of the barrel I reverses the movement of the gear-wheel H, which latter then turns the ring G in an opposite direction from that in which it was revolving while the time-piece was being wound, or, in other words, turns it in the direction of the double arrow in Figs. 2 and 4. The ring G, moving in the direction of the double arrows, is engaged by the dial C, and thereby locking both dials C and D to the ring G. The distance the ring G and the two dials C and D (which latter are locked together by spring F) travel corresponds to one space on the said dials, so that the following name and date of the following day appear directly over the figure "12" of the time-dial B. From this it will be seen that the calendar is shifted only when the winding up of the watch has been completed. It will also be seen that as the calendar is shifted one day every time that the time-piece is wound it would be best to wind the time-piece either just before retiring at night or the first thing in the morning, so that the change in the calendar from one day to the next may take place when (so far as the owner of the time-piece is concerned) one day is finished or the next day commences.

The calendar has to be set at the end of each month, and this is accomplished in the following manner: When the watch or clock has been wound up as usual and the calendar-dials C and D have shifted one day, as above described, the spring-latch L is pressed inward with the finger to engage one of the notches D′ of the dial D, thus stopping further motion of the latter. The key or winding-arbor of the winding mechanism is then again turned forward as far as the slots in the ratchet-wheel I^4 will permit it to go. The pressure on the key is relaxed, and the barrel I, moving backward, moves the dial C one day in the manner above described, without, however, carrying along the dial D, as the latter is locked in place by the spring-latch L. The pressing and releasing of the key is repeated, the dial moving the distance of a space each time until the correct date comes over the number "12" of the time-dial B. The operator then releases the spring-latch L, so that the dial D is set free to turn with the dial C. It is understood that the dial D needs no shifting at the end of the month, as the names of the days are marked in succession on the said dial. The calendar is then set for the month, and no further attention need be given to it until the beginning of the next month. If the calendar-dial is made for one year instead of one month, the action is the same, and no setting of it will be required during the year except in February of leap-year. For watches, however, the yearly dial would be inconveniently large on account of the many spaces necessary; but it can be used on clocks either in the shape of a circular dial or in the form of an endless tape or band moving verticaliy.

In the modification illustrated in Figs. 14 to 22 the additional spring I^2 is dispensed with, and a gear-wheel J^2 of the winding mechanism is secured on shaft J and provided with a lug J^3 to fit into a segmental slot N′, formed in a ratchet-wheel N, which latter is held loosely on the shaft J, between the gear-wheel J^2 and the ratchet-wheel J^4 on the shaft J. The ratchet-wheels J^4 and N are engaged by the spring-pawls O and P, respectively. The spring-pawl O engages the ratchet-wheel J^4, and the free end of the said spring-pawl O passes into a slot Q′ in a rod Q, Figs. 17 and 18, extending upward and adapted to slide in suitable bearings in the watch-case. The upper end of the rod Q is provided with an offset Q^2, on which is adapted to press a cam R′, formed on the offset R^2 of the ring R, which latter is provided on its other end with the offset R^3, extending parallel to the offset R^2. Pivots R^4 pass through the parallel offsets R^2 and R^3, Fig. 14, thus permitting the ring R to swing from its normal position in line with the watch-case into a right-angular position. The operation under this plan is as follows: When the ring R is at right angles to the plane of the watch-case and the watch is wound, the gear-wheel J^2 and the ratchet-wheel J^4, fastened on the mainspring-shaft J, are revolved, so that the lug J^3 of the gear-wheel J^2 passes along the slot N′ in the ratchet-wheel N, which is standing still, until it (the said lug) strikes the end of the slot, when the three wheels J^2, N, and J^4 will turn together until the watch is completely wound. When the operator turns the ring R into the normal position shown in Fig. 14, the cam R′ on the offset R^2 of the ring R acts on the offset Q^2 of the rod Q, depresses the pawl O, and releases the ratchet-wheel J^4. The inner end of the wound-up mainspring J′ then revolves the shaft J, with the wheels J^4 and J^2, in the opposite direction from that

in which they were going when the watch was being wound, until the lug J^3 of the wheel J^2 strikes that end of the slot N′ from which it originally started, and, as the ratchet-wheel N is held stationary by its pawl P, motion ceases until it is necessary to wind the watch again. While the watch is being wound, the gear-wheel J revolves the gear-wheel H, which turns the ring G of the calendar in the same direction as that in which the hands of the time-dial move; but the calendar-dials C and D are held stationary by the action of the spring-pawl K, Fig. 2, engaging the teeth of the dial C. When the winding has been completed and the ratchet-wheel J^4 released, the wheels J^2 and H and the ring G revolve in the opposite direction to that in which they were going while the winding was taking place, and the ratchet-teeth G^2 of the ring G, acting on the spring-pawl C^3, Fig. 6, move the dial C the distance of one space or day, carrying the dial D with it. The length of the slot N′ is regulated by the distance the calendar-dials have to move each day. The setting of the calendar is the same as that previously described in reference to Figs. 1 to 13, except that while the calendar is being set the ring R must be up in line with the plane of the watch, while in the other plan no attention need be given to the position of the ring.

The modification shown in Figs. 23 to 28 is to be used on the watch described above, and shown in Figs. 14 and 15. An additional spring I^2, Fig. 23, is employed, similar to the spring previously referred to, but somewhat weaker than the mainspring J′ when said mainspring J′ is run down, and of just sufficient strength to move the calendar-dials. The spring I^2 is secured by its outer end to the barrel I and by its inner end to the hub I^3 of the ratchet-wheel I^4, engaged by the pawl O, Fig. 16, and is coiled in the opposite direction to that in which the mainspring is coiled. Between the barrel I and the said ratchet-wheel I^4 is placed a ratchet-wheel N, through the segmental slots of which pass the pins I^6 of the barrel I, the said pins also passing through the slots I^5 of the ratchet-wheel I^4, which latter is secured on the shaft J, while the wheel N and the barrel I are loose on the same. The ratchet-wheel N is engaged by the pawl P, Fig. 16, connected with the rod Q, operated from the cam of the ring R. When the winding takes place, the barrel I and the ratchet-wheel N revolve together until the pins I^6 strike the ends of the slots I^5 in the ratchet-wheel I^4, so that the latter is also turned, and the mainspring J′ is wound up. The ratchet-wheel N is then released by the pawl actuated by the rod Q and cam R′ of ring R, as previously described, while the ratchet-wheel I^4 is held stationary by its pawl O. The ratchet-wheel N and the barrel I are carried backward by the reaction of the spring I^2 as far as the slots I^5 in the ratchet-wheel I^4 permit. The barrel I in moving backward moves the calendar-dials in the manner described above, so as to change the dials for the next day. The setting at the end of the month is accomplished in the manner previously described relating to Figs. 14 to 22. It is understood that the back action of the calendar-spring I^2 causes the shifting of dials C and D, as above described.

The modification shown in Figs. 29 to 34 is to be used on the watch described in reference to Figs. 1 and 2 and is equally applicaable to twenty-four-hour clocks. The gear-wheel N is fast on the shaft J of the mainspring J′, and the central wheel U′ of the Geneva stop U is secured on the hub of the ratchet-wheel V, mounted loosely on the shaft J. The auxiliary spring W is attached by its inner end to the hub of the gear-wheel N and by its outer end to the barrel of the ratchet-wheel V. It is coiled in the same direction as the mainspring, and its strength is just sufficient to overcome without bending the resistance of the spring-pawl O as it slides over the backs of the teeth of the ratchet-wheel V while the watch is being wound up. The projection V′ on the barrel of the ratchet-wheel V fits into the slot N′ of the gear-wheel N. The action is as follows: When the watch is being wound up, the gear-wheel N is revolved by the usual mechanism, (shown in Fig. 2,) and the wheels V and U′ are carried along with it by means of the auxiliary spring W until the motion of the said wheels V and U′ is arrested by the star-wheel U^2 of the Geneva stop U. The gear-wheel, however, still continues to revolve until the right-hand end of the slot N′ strikes the projection or lug V′ on the barrel of the ratchet-wheel V and all forward motion ceases. Then when the pressure of the operator's hands on the winding-arbor is relaxed the gear-wheel N is carried backward by the reaction of the mainspring J′ and the auxiliary spring W until the left-hand end of the slot N′ rests against the lug V′ on the barrel of the ratchet-wheel V, as it did before the winding began. It is understood that the ratchet-wheel V is prevented from moving backward by its spring-pawl O. The gear-wheel N in moving backward, when the winding has ceased, the distance which its slot N′ will permit moves the gear-wheel H, which moves the calendar one space or day. The method of setting the calendar is precisely the same as that of the device above described relative to Figs. 1 to 13, inclusive.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, in a watch or clock, of a spring and a calendar operated by the reaction of the spring, said spring being put under tension during the winding operation, but coming into action only after the winding is completed.

2. The combination, in a watch or clock, of an annular revolving dial showing simultaneously the name of each day of the week for five weeks in succession, and means, substan-

tially such as shown and described, for imparting motion to the dial, said dial being adapted to be set or altered at any time and to any extent by the winding-arbor.

3. The combination, in a watch or clock, of an annular revolving dial showing simultaneously and in succession the date of each day of the current month, and means for imparting motion to the dial, said dial being adapted to be set or altered at any time and to any extent by means of the winding-arbor.

4. The combination, in a watch or clock, of an annular revolving dial divided into thirty-five equal spaces and showing simultaneously the name of each day of the week for five weeks in succession, with a second annular revolving dial concentric with the first, divided into thirty-five equal spaces, and showing simultaneously the dates of the days of the month, both of which said dials can be set or altered separately or together at any time and to any extent by means of the winding-arbor.

5. The combination, in a watch or clock, of an annular revolving dial showing simultaneously the name of every day for five weeks, and a spring which by its reaction shall actuate the dial, said spring being put under tension during the winding operation, but reacting to operate the dial only after the winding has ceased.

6. The combination, in a watch or clock, of an annular revolving dial showing simultaneously the date of every day of the current month, and a spring reacting to actuate the dial, said spring being put under tension during the winding operation, but coming into action only after the winding has ceased.

7. The combination, in a watch or clock, of a calendar consisting of two annular and concentric dials exhibiting simultaneously the name and date of each day of the current month, and a spring which by its reaction shall operate said dials, said spring being put under tension during the winding operation and coming into action only after the winding has ceased.

8. The combination, in a watch or clock, of two annular concentric revolving calendar-dials with a spring-latch or push-pin held in the casing of the watch or clock and adapted to be depressed by hand, so as to arrest the movement of the name-dial by entering notches in its periphery when it is necessary to set or alter the other or date dial alone, substantially as shown and described.

9. The combination, in a watch or clock, of two annular concentric revolving calendar-dials actuated by the reaction of a spring put under tension during the winding operation, but which shall come into action only after the winding of the watch or clock has been completed, and intermediate mechanism connecting said dials with the winding-arbor, so as to enable the said dials to be set or altered at any time and to any extent by means of the winding-arbor from the outside of the watch or clock casing, all substantially as shown and described.

10. In a watch, the combination, with two annular concentric revolving calendar-dials, of a pivoted watch-ring provided with a cam and of an arm or rod connecting said cam with a pawl which controls the ratchet-wheel of the mainspring, for the purpose, when necessary, of depressing said pawl and thereby releasing the mainspring, the reaction of which operates the said calendar-dials, substantially as shown and described.

11. In a watch, the combination, with two annular concentric revolving calendar-dials, of a pivoted watch-ring provided with a cam and of an arm or rod connecting said cam with a pawl which controls the ratchet-wheel of the auxiliary or additional spring, for the purpose, when necessary, of depressing said pawl and thereby releasing the said spring, which by its reaction operates the calendar-dials, substantially as shown and described.

12. The combination, in a watch or clock, of an auxiliary or additional spring with annular concentric revolving calendar-dials exhibiting simultaneously the name and date of each day in the current month and actuated through intermediate gearing by the reaction of the said spring after the winding of the watch or clock has been completed, substantially as shown and described.

13. The combination, in a watch or clock, of a mainspring and an auxiliary or additional spring, and two annular concentric revolving calendar-dials exhibiting simultaneously the name and date of each day of the current month and actuated through intermediate gearing by the reaction of said spring after the winding of the watch or clock has been completed, substantially as shown and described.

14. The combination, with an auxiliary spring connected with the winding mechanism of a watch or clock, of dials actuated by the reaction of the said auxiliary spring, substantially as shown and described.

15. The combination, with two calendar-dials, of a pivoted watch-ring provided with a cam and mechanism connecting the said watch-ring with the winding mechanism of the watch for the purpose of releasing the spring operating said calendar-dials, substantially as shown and described.

16. The combination, with an auxiliary spring connected with the winding mechanism of a watch or clock, of a dial indicating the days of the month and mounted to turn by the back action of the said auxiliary spring, substantially as shown and described.

17. The combination, with an auxiliary spring connected with the winding mechanism of a watch or clock, of a dial indicating the days of the month and mounted to turn by the back action of the said auxiliary spring, and a second dial provided with the names of the days and carried by the said first-named dial, substantially as shown and described.

18. The combination, with an auxiliary spring connected with the winding mechanism of a watch or clock, of a dial indicating the days of the month and mounted to turn by the back action of the said auxiliary spring, a second dial provided with the names of the days and carried by the said first-named dial, and a spring-latch for holding the said second dial while the first-named is being set, substantially as shown and described.

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Witnesses:
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