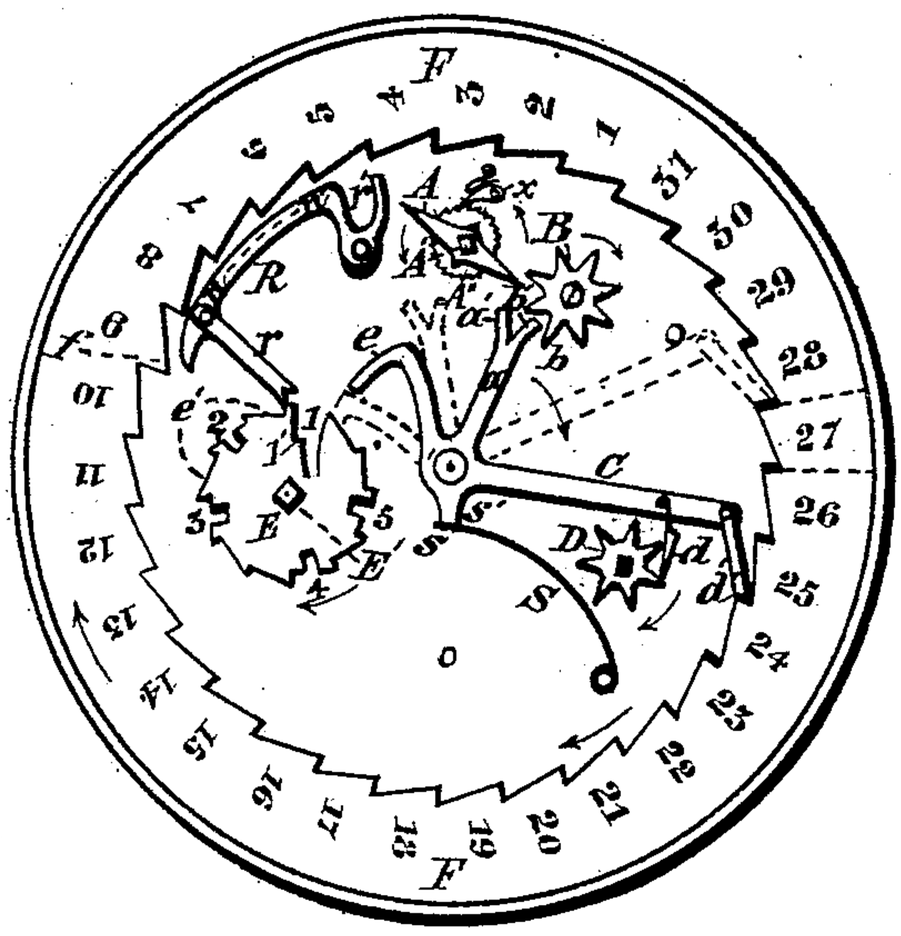
M. H. PADDOCK.

Calendar-Watch.

No. 203,640. Patented May 14, 1878.



Witnesses:

E. Laass.

N. J. Paddock,

Inventor:

Milner H Paddock

N. PETERS, PHOTO-LITHOGRAPHER, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

MINER H. PADDOCK, OF EAST CLARKSON, NEW YORK.

IMPROVEMENT IN CALENDAR-WATCHES.

Specification forming part of Letters Patent No. **203,640,** dated May 14, 1878; application filed October 12, 1876.

To all whom it may concern:

Be it known that I, MINER H. PADDOCK, of East Clarkson, in the county of Monroe and State of New York, have invented a new and useful Improvement in Calendar Time-Pieces, which improvement is fully set forth in the following specification, reference being had to the accompanying drawing, forming part of this specification, which shows the calendar devices with the dial of time-piece removed, the said devices being located between the dial and time-movement, and pivoted to the upper plate of the movement, or to a separate cap.

My invention relates to that class of calendar time-pieces in which the calendar-indexes are operated in the act of winding by force of hand through the winding mechanism, independently of the mainspring; and my improvement consists in introducing a winding post or arbor, constructed to revolve at any time in but one direction, as the source of the motion which operates the calendar, the said post being in combination with the mainspring of a time-piece and a going-barrel or other means of operating the time-movement, by which improvement I avoid the use of devices in the calendar immediately connected with the winding mechanism, having a reverse movement, and the disconnecting devices necessitated by the said reverse movement, and I introduce simple special devices, which, operating the calender from the winding stem or arbor, I call "arbor-setting" devices.

My improvements further consist in combining a daily-setting calendar-lever, controlled by skipping devices, with stem-setting devices, and in improved skipping devices and skipping-device connections.

In the drawing, D is a seven-cogged wheel, arranged to rotate one cog each day, and having a stem which projects upward through the main dial, bearing a hand which points successively to characters denoting the day of the week, arranged in a small dial on the main dial.

F is an annular wheel, lying near the outer edge of time-piece, and concentric with it, notched on its inner perimeter with thirty-one teeth, corresponding to the greatest number of days in any month, and having on its upper face numerals, ranging from one to thirty-one, which numerals, in the revolution of F, one at a time, are successively displayed through an aperture in the main dial, to indicate the day of the month. Projecting inwardly from F is the tooth *f*, made longer than the others, which, in the revolution of F, acts each month upon the lever R, which lever, lying near F, and being in combination by means of pawl *r* with the month-of-the-year wheel E, rotates E one cog each month.

E is the month-of-the-year wheel, having twelve cogs on its circumference, rotating, by action of R, one cog each month, and provided with hand and small dial above on main dial, to indicate the month of the year. Projecting inwardly from the circumference of E, and located between its cogs, are five slots of different depths, numbered in the drawing 1, 2, 3, 4, and 5.

By the co-operation of the circumference and slots of wheel E with arm *e* of lever C, the scope of lever C in the daily setting of the calendar and in skips at end of short months is determined in manner to be described.

C is a lever, which I call "calendar-lever," because of its relation to the calendar, located at or near the center of the supporting-plate, bearing spring-seated pawls *d* and *d'*, for setting, respectively, the day-of-the-week wheel D and the day-of-the-month wheel F, as indicated by the arrows, having the arm *e* for co-operation with the circumference of E in determining skips for short months, and provided with arm *a*, having teeth *a'* and *b'* for co-operating with the calendar stem-setting devices A and B, whereby the calendar devices are set in the act of winding.

S is a spring, located to act upon shoulder *s'* of C to urge lever C reversely, or oppositely to the arrows. The shoulder *s'* of C is shaped with reference to the end *s* of S, so that when lever C, pushed forward by the stem-bar A, has reached the utmost limit of its forward movement, the end *s* catches upon the shoulder *s'*, whereby the spring S ceases to act as a spring to reverse lever C, but becomes a detent and holds lever C in a forward position, not to be acted upon again by A till released from the detent by B of the stem-setting device, in manner to be described. Immediately upon

held by detent S, as described. This action takes place regularly on every daily winding of the time-piece, the wheel B allowing a considerable daily variation of some hours in the winding of the time-piece, averaging one revolution in every twenty-four hours, and effecting one daily setting of the calendar by force of hand.

To effect skips at end of short months, the scope of lever C need only be increased to take in two or more teeth of the day-of-the-month wheel F, which is accomplished by wheel E bringing, in its revolution, into co-operation with *e* one of its slots, constructed and operated as follows: The lever R, which rotates E, lies closely adjacent to the inner perimeter of the day-of-the-month wheel F, covering with its working-face *n n'* four teeth of F, whereby for four calendar days—to wit, the 29th, 30th, 31st, and 1st of succeeding month—wheel E, through R, is under control of tooth *f* of F, and receives for each of those days an impulse from F. Actuated by *f*, R, by the sum of the impulses, rotates E one cog, whereby the hand on dial above E indicates a change of month, and a portion of the surface of E passes along under the working-point of *e*. This surface of E, which acts as a limit to *e* equal to one-twelfth of the circumference of E, is obviously marked off into divisions by the impulse movement of R, corresponding to the days on which the impulses caused by *f* occur, namely, the supernumerary calendar days of the month and the first of the succeeding month. To each twelfth of E, in the order of the months, belongs a month of the year occupying the wheel's circumference. During the month indicated by index-hand on dial above E the corresponding twelfth of E, with its subdivisions for supernumerary calendar days, operates as a limiting-surface to *e*.

By the co-operation of a slot placed in the twelfth of E, representing a month in which a skip should occur, and in the subdivision of the twelfth corresponding to the day on which a skip should occur, with the arm *e*, the limiting-surface of E is removed or set farther back, so that *e*, by passing to the bottom of the slot, increases the scope of C to effect the necessary skip, the depth and width of the slot depending upon the number of days to be skipped. There are five slots, corresponding to the five short months of the year. Wheel E, rotating by impulses, as described, and having operating-surfaces *e'* and slots 1, 2, 3, 4, and 5, constructed and located as described, co-operates with lever C to cause skips, as follows:

The drawing represents the calendar devices in position previous to winding for the 28th of February—*i. e.*, the date 27 appears at aperture in the dial of time-piece. *f* lies in position on next movement of F to engage R, and wheel E lies with slot 1 in position to be brought under *e* on next movement of E by R. On the winding of the time-piece for the day, A revolves B, as described. B, through *b*, striking upon *b'*, drives C backward, thereby bringing *e* against the circumference of E, bringing *a'* within reach of A, and causing the pawls *d* and *d'* to retreat one notch on their respective wheels D and F, these positions being determined by *e*. The bar A immediately, in the continued winding, engages *a'* and urges C forward again to the control of detent S, thereby setting the calendar-wheel D for the day of the week, changing the day of the month at the dial-aperture from the 27th to the 28th, and rotating E by means of the action of *f* upon R, one of the subdivisions of the twelfth for February corresponding to the day on which the skip is to take place and sufficient to bring the slot 1 under *e*. On the 29th, in the winding of the time-piece, as before, *b* strikes upon *b'*, driving C backward, but *e* passing into slot 1. *d'* is carried back by force of spring S upon C over three teeth of F, and *a* takes the position of the dotted line, with *a'* out of reach of A, and *b'* ready to be acted upon by A. A then strikes upon *b'*, carrying it forward till out of reach of A, the effect of which is to rotate F forward two teeth. As A passes out of reach of *b'* lever C, being urged reversely by spring S, and not having yet reached the position when S acts as a detent, is rotated again backward; but the advance of wheel F having, by means of *f* acting upon R, rotated the wheel E sufficiently to bring the shoulder 1' of slot 1 under *e*, arm *e* strikes upon 1', and C is stopped thereby. The effect of this second backward movement of C is to bring pawl *d'* back on F one additional notch of F and to bring *a'* into the former position of *b'* within reach of A. A immediately engages *a'*, bringing the lever C forward to the position of rest under detent S, rotating F forward two additional teeth, changing the day of the month to the first of succeeding month, setting the day-of-the-week wheel D, and by means still of F upon R rotating E sufficiently to change the month of the year on dial above E from February to March, and to bring the March division of E under arm *e*. It is evident, there being no slot in the March division, the changes of the indexes will take place regularly without any skips.

In the April division a slot of less depth than slot 1, placed so as to increase the scope of C to two teeth of F on the day to be skipped, causes the calendar F to pass from the 30th to the 1st of the succeeding month, and thus wheel E, by its circumference and five slots, is arranged to cause the skips for the entire year.

In will be seen that lever C, in effecting the February skip, moves F twice, two teeth at a time, making four teeth necessary in skipping from the 28th to 1st of succeeding month. With a proper proportion of lever A and arm *a*, C could be rotated to effect the skip at one action of A upon *a*.

The wheel E could be arranged to act as a detent upon C without allowing C to retrace

one notch of F in the February skip, in which case the maximum scope of C must be four teeth of F, and teeth a' and b' must be arranged accordingly.

Calendar-lever C can evidently be applied to any wheel or stem of a time-piece revolving in the one direction and acting upon the lever once in twenty-four hours. I might have used, in combination with C, a separate spring from S to act as a detent upon C, placed and tripped in any convenient manner. The same spring or another might answer for the second detent instead of $1'$ of E; also, in the manufacture of different styles of calendars and of different grades, I may use the whole or a part of lever C as regards its arms and pawls, placed as I have herein given, or differently, all of which above I enumerate as equivalents.

I do not confine myself to the precise shape or position of lever C, nor to the collocation of the calendar-indexes and devices I have given. So far as necessary, any of the ordinary means may be used to hold the different wheels and indexes in position.

R is provided with an arm, r', on which f, striking, throws R back into the position which the lever held previous to being acted upon by f, while a spring holds pawl r against the teeth of E.

It will be seen that in the combinations and devices of this combined calendar and time-piece I have three elements, viz: the winding mechanism constructed to revolve in one direction only, the calendar devices D F, &c., or calendar proper, and the arbor-setting devices A B, &c., or means of setting the calendar from the arbor; and that these last or arbor-setting devices are the means of combining the other two elements mentioned above. It is plain that the bar A may be substituted by pegs projecting upward from the ratchet of the watch to operate B in the revolution of the ratchet the same as the ends of the bar A, and the purpose of the arbor device A be subserved thereby, or that a lever or other device may intervene between A and B, and the office of the arbor-setting devices as above still be met.

Having thus described my invention, what I claim as new and of my invention is—

1. The combination of calendar-indexes and arbor-setting devices with the winding mechanism of a time-piece constructed to revolve the arbor in one direction only, for purposes set forth.

2. The combination of an arbor-setting device with the winding-post A', having a ratchet, A'', retained by spring-forced click x, or equivalents, substantially as described.

3. The combination of the wheel B, the bar A, and the winding mechanism A', substantially as and for purpose set forth.

4. The lever C, having shoulder s', in combination with spring S, acting as a detent, and having arm a, in combination with wheel B, acting as a release, or their equivalents, substantially as described.

5. The combination of the arbor-setting devices A and B, or their equivalents, with the calendar-lever C, substantially as described.

6. The arbor device A, in combination with the calendar-lever C, substantially as and for purpose set forth.

7. The lever C, having arm e, pawls d and d', shoulder s', and arm a, or their equivalents, substantially as and for purpose set forth.

8. In the arbor-setting devices of a combined calendar and time-piece, the wheel B, or equivalent, having its circumference divided proportionally in number to the ends of the device A, or equivalent, and arranged in its daily revolution by A to bring once in twenty-four hours the point b into co-operation with calendar devices for the setting of the calendar, substantially as described.

9. The combination of wheel B, lever C, and detent S, substantially as and for purpose set forth.

10. The combination of arbor-setting devices and the daily-acting calendar-lever C with skipping device E, or equivalent, substantially as described.

11. The lever R, or its equivalent, in combination with skip-regulator E, and having working-face n n', in combination with f, or equivalent, substantially as and for the purpose set forth.

12. The wheel E, having cogs on its circumference, whereby, by action of R or equivalent, to revolve once a year, having its circumference arranged to act as a limit to the daily movement of lever C, or equivalent, for setting the calendar, and provided with slots for increasing the scope of said lever in effecting skips at end of short months, substantially as set forth.

13. The wheel E, or its equivalent, having slot 1 and shoulder $1'$, for purpose set forth.

14. The lever C, in combination with spring S and shoulder $1'$ of wheel E, substantially as described.

15. The combination of lever C with calendar-index wheels D and F, lever R, and wheel E, or its equivalent, substantially as described.

16. The combination of lever C, index-wheels D F, lever R, and wheel E with the arbor-setting devices B A, the spring and detent S, and the winding-stem A', substantially as described.

17. The lever R, having arm r', in combination with F, having tooth f, or equivalent, substantially as described.

MINER H. PADDOCK.

Witnesses:
D. HALL RICE,
CHARLES E. PRATT.