(Model.) 3 Sheets—Sheet 1.

G. E. SANFORD.

TIME PIECE CALENDAR.

No. 255,198. Patented Mar. 21, 1882

Fig. 1.

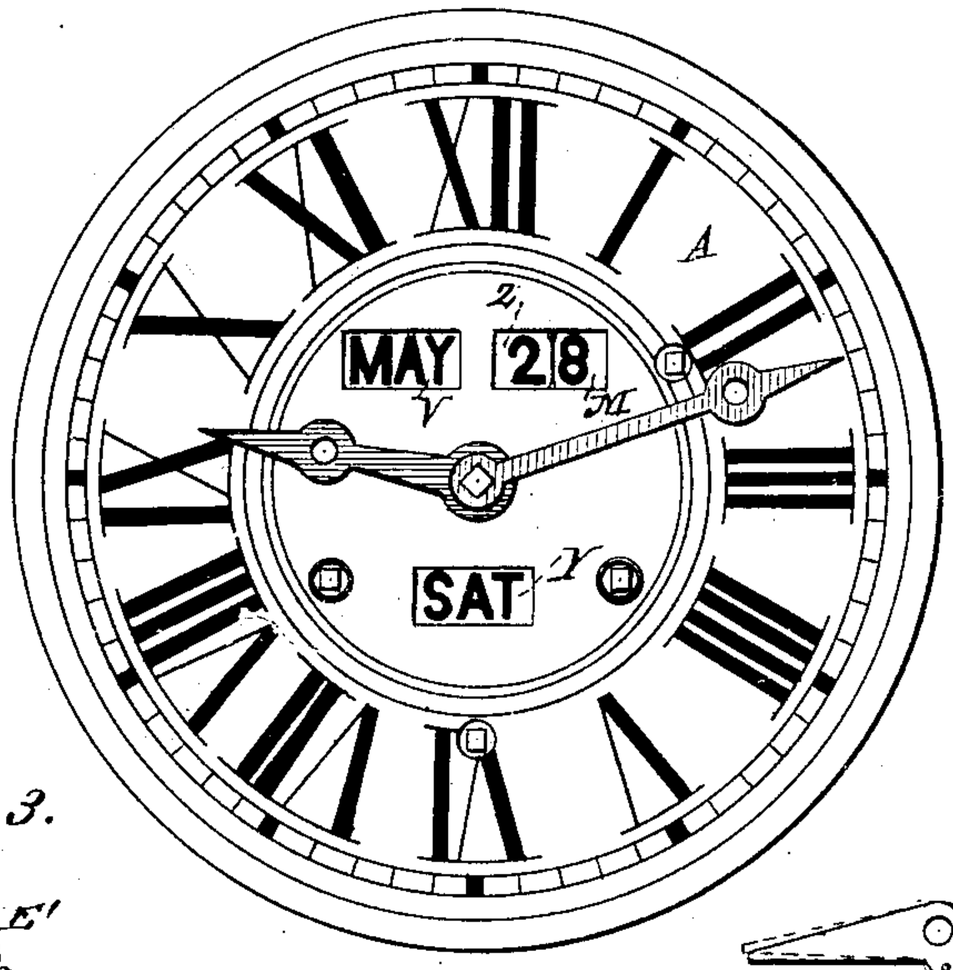


Fig. 3.

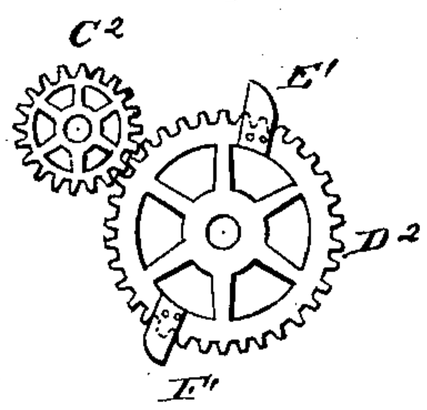


Fig. 4.

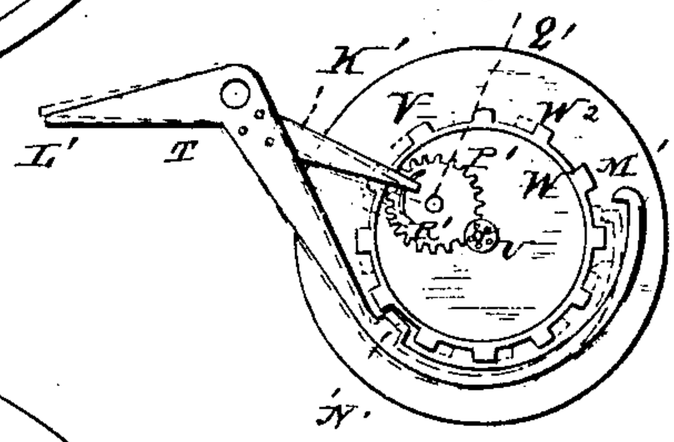
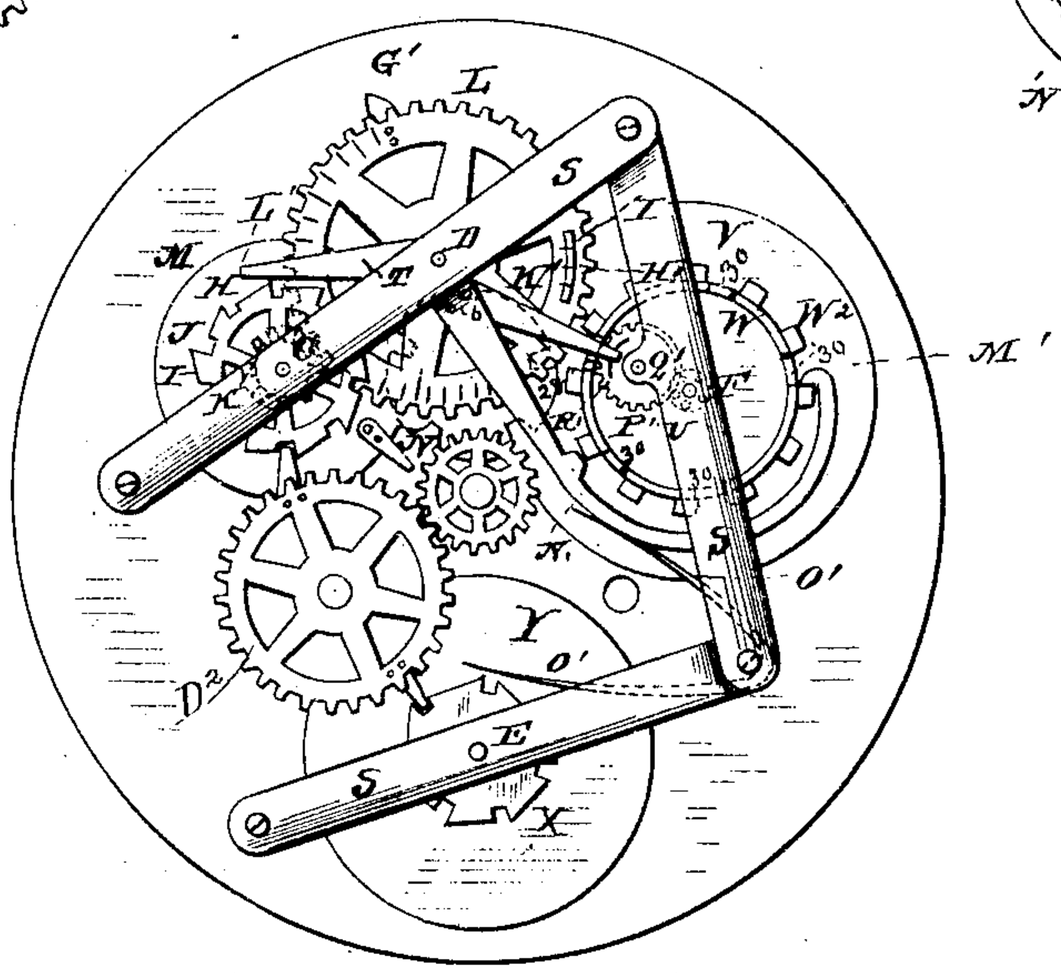


Fig. 2.



WITNESSES

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(Model.) 3 Sheets—Sheet 2.

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Fig. 8.

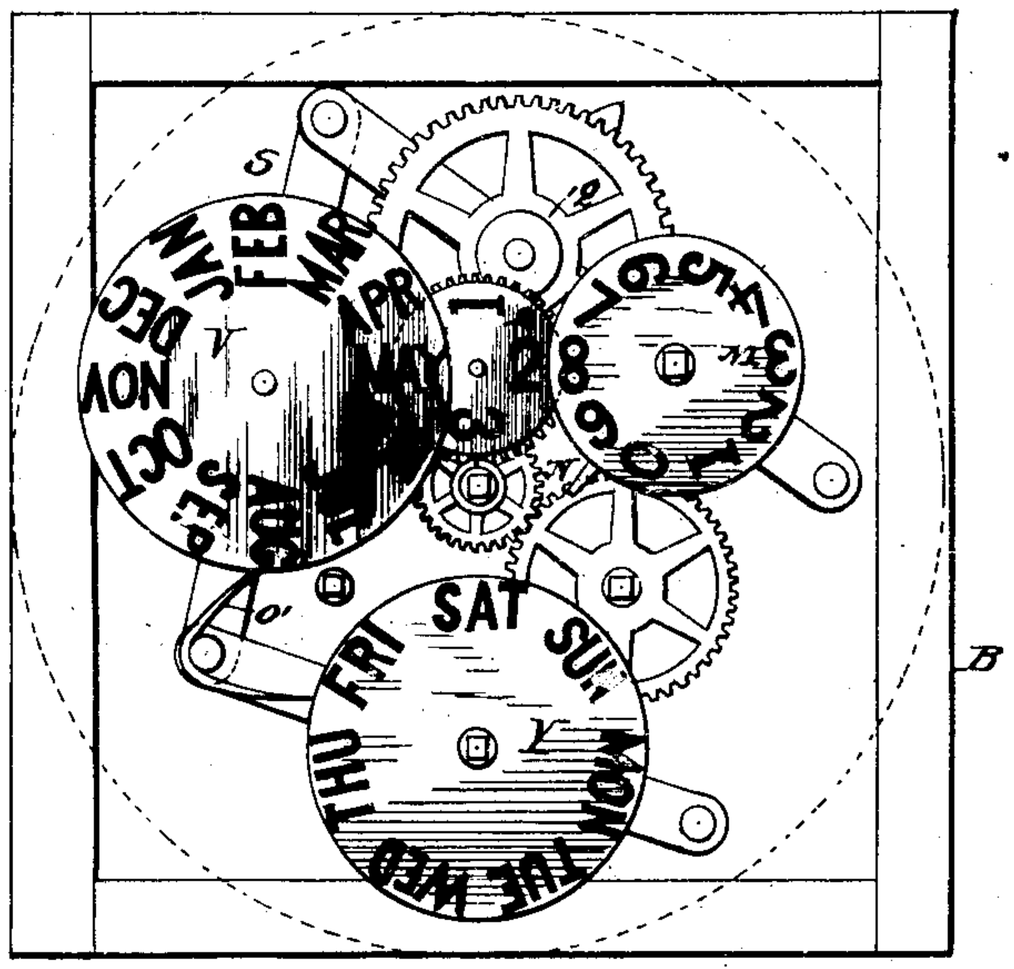


Fig. 5.

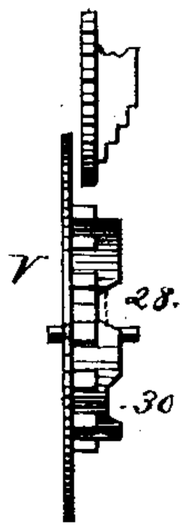


Fig. 6.

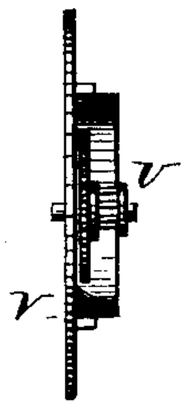
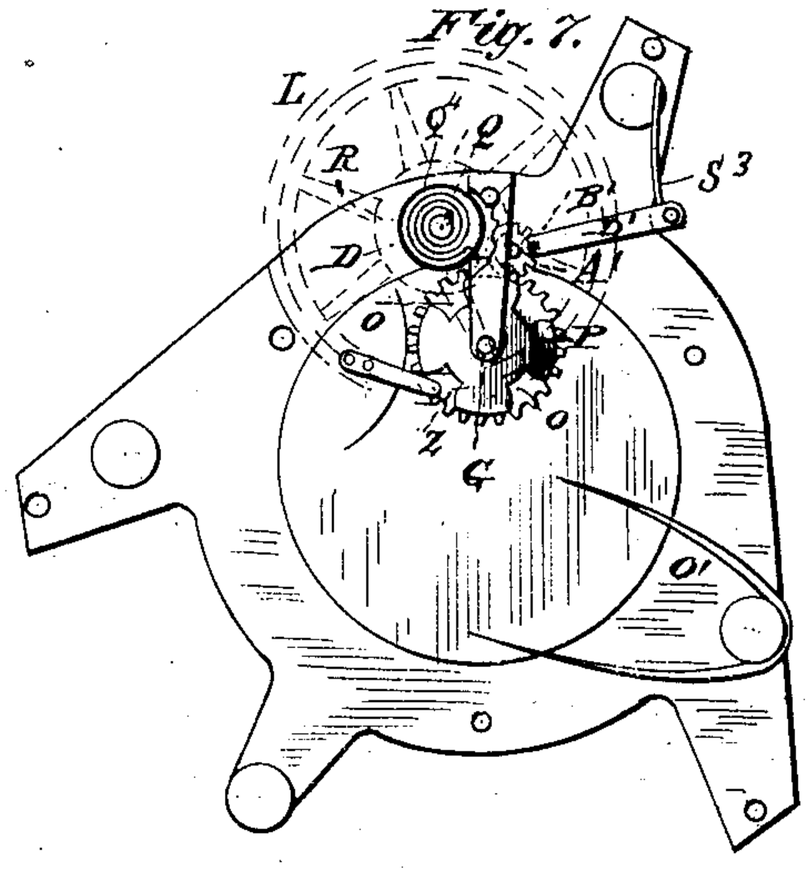


Fig. 7.



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G. E. SANFORD.

TIME PIECE CALENDAR.

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Fig. 9.

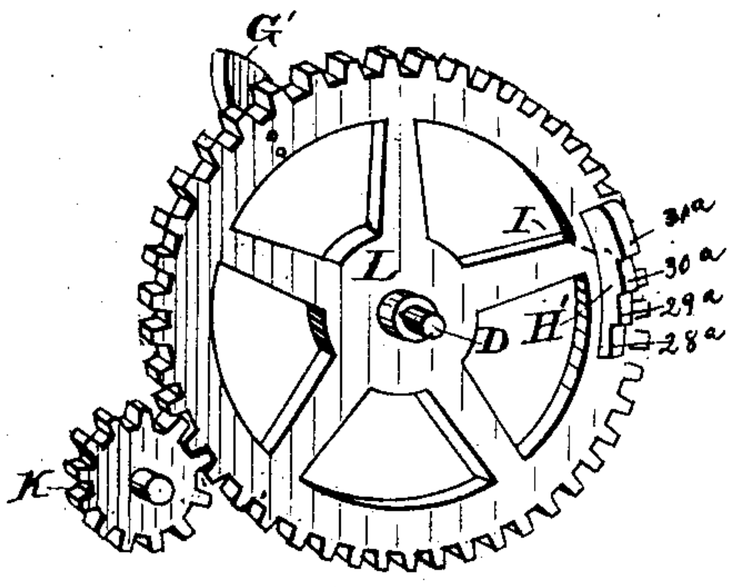


Fig 10.

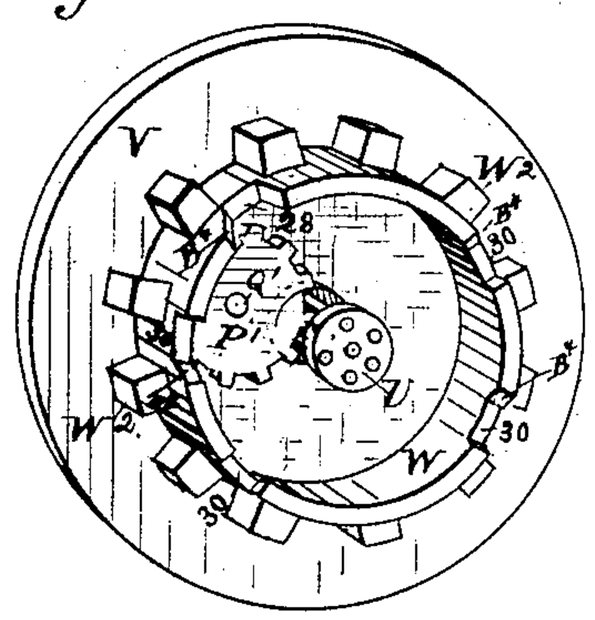
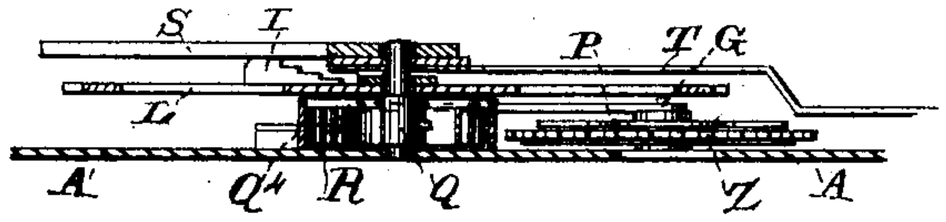


Fig. 11.



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UNITED STATES PATENT OFFICE.

GEORGE ELMER SANFORD, OF GENOA, NEW YORK.

TIME-PIECE CALENDAR.

SPECIFICATION forming part of Letters Patent No. 255,198, dated March 21, 1882.

Application filed July 14, 1881. (Model.)

To all whom it may concern:

Be it known that I, GEORGE ELMER SANFORD, a citizen of the United States, residing at Genoa, in the county of Cayuga and State of New York, have invented a new and useful Time-Piece Calendar for Clocks and Watches, of which the following is a specification.

This invention relates to calendar time-pieces; and it consists in certain improvements in the construction of the same, which will be hereinafter fully described, and particularly pointed out in the claims.

My invention has for its object, first, to provide a calendar time-piece which will operate equally well in any position in which it may be placed; second, to so construct and arrange the mechanism as to occupy but small and flat space; third, to cause a retrograde movement of the dating-wheel in lieu of the usual advance or skipping movement at the end of the month, thus making it possible to operate the time-piece and calendar with less power than heretofore; and, fourth, to avoid a large and confusing number of figures upon the face of the dial, thus enabling the requisite figures to be made larger, so as to show more plainly.

I attain the objects of my invention by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a face view of a clock-dial to which my invention has been applied. Fig. 2 is a rear view of the calendar mechanism. Fig. 3 is a front view of the driving-gear. Fig. 4 is a plan view of the year-wheel and the lever T. Fig. 5 is a side view of the year-wheel and part of the gage-wheel. Fig. 6 is a part sectional view of the year-wheel and four-year wheel. Fig. 7 is a rear view of the main frame with the springs, regulator-wheel, pitman-rod, and other parts in position. Fig. 8 is a face view with the dial removed. Fig. 9 is a perspective view of the gage-wheel. Fig. 10 is a perspective view of the year-wheel; and Fig. 11 is a detail view, showing the arrangement of the spring for causing a retrograde movement to the gage-wheel.

Corresponding parts in the several figures are denoted by like letters of reference.

A in the drawings refers to the dial, which may be an ordinary zinc dial, with the central portion sunk so as to accommodate the works, the dial being secured to a suitable frame or casing, B, which is to be made of any suitable construction, so as to adapt it for watches or clocks of any kind or size.

In small clocks or watches the dial may be cast with posts to hold the back, and its rear side may be recessed to receive the calendar-wheels.

Suitable bearings are provided in the frame and dial for the several shafts, C, D, E, F, and G. Shaft C carries a toothed wheel, H, having ten teeth or ratchets, I, with intermediate notches, J, and a small cog-wheel or pinion, K, to mesh with the gage-wheel L, as shown in detail in Fig. 9 of the drawings. Shaft C also carries a plate or disk, M, numbered upon its face from 0 to 9, inclusive, as in Fig. 8. These figures are used to show the unit-figure of the date. Hence I call disk M the "units-disk."

Disk M is provided upon its rear side with a radially-projecting arm, N, arranged to mesh in the notches O (four in number) of a disk, P, mounted upon shaft G, adjoining disk M, which thus serves to turn disk P forward the space of one notch or one-fourth its circumference during each revolution of said disk M. Arm N is placed upon disk M at a point between the numbers 9 and 0. Shaft G also carries in front of disk P a disk, Z, numbered upon its front side 1, 2, and 3. It is, however, divided into four equal parts, one of which, between 3 and 1, is left blank. This disk, which I call the "tens-disk," is, as stated, turned forward one space by each revolution of the units-disk. Thus, supposing it to be placed so as to show its blank space through the slot in the dial shown in Fig. 1, it will remain undisturbed until the units-disk shows the figure 9, indicating the ninth day of the month. When the units-disk is again moved forward, so as to show figure 0, it at the same time moves the tens-disk forward one space, so as to show figure 1. Thus the two disks together will show the correct date—10. The tens-disk now again remains undisturbed during a revolution of the units-disk or until the latter again shows figure 9. It is then moved

forward so as to show figure 2, which, with figure 0 of the units-disk, shows the correct date—20.

To prevent the tens-disk from being moved forward too great or too small a distance when actuated by the arm N of the units-disk, I avail myself of the following mechanism: The edge of disk Z is toothed, as shown in Fig. 7, and engages a small suitably-arranged pinion, A′, which I call the "regulator-wheel," and which makes four revolutions to one of the disk Z. Pinion A′ has a crank-pin, B′, connected by a pitman or rod, D′, with the end of a suitably-arranged spring, S^3. The pinion A′ and disk Z are relatively so arranged that when pitman D′ is held by the spring S^3 in the position shown in Fig. 7, and the crank-pin B′ thus at a dead-center, one of the figures on face of disk Z shall show plainly through the slot in the dial. Now, when disk Z is moved forward by arm N of the units-disk engaging one of the notches O in disk P, the pinion A′ is rotated against the tension of the spring S^3 until disk Z has been moved forward one-half of the required distance. The first dead-center of the crank-pin B′ is now reached, and as soon as it has been passed the spring S^3 reacts, assisting in moving the disk Z forward to the required point.

Shaft D carries the gage-wheel L, which is toothed, as shown, and meshes with the pinion K on shaft C. Secured to shaft D is one end of a spring, R, which is wound in and has its other end secured to a drum or barrel, Q, suitably secured to the frame. Spring R is so arranged as to be wound upon shaft D as the gage-wheel is being moved forward by the pinion K upon shaft C.

The frame-bar S, which forms one of the bearings for shaft D, has a collet, encircling said shaft, and forming a bearing for a lever, T, the construction and operation of which will be hereinafter described.

Shaft F carries the year wheel or disk V, which consists of a flat disk having the names of the twelve months or their abbreviations inscribed upon its face, so as to show successively through a slot in the dial, as in Fig. 1. This wheel, the construction of which is shown in detail in Fig. 10 of the drawings, is provided upon its rear side with a circular rim or flange, W, having twelve equidistant radially-projecting teeth, W^2, and provided with notches 28 30, the rear ends of which are beveled, as shown at B^4, Fig. 10, in order to make the spring K′, which will be hereinafter described, to escape from the said notches as the wheel advances. The notches 30 are so located as to correspond with the months of April, June, September, and November upon the face of the dial, said months having but thirty days. The notch 28, which is three times as deep as any of the notches 30, is located to correspond with the inscription "Feb." upon the face of the wheel.

Shaft E carries a toothed wheel, X, having seven teeth or ratchets, and a disk Y, having its face inscribed with the names of the days of the week or abbreviations thereof. In watches the shaft E may be made hollow, to afford space for the passage of the second-hand arbor.

The lever T, to which reference has been made above, is a bell-crank lever, one arm of which is straight, as at L′, and serves as a detent to the teeth I of the units-wheel H. The other arm is curved and terminates in a hook, M′, engaging the teeth W^2 of the rim W upon the year-wheel. The curved arm is also provided with a projection, N′, adapted to enter the spaces between the said teeth W^2 when the hook M′ is disengaged therefrom. Lever T has a third elastic arm or flat spring, K′, projecting from its fulcrum and adapted to engage the notches 28 30 in the rim W of the year-wheel. Lever T is held to its work by a curved spring, O′, one end or arm of which presses the curved arm of said lever upward toward the rim of the year-wheel, while its other end serves as a spring pawl or detent to the teeth of the week-wheel or seven-toothed wheel X.

The gage-wheel L is provided upon its rear face with a segmental flange, H′, having four steps, (denoted by 28^a, 29^a, 30^a, and 31^a.) The height of each of these steps is equal to the depth of one of the notches 30 in rim W of the year-wheel, step 30^a being on a level with the top edge of said rim. Gage-wheel L, it will be remembered, is moved forward by the pinion K upon the shaft C of the units-disk, and each of the steps upon flange H′ should be of a length equal to the space which the gage-wheel is in this manner moved forward in the course of twenty-four hours. Gage-wheel L is also provided with a radially-projecting arm, G′, located at a distance from step 31^a equal to the space traveled by the gage-wheel in the course of thirty-one days.

Upon the shaft F of the year-wheel is secured a small pinion, U, meshing with a toothed wheel, P′, turning upon a pin or post, Q, Fig. 2, made fast to the frame within the rim or flange W. Wheel P′, which I call the "four-year wheel," makes one revolution to four of the pinion U, (and the year-wheel,) and it is provided upon its rear side or face with a segmental projection, R′, extending round ninety degrees or one-fourth of said wheel, as shown in Fig. 2; and the said projection is of such a height as to be on a level with a point between the bottoms of the notches 28 and 30 in the rim W of the year-wheel. Wheel P′ must, moreover, be set in such a manner in relation to the year-wheel that when February of a leap-year is shown, and only then, shall the projection R′ be directly opposite the notch 28 in the rim of said year-wheel.

The driving-gear shown in Fig. 3 may be attached to the works or gear of any time-piece; and it consists of the ordinary twelve-hour dial-wheel, C^2, carrying the hour-hand and

meshing with a wheel, D^2, placed upon one of the winding-posts so as to turn loosely. Wheel D^2 is twice the size of wheel C^2. Hence it turns but once in twenty-four hours.

Drive-wheel D^2 is provided with two projecting arms, E′ F′, so arranged that arm E′ shall mesh only with the units-wheel and the arm F′ with the week-wheel X only. These arms are so placed as to move the said wheels forward the space of one tooth each about the hour of midnight.

Modifications of construction may be made when saving of space is a desideratum, as when the time-piece has to be wound from the rear, (as in ordinary watches,) or by stem-winding mechanism. Such modifications, however, will readily suggest themselves to those skilled in the art to which my invention appertains; and I do not wish to be considered as limiting myself to any details in this respect.

The operation of my invention is as follows: After the various parts of the calendar have been properly set or regulated and the time-piece wound, the drive-wheel D^2 once in twenty-four hours moves the units-wheel and week-wheel forward the space of one tooth each, thus advancing the date one day. The tens-wheel is operated by the units-wheel, as already described. For the sake of illustration let it now be supposed that March of any year is shown by the year-wheel. This month having thirty-one days, the spring-finger K′ of lever T rests upon the top of flange W of the year-wheel. The gage-wheel L continues to revolve, operated by pinion K of shaft C, until the step 31^a of flange H′ reaches finger K′, the remaining steps of said flange having already passed under finger K′, which, it will be remembered, is supported on top of flange W, which is higher than the step 30^a of flange H′. When step 31^a strikes finger K′ it operates the lever T, of which said finger forms part, with the following result: The projection N′ is disengaged from the space between teeth W^2 which it previously occupied. The hook M′ catches against one of said teeth and moves the year-wheel forward half a space, thus causing projection N′ to be supported against the outer end of one of the teeth. When the lever is in this position the arm L′ of the lever is disengaged from the teeth of the units-wheel, upon which it has been acting as a detent, and through it upon the gage-wheel. The latter being thus released, the spring R will react upon its shaft D, upon which it has been wound by the progress of said wheel during the month, thus turning the gage-wheel L back until its projecting arm G′ strikes one of the teeth of the year-wheel, which is thus moved forward the remainder of one month's space. The notch N′ of lever T, which is actuated by spring O′, then instantly passes back between two of the teeth of the year-wheel, locking the latter. The next month, April, is shown, and finger K′ rests in the notch 30, corresponding with said month. Arm L′ of lever T again engages the teeth of the units-wheel, preventing the gage-wheel from being turned back any farther by the action of spring R, and the train consisting of the units-wheel and tens-wheel having been turned back by the reaction of the gage-wheel, the first day, or figure 1, is indicated or shows through the slot in the face of the dial.

In months having less than thirty-one days the operation is precisely the same, with the exception that it takes place sooner, when the spring-finger K′ is struck by step 28^a, 29^a, or 30^a of the gage-flange H′. The step 29^a comes into action only once in four years, when the finger K′ is supported upon the projection R′ of the four-year wheel P′, which is then opposite the notch 28 in the flange or rim W of the year-wheel.

The front ends of the shafts C and E may be made to project through the front of the dial, and squared, so as to enable the dating-disks, when misplaced, to be replaced by means of a key.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a time-piece calendar, the gage-wheel L and spring R, arranged to be wound upon the shaft of said wheel during the month or while the gage-wheel advances, and to react upon said wheel when released, in combination with mechanism for automatically releasing said wheel at the end of the calendar-month, as set forth.

2. In a time-piece calendar, the gage-wheel L, having arm G′ and stepped flange H′, substantially as set forth.

3. The combination of the units-wheel having projecting arm N with the tens-wheel P, having notches O, the toothed tens-disk Z, the regulator-wheel A′, having crank B′, the pitman D′, and the spring S^3, all substantially as and for the purpose set forth.

4. The combination of the year-wheel having a notched rim, W, with the lever T, having spring K′, the gage-wheel L, and the toothed wheel or units-wheel I, all substantially as shown, for the purpose specified.

5. The gage-wheel L, having arm G′ and stepped flange H′, in combination with the units-wheel I, the drive-wheel D^2, having arms E′ F′, and the week-wheel X, as herein described, for the purpose set forth.

6. In a calendar time-piece, the driving-wheel D^2, placed loosely upon one of the winding-posts, engaging the dial-wheel C^2, and having arms E′ F′ for simultaneously actuating the day-wheel and the unit-disk of the month-register, as herein shown and specified.

7. The combination of the year-wheel having rim W, provided with teeth W^2 and notches 28 30, the lever T, having spring K′, and curved arm provided with hook M′ and tooth N′, and the gage-wheel L, having stepped flange H, substantially as set forth.

8. The combination of the units-wheel I,

having teeth or ratchets J, the gage-wheel L, the lever T, having arm L′, and the spring O′, substantially as set forth.

9. The combination of the year-wheel having notched rim W, the four-year wheel having projection R′, the gage-wheel L, and the lever T, all arranged and operating substantially as and for the purpose herein shown and specified.

GEORGE ELMER SANFORD.

Witnesses:
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ADELBERT H. ANDREWS.