M. H. PADDOCK.

Combined Calendar and Time Piece.

No. 211,583. Patented Jan. 21, 1879.

Fig. 1.

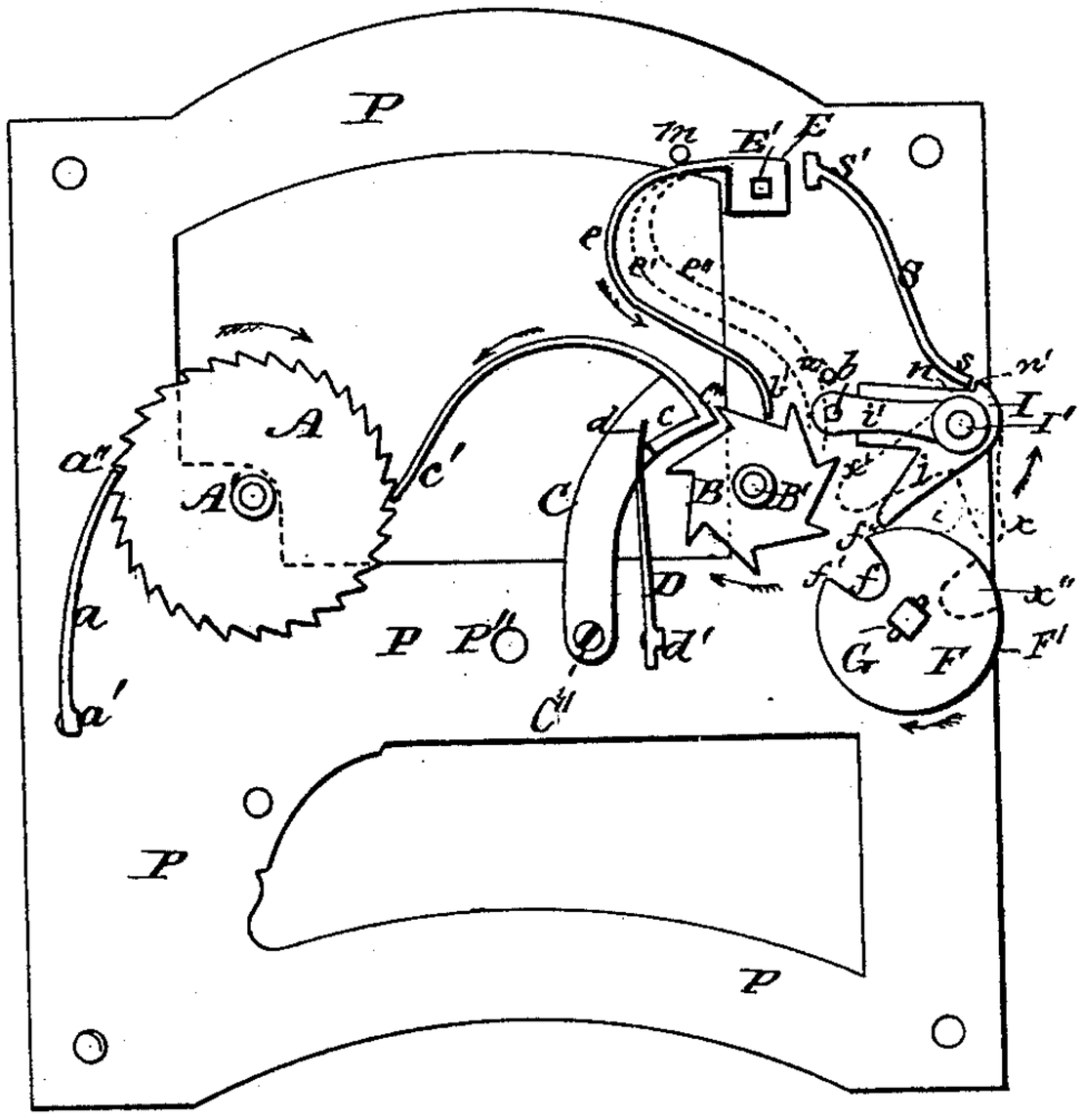
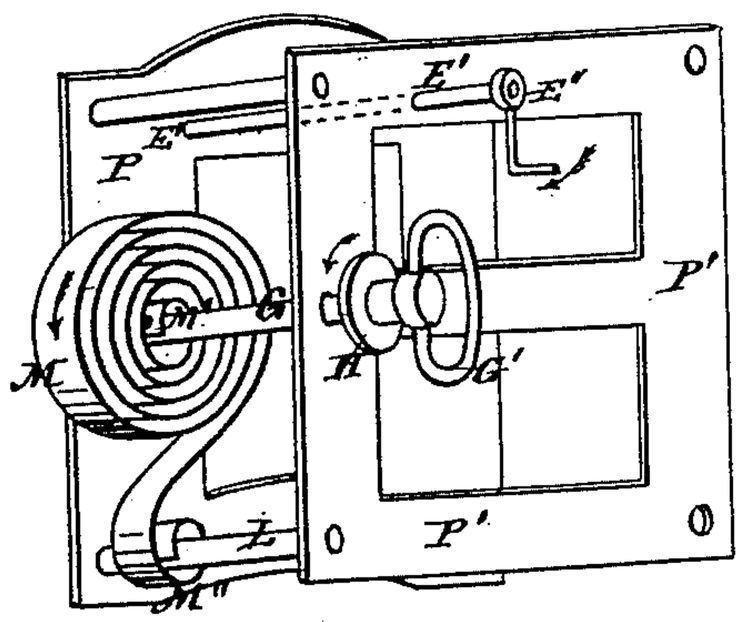


Fig. 2.



Witnesses:
Philip F. Garner
Floyd Harris

Inventor:
Miner H. Paddock
By Wm. H. Wood
Attorney.

UNITED STATES PATENT OFFICE.

MINER H. PADDOCK, OF CLARKSON, NEW YORK.

IMPROVEMENT IN COMBINED CALENDAR AND TIME-PIECE.

Specification forming part of Letters Patent No. **211,583,** dated January 21, 1879; application filed June 13, 1878.

To all whom it may concern:

Be it known that I, MINER H. PADDOCK, of Clarkson, in the county of Monroe and State of New York, have invented a new and Improved Combined Calendar and Time-Piece; and I do hereby declare that the following is a clear, full, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents the devices lying in position on the front plate of the movement, or that plate immediately under the dial, the dial of the time-piece being removed, in order to display the said devices; and Fig. 2 represents a rear view of the movement, displaying the winding-arbor with mainspring attachment and an independent setting-arbor for the calendar.

My invention relates to an improved combination of calendar-indexes with the winding-arbor of a time-piece, so arranged as to indicate on the dial of the time-piece the calendar-dates, in addition to the time of day; and my improvements consist in improved devices for operating the index-wheels directly from the arbor; in the combination of an arbor-setting calendar with an arbor actuated by the hand directly in one direction, and having a reverse movement actuated by a spring fastened to the arbor and to a support apart from the winding mechanism, as herein described; in an improved means for setting the calendar-indexes independently of the winding-arbor; and in a simplified and cheaper construction of the entire calendar; and also in certain specific combinations of mechanism, hereinafter fully described.

In the drawings, Fig. 1, A is a wheel of thirty-one cogs, lying on and pivoted to the frame-plate P, and having its stem A′ projecting upward through the dial of the time-piece, for the purpose of bearing an index-hand, constructed so as to point each day successively to numerals ranging from 1 to 31, which are arranged on the main dial, to constitute a smaller dial, in the usual manner, for indicating the day of the month. The spring *a* is pivoted at the end *a′* to the plate P, and engages the teeth of the wheel A with its free end *a″*, allowing the wheel A to revolve in but one direction.

B is a seven-toothed ratchet-wheel, lying on and pivoted to the frame-plate, and having its axis B′ projecting upward through the dial, for the purpose of carrying an index-hand for pointing to characters on the main dial, indicating the day of week, arranged and operated similarly to that of the month-dial, before described.

C is a lever, lying between wheel B and month-wheel A, pivoted to the plate at C′, having a spring-arm, *c′*, arranged to engage the teeth of the month-wheel A, and fitted, at *c*, to engage with the teeth of the day-wheel B, and to operate as a click thereto, as well as to be vibrated thereby.

D is a spring, pivoted to the plate at *d′*, pressing with its free end *d* against the shoulder of arm C, thereby forcing it toward the wheel B and in proper engagement therewith. The lever C can, with its spring-arm *c′*, be made of one piece of metal, if desired, and it has been so made by me.

In the reverse movement of lever C, the end *c′* snaps backward over the teeth of wheel A without operating it reversely. Since the projection *c* is held firmly, as already stated, between the teeth of day-wheel B by action of spring D, it is evident that lever C thus acts as a snap or click to hold day-wheel B in its position of rest; and, furthermore, whenever said wheel by any force is rotated so as to cause a tooth thereof to pass by the projection *c* of lever C, this lever is pushed forward in direction of arrow by the tooth of wheel B in passing; and immediately after said tooth has passed, lever C returns to its normal position. During this action of day-wheel B on lever C, the spring-arm *c′* thereof rotates month-wheel A one cog, as above described. Thus lever C serves to hold day-wheel B in position, has a forward motion when day-wheel B rotates one cog, and also rotates month-wheel A one cog at a time, so that the setting of index-wheels A and B occurs simultaneously through the interposition of lever C whenever, by any means, day-wheel B is rotated one cog. As thus disposed, wheels B and A may be operated through arbor-setting devices, or through an

independent setting device, as follows: The arbor-setting devices embody a bell-crank lever, I, pivoted to the plate at I′, having an arm, *i*, for engagement with a winding-arbor disk, F, and also an arm, *i′*, for communicating motion to the day-wheel B. Projecting downward from the end of arm *i′* is the peg *b*. The arm *i′* is so long that in the forward movement of the lever I, carrying the arm *i′* to the position of the dotted line *x*, the arm *i′* passes over a tooth of wheel B, and the peg *b*, projecting downward from *i′*, engages the said tooth, and thereby rotates day-wheel B one cog, which movement operates month-wheel A simultaneously, as already stated. The arm *i′* is attached to the lever I near the pivot I′, and between its point of attachment and the peg *b* the arm *i′* is made thin to constitute a spring, and the peg *b*, underneath *i′*, is beveled on its lower end, causing it to operate with a latch movement, by which arrangement the arm *i′*, in its forward movement to the position of the dotted line *x′*, as stated above, operates to rotate wheel B one cog; but in the backward movement of *i′* to its former position, the peg *b* rises and passes over B without operating it reversely. This forward movement of I to the position of the dotted lines *x′ x*, and the backward movement of the same to its first position again, rotating wheel B in the forward movement, and passing freely over it in its backward movement, causes the daily setting of the calendar-indices. To give lever I its single forward and backward movement is the object of the disk F, which engages with lever-arm *i*.

The disk F is located on the winding-arbor G, having its circumference unbroken, except by the slot *f*. The disk F and arm *i* are placed contiguous to each other with reference to the control of arm *i* by the periphery F′ of disk F, and also to its movement by the slot *f*, and they are sufficiently near each other to prevent arm *i* from passing to the position of the dotted line *x*, or reversely, so long as the continuous peripherical surface F′ presents itself against arm *i;* but whenever in the revolution of disk F the slot *f* is presented to arm *i*, this may enter and be moved by the turning of the disk F to the position of the dotted line *x*, or reversely, according to the previous position of arm *i*. The disk F is mounted on arbor G, and is arranged to revolve therewith in either direction.

It is plain that once having entered the slot *f*, and moved to the opposite position during the revolution of disk F, the arm *i* cannot reenter and pass back again to its former position until disk F changes its direction of revolution, the slot *f* causing the movement of lever I, and the continuous peripherical surface F′ acting to regulate the time of the movement of said lever.

The lever I has shoulders *n* and *n′*. The spring S is fastened to the frame-plate at S′, and bears against lever I with its free end *s*, in such a way that when the lever is in the position shown in the drawing the end *s* presses against the shoulder *n* to force the arm *i* against the peripherical surface F′ of disk F; but when lever I is in the position shown by the dotted lines *x′ x* the end *s* bears against the opposite shoulder *n′*, and forces lever I in a direction opposite to the previous direction, so as still to maintain the arm *i* in contact with the surface F′.

The object of spring S and shoulders *n n′* is to cause arm *i* to enter the slot *f* in the disk during its revolution in either direction.

G in Figs. 1 and 2 denotes the winding-arbor of the time-piece, supported by the frame-plates P and P′, having on one end the disk F, before described, and on the other end the winding hand-piece G′. The hand-piece G′ is permanently affixed to the post, projects outside the case of the time-piece, and performs the office of a winding-key. It is turned in direction of the arrow in winding.

M is the mainspring, coiled about the arbor G, having one end fastened thereto at M′, and the other end, at M″, fastened to the post L of the frame.

Constructed as shown in the drawing, with one end fastened to the arbor and the other end to the post, which is a support apart from and independent of the winding-arbor, the action of the spring M is contrary to the direction in which the arbor G is moved in winding—that is to say, while the turning of the winding-arbor in the direction of the arrow coils or winds the spring up, the tension of the spring, since its end M″ is fastened to a secure support apart from the arbor, tends to rotate the arbor backward in a direction contrary to the arrow by as many turns as have been given the arbor G in the forward direction, which backward turning by force of the spring operates the time-movement, connected with the arbor through a suitable wheel train-work, not necessary to be specified in this application.

In addition to the ordinary function of the forward and backward movements of arbor G, respectively, to wind the mainspring M and to operate the train-work, the forward movement of the arbor, by force of hand in winding, operates to set the calendar-indexes, and the backward movement, by force of spring M, operates to reverse the position of the arbor-setting devices, as follows: Fig. 1 represents the arbor-setting devices F and I in position previous to the act of winding. The arm *i*, by force of spring S, acting on shoulder *n*, is pressing against F′, and ready to enter slot *f*. The hand of the operator, placed upon hand-piece G′, turns arbor G and disk F in the direction of the arrow. The slot *f* being thus brought into position, arm *i* enters slot *f* by force of spring S, described. In the continued turning of disk F the arm *i* is engaged by shoulder *f′* of slot *f*, which rocks lever I and places arm *i* in the position of dotted line *x*. Although the disk F makes several complete

revolutions in a single winding of the time-piece, the arm *i* remains in the position of the dotted line *x* without returning to its former position, (and without acting a second time on day-wheel B,) slightly pressed against surface F′ by force of spring S, acting on shoulder *n′*, until the time-piece is fully wound up, the lever being retained in its forward position of the dotted line *x* by contact with surface F, as already described. By the rocking of lever I to *x* the arm *i′* is brought to the position of the dotted line *x′*, by which action of this arm the peg or stud *b* engages a tooth of day-wheel B and rotates it one cog, and at the same time, also, moves the month-wheel A in manner before described, thus accomplishing the single setting of the calendar-indexes during the winding of the time-piece. The reverse movement of lever I back to a position from which it may re-engage day-wheel B on next winding of the time-piece is secured by action of the mainspring M. Immediately on completion of the act of winding, the spring M, as previously described, exerts its force to rotate arbor G reversely to its direction in winding—a movement of arbor G gradual and slow, on account of the resistance of the clock train-work. By this reverse movement of the arbor G disk F is carried in a direction contrary to the arrow. On the approach of slot *f* in this backward movement of disk F to the position shown in dotted line at *x″*, the arm *i*, then in position of dotted line *x*, and pressed against surface F′ by action of spring S on shoulder *n′*, as stated above, re-enters the slot *f*, and, by action of the opposite shoulder, *f″*, upon arm *i*, the lever I, by the continued turning of disk F in direction contrary to arrow, is brought back to its former position given in the drawing. By this backward movement of lever I peg *b* rises and passes freely over the adjacent tooth of day-wheel B, and arm *i′* takes position for re-engaging therewith at the next forward movement of lever I on next winding the time-piece. During the continued running of the time-piece and unwinding of mainspring M, the disk F, having once acted upon arm *i* to give the reverse movement to lever I, makes several revolutions, but obviously without re-engaging the arm *i*, so long as the revolution of disk F continues unchanged in the same direction. Thus, by action of the hand of the operator giving a forward movement, and by action of the mainspring giving a reverse movement, the single daily setting of the calendar-indexes B and A, through arbor-setting devices I and F, is secured.

Having thus described the action of the arbor upon the calendar devices, I will next show how the calendar devices are operated independently thereof.

E is a spring-lever, located on a setting-arbor, E′, and having the long bent spring-arm *e*, with its end *b′* arranged to engage the teeth of day-wheel B. The setting-arbor E′ passes through both frame-plates of the movement, is supported thereby, and has on its outer end a handle, E″, which projects outside the case, if used in a clock, by which the setting-arbor E′ is rotated by hand. Between the end *b′* and the arbor E′ the arm *e* is made thin to constitute it a spring-arm, by which means the end *b′* is held with elastic pressure against the edge of day-wheel B. On a forward movement of arm *e* in direction of arrow, its end *b′* engages a tooth of day-wheel B, rotating it in direction of the arrow. When the arm *e*, by rotation of arbor E′, advances to position of dotted line *e″*, the end *b′* passes sufficiently far to rotate the wheel B the full space of one cog.

From what has been previously said relative to wheels A and B it is plain that the effect of this movement just described is to advance both wheels one cog, thereby advancing the calendar-dates, the day of the week, and day of month each one day. This application of the hand-setting devices is of use in case the time-piece has been allowed to run down and remain unwound any length of time, it then being necessary to advance both index-wheels equally. On a backward movement of arm *e*, which follows the forward movement of the same, or on the rotation of day-wheel B by the arbor setting lever I independently of arm *e*, this arm snaps backward over the teeth of the day-wheel B, on account of the spring construction of said arm *e*, without acting upon the wheel reversely.

To advance the day-of-the-month wheel A independently of the day-wheel B, as at the end of months of twenty-eight and thirty days, the devices have the following capacities: The projection *c* of lever C is prolonged to afford the point *c″*. The effect of the point *c″* in the action of the lever C is to cause the arm *c′* to rotate the month-wheel A one cog before the tooth of day-wheel B in operating C has fully passed *c″*. The combination of lever E, day-wheel B, and lever C with point *c″* is such that when arm *e* is only brought forward to dotted line *e′* the end *b′* of arm *e* rotates day-wheel B a space less than one of its cogs, which, although not sufficient to carry a tooth of day-wheel B beyond the point *c″* of lever C, is, however, enough, as shown above, to cause the arm *c′* to rotate month-wheel A one cog. The force applied through setting-lever E on day-wheel B being now removed, and the tooth of wheel B not having passed by the point *c″*, said wheel flies back to its former position through action of lever C, forced by its spring D, and arm *c′*, having advanced month-wheel A one cog, as stated above, snaps back thereon without operating it reversely, because it is held by click *a*. To advance both indexes, therefore, the independent or hand-setting arbor advances fully to dotted line *c″*, causing wheel B to fully

pass point c'' of lever C. To adjust day-of-the-month wheel alone, the setting-arbor advances only to dotted line e', that being sufficient to advance wheel A one cog without unduly moving wheel B.

In making the complete movement and fully passing point c'', wheel B gives lever C more than a sufficient impulse to operate wheel A a single cog; but care is taken that lever C shall not have the point c'' long enough to cause wheel A to be rotated the space of two cogs at any one time.

The hand-setting arbor E′ may be operated from back or front of the time-piece, the same as a winding-arbor.

The posts *m m* in the plate P are stops for restricting and controlling the operation of spring-arm *e*.

With the independent setting-arbor in this kind of calendar time-piece, other well known devices, such as a wheel or lever and pawl, may be used to connect the arbor and calendar, as equivalents of the precise mechanism shown.

I do not confine myself to the exact construction of the lever I and disk F which I have shown. The disk F, because of its peripherical bearing-surface, is enabled to retain the lever I in either of its two positions, and this capacity is due to its circular form. So far as relates to the motions imparted to lever I by the disk F, however, it will be seen that if a bar on the main arbor were employed it would have the same capacity as the disk for moving the lever I in both directions, and, in combination with said lever, the bar would to that extent be the equivalent of the slotted disk. Any form of spring arrangement or source of force operating in connection with lever I for the same purpose as spring S and shoulders *n n′* would be a manifest equivalent.

The spring M on arbor G, with its end M″ fastened to post L, represents any application of a mainspring directly to the arbor of time-piece, with one end of said spring fastened to a post or any equivalent fixed support apart from and independent of the winding mechanism, so as to attain the required reverse movement of the arbor G.

It will be obvious that the prolongation of lever C at c'' may be dispensed with, provided the teeth of wheel B be so far lengthened as to produce the same effect.

To prevent dust from entering the clock at apertures in the case through which project the arbors provided with the hand-pieces G′ and E″, &c., I have arranged the dust-cap H. It is composed of a disk of metal large enough to cover the aperture through which G projects, and lined on surface toward the case by a similar disk of paper; or felt may be used. The cap H is located on the hand-piece G′, closely enough to the aperture in the case to serve the purpose of a dust-cap.

I do not confine myself to the materials or manner of construction designated, and I apply the dust-cap to all arbors or posts projecting loosely through the case and leaving an aperture at which dust may enter.

I am well aware that dust-caps have heretofore been employed in connection with hinged covers or caps in watches for guarding against the introduction of dust from a watch-key; but so far as my knowledge extends no provision has heretofore been made to guard apertures in the outside cases of time-pieces adjacent to protruding arbors.

So far as these devices and claims are applicable, I embrace watches as well as clocks in the scope of my claims. The clock-calendar movement, with appropriate calendared dial, may be inclosed in case of single metal band of lacquered or nickel-plated brass, having the usual glass front, and having the back piece pierced for arbors, with winding hand-pieces and turning-nuts; or the said movement may be inclosed in any of the square, upright, or other cases in use.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with a winding-arbor provided with a mainspring connected thereto and to a fixed post or stud, of the calendar index-wheels and intermediate vibrating mechanism for operating them through or by the winding-arbor, substantially as described.

2. The combination of wheel A, lever C, or equivalent, and wheel B, with arbor-setting devices and a winding-arbor bearing a mainspring, M, having its ends fastened at M′ and M″, substantially as described.

3. The combination, with a winding-arbor provided with a spring attached thereto and to a fixed stud, of a calendar index-wheel of thirty-one cogs, operated by the winding-arbor, and having its stem projecting through the dial of a time-piece, substantially as described.

4. The combination of an index-wheel, A, lever C, index-wheel B, or their equivalents, and arbor-setting devices, with winding-arbor G, having hand-pieces G′, substantially as described.

5. In a combined time-piece and calendar having arbor-setting devices, an independent setting-arbor, whereby the calendar devices may be operated, substantially as described.

6. The combination of wheel A, lever C, or equivalent, and wheel B with setting devices E E′, or equivalents, substantially as described.

7. The combination of wheel B and lever C, having point c'', or equivalent, with wheel A and setting devices E E′, substantially as described.

8. The combination of winding-arbor G, the spring M, the post L, and an arbor-setting device, F, or equivalent, substantially as described.

9. The combination of lever I, having shoulders *n n'*, and spring S with disk F, or equivalent, substantially as described.

10. The combination of disk F, having surface F′ and slot *f*, with lever I, or equivalent, substantially as described.

11. The combination of wheel A, lever C, and wheel B with lever I, disk F, arbor G, spring M, and post L, substantially as described.

12. The combination of calendar index-wheels A and B and an independent setting-arbor with a time-piece having an arbor, G, in combination with spring M and post L, substantially as described.

M. H. PADDOCK.

Witnesses:

GEO. H. BARTON,

EDWARD S. PECK.