E. ALLEN.

Calendar Clock.

No. 15,637. Patented Sept. 2, 1856.

Fig: 1.

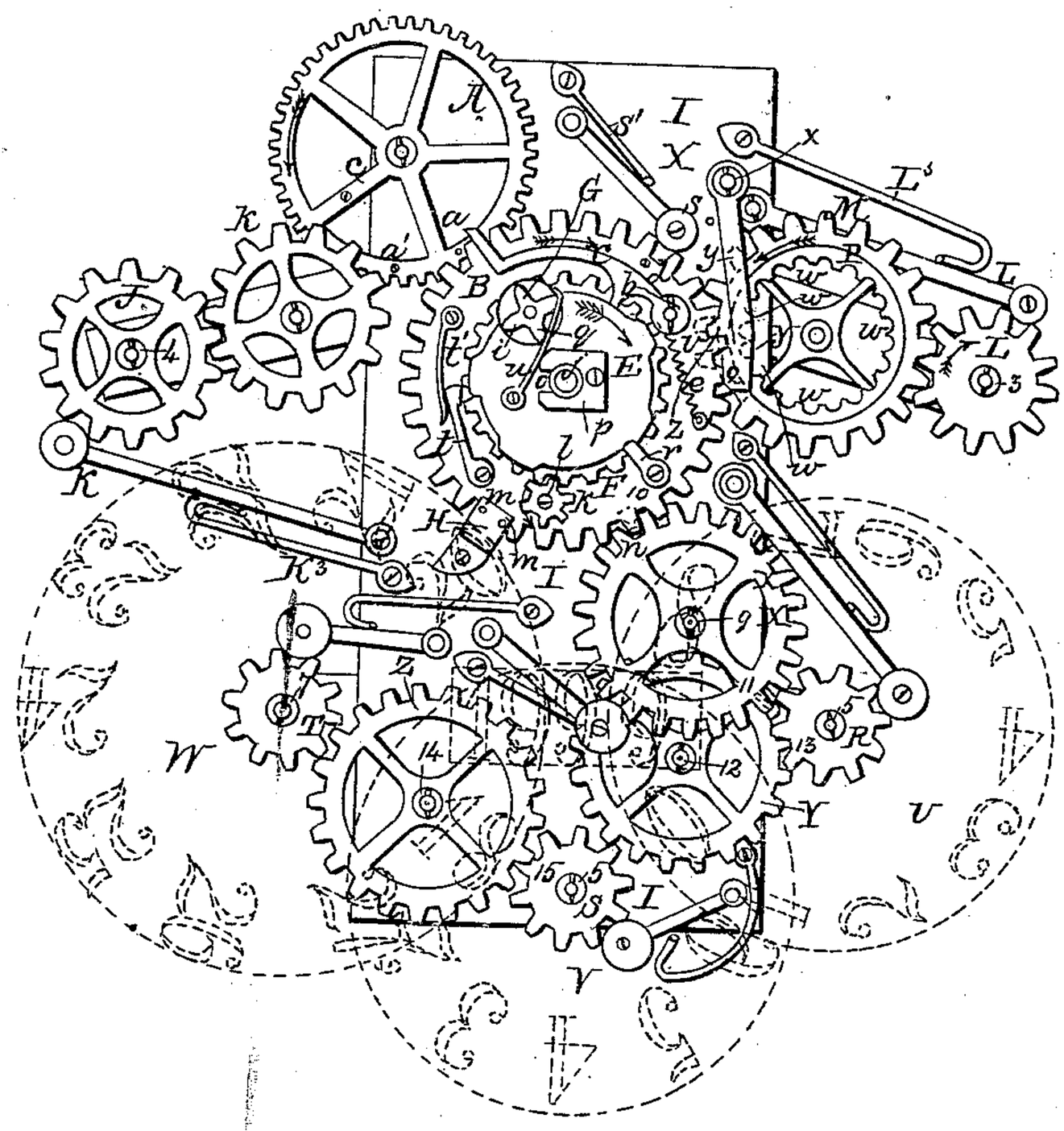
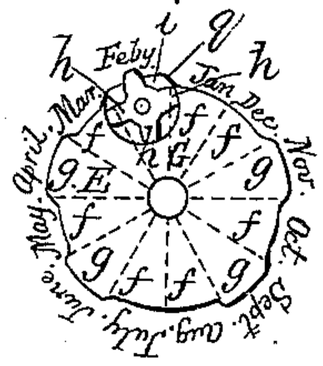


Fig: 2.



UNITED STATES PATENT OFFICE.

EDWIN ALLEN, OF GLASTENBURY, CONNECTICUT.

CALENDAR-CLOCK.

Specification of Letters Patent No. 15,637, dated September 2, 1856.

To all whom it may concern:

Be it known that I, EDWIN ALLEN, of Glastenbury, in the county of Hartford and State of Connecticut, have invented a new and useful Improvement in Calendar-Clocks; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is a front view of the mechanism of the calendar constructed according to my invention. Fig. 2, is a front view of what are termed the "change wheel" and leap year wheel detached from the rest of the mechanism.

Similar letters of reference indicate corresponding parts in both figures.

My invention consists in certain novel means of effecting the changes that are rendered necessary by the different lengths of the months.

A, is what is known as the "twenty-four-hour-wheel," receiving a continuous rotary motion in the direction of the arrow shown upon it in Fig. 1, from the twelve-hour-wheel of the clock movement and completing its revolution in twenty four hours exactly. B, is the "month wheel" which carries the hand that indicates the day of the month on the dial, said wheel being fitted to turn on a stationary arbor *j*, and having its periphery divided equally into thirty one teeth, one of which is caught every day by a pin *a*, standing out from the face of the twenty-four-hour wheel and by that means the month wheel is moved in the direction of the arrow shown upon it in Fig. 1, the distance of one tooth every day which just completes its rotation in each month of thirty one days but leaves a portion of the rotation equal to one, two or three teeth, according as the months have thirty, twenty-nine or twenty-eight days to be completed at the end of all the other months, by other means.

The means of completing the rotations of the month wheel at the ends of the shorter months will now be described.

C, is a lever fitted to move on a pin *b* which is secured in the face of the month wheel B.

c, is a pin standing out from the face of the twenty-four-hour-wheel A far enough to strike the end of the lever C, when the point of the said lever stands far enough out from the axis of the month-wheel B and to drive the said lever against a pin *d*, on the face of the month wheel, by that means bringing the lever to a stationary condition relatively to the month wheel and causing the latter to be rotated on its axis by the continued action of the pin *c*, on the lever as the rotation of the wheel A continues. The point of the lever C, at the end of a month of thirty-one days, does not stand out far enough from the axis *j*, of the month wheel to be struck by the pin *c*, so the rotation of the month wheel continues at the rate of one tooth a day, but on the last day of a shorter month it stands out far enough to be caught by the pin *c*, and driven against the pin *d*, to move the month wheel the distance necessary to complete its rotation.

The position of what may be termed the "change wheel," E, of which a separate view is given in Fig. 2, is what regulates the position of the lever C, and the action of the pin *c*, upon said lever. This "change-wheel" E, consists of a wheel having a periphery of irregular form firmly secured to a toothed wheel F, of twenty four teeth and with said toothed wheel fitted to the hub *o*, of the month wheel B, in such a manner as to be capable of turning thereon, but clamped to the month wheel by a spring clamp *p*, which causes it to be carried around by the month wheel. The wheel F, to which the "change wheel" E, is secured, may be termed the "year-wheel," as in addition to its movement with the month wheel B, it makes one twelfth part of an independent rotation every month, in advance of the month-wheel, thus completing an independent rotation in advance of the month wheel, every year. The change wheel is divided from the center into twelve equal parts, as shown by red lines in Fig. 2. Seven of these divisions *f* less prominent than the rest, represent the seven months of thirty-one days and serve as resting places against which the lever C, is held by a spring *e*, during the latter parts of and till after the termination of those months, in which position of the lever its end does not stand out far enough from the center to be struck by the pin *c*, so that the month wheel continues to be moved one tooth every day by the pin *a*, to the end of the month and through the next month.

Four other divisions *g*, more prominent than *f*, represent the four months of thirty-days, and serve as resting places against which the lever C, is held by the spring *e*, during the latter parts of those months in which positions the lever stands out far enough to be caught by the pin *c*, and thereby thrown against the pin *d*, and caused to move the wheel, the distance of one tooth necessary to complete its rotation to bring the hand to the proper position on the dial to commence the following month. One other division, representing the month of February, contains a circular recess which is filled with a circular plate or wheel G, which I call the leap year wheel. This wheel which makes one fourth of a rotation on its axis every year, thus completing its rotation in four years, may be supposed to have its periphery divided into four equal parts, as shown by red lines in Fig. 2, of which three parts *h*, form portions of the circle represent the months of February in the three years intervening between leap years, when that month has twenty-eight days, and the fourth part *i*, which has a segment cut off, represents the month of February in leap year when that month has twenty-nine days. One of the divisions of the leap year wheel always stands out beyond the most prominent part of the periphery of the change wheel E, so that in the month of February, when the lever C, rests upon the leap-year-wheel, its extremity is always thrown out farther from the axis *j*, so that the lever may be acted upon by the pin *c*, during a greater portion of the rotation of the latter than in the thirty-day months, as the month wheel requires to be moved twice or three times as far by the pin *c*, at the end of the month of February as it does in the thirty-day months. The divisions *h*, of the leap-year wheel, when turned outward to form a continuation of the periphery of the change wheel E, hold the lever out to such a position that the month wheel will be moved a distance equal to three of its teeth by the pin *c*, but the division *i*, representing leap year, when turned outward does not stand so far from the axis *j*, and thus does not hold the lever out quite so far, but yet far enough for the pin *c*, to move the month wheel a distance equal to two of its teeth. The lever C, is allowed more or less play between the change wheel and the pin *d*. This play is very considerable when the lever has been resting on the divisions *g*, representing the thirty day months, but in the month of February, when that month has twenty eight days, little or no play is allowed. The effect of this is, that in the former case, when only a short movement of the month wheel is required to complete its rotation, the pin *c*, does not act upon the month wheel for some time after it first strikes the lever, but in the latter case, when a long movement is required the said pin acts upon the month wheel almost as soon as it touches the lever.

The year wheel F with the attached change wheel E, receive their necessary motion independently of the month wheel to make the changes in the length of the months, viz: one-twelfth of a rotation every month, from a pinion *k*, the number of whose teeth is not material, working on a pin *l*, secured to the face of the month wheel B, and gearing with the year wheel F, said pinion deriving the motion necessary to move the year wheel a distance equal to two of its twenty-four teeth, from two stationary pins *m*, *m*, secured in a stationary cock A, which is secured to the same plate I, as the arbor *j*, and which stands out in front of the month wheel B. This pinion *k*, at some convenient time during the monthly rotation of the wheel B, comes into gear with the two pins *m*, *m*, and in passing them receives the necessary movement to give the month wheel and change wheel the movement required to present a new division of the change wheel opposite the lever C, to bring the said lever to the required position to be acted upon or missed by the pin *c*, at the end of the month, as the length of the month may require. The annual quarter rotation of the leap-year wheel G, is imparted to it by a pinion *q*, of four teeth, which is secured to its outer face, and a catch tooth *r*, secured immovably to the face of the month wheel in such a position that at some convenient time during the year, the year wheel F and change wheel E, by their independent yearly rotation, carrying the leap-year wheel around the axis *j*, bring one of the teeth of its pinion *q*, into contact with the catch tooth *r* and in carrying the leap year wheel past the said tooth *r*, the pinion is caused to receive a quarter of a rotation. This quarter rotation of the leap year wheel, however effects no change in its action till every fourth year when it presents its quarterly division *i*, in the periphery of the change wheel E.

The month wheel is held steady between its daily movements and prevented moving too far, by means of a roller pawl *s*, and a spring *s'*, pressing on the said pawl. The year wheel F is stopped, and prevented from moving too far or turning back, by means of a pawl *t*, and a spring *t'*, pressing on the said pawl. The leap year wheel G, is stopped and held steady by means of a spring *u*, pressing on two of the teeth of the pinion *q*.

J, is a spur wheel turning on a fixed arbor 4, and carrying the card with the days of the week marked upon it, said wheel having fourteen teeth.

K, is a spur wheel having any number of teeth, gearing with J. One tooth of the

wheel K, is caught by the pin *a*, before described, on the twenty four hour wheel A, and another tooth on the same wheel is caught by a pin *a'*, secured in the same wheel A, every time the said wheel A, rotates, and by that means the wheel K, is caused to move two teeth, moving the wheel J, also two teeth or one seventh of its rotation every day, thus changing the day of the week as indicated on the card. The pin *a'*, must be so short as not to strike the month wheel.

K', is a roller pawl to hold the wheel R, steady when not required to be in motion, and K^2, a spring to press the same against the wheel.

L, is a spur wheel turning on a fixed arbor 3, and carrying the month card with the names of the months, said wheel having twelve teeth.

M, is a spur wheel which may have any number of teeth, gearing with the wheel L. One tooth of the wheel M, is caught during every rotation of the month wheel B, by a tooth *v*, (shown dotted in Fig. 1) on the back of the month wheel and moved the distance of one tooth, thus moving the wheel L, one tooth or one twelfth of its rotation every month and changing the name of the month as indicated by the month card.

L', is a roller pawl to hold the wheel L, steady when not required to be in motion, and L^2, a spring to press the said pawl against the wheel.

P, is a ring secured to the outer face of the wheel M, and having all around its inner periphery a series of notches *w*, *w*, at equal distances apart corresponding in number with the teeth on the wheel M.

Q, is a lever working on a stationary pin *x*, secured in the plate I, and carrying a pin *y*, which is caused by a spring *y'*, acting on the lever Q, to enter one of the notches *w*, *w* and thus to lock the wheel M, positively, in the intervals between its movements by the tooth *v*, thereby locking the wheel L, and preventing the accidental shifting of the month card which frequently occurs in calendar clocks. The pin *y*, is thrown out of the notch *w*, at the instant the tooth *u*, comes into operation on the wheel M, by means of a pin *z*, standing out from the face of one of the thirty one teeth of the month wheel B, which pin *z*, throws aside the lever Q; but by the time the wheel M has been moved the necessary distance by the tooth *v*, the pin *x*, passes the point of the lever and allows the pin to fall into the next notch *w*, in the ring P.

R, S, T, are three spur wheels having each ten teeth and fitted to turn freely on fixed arbors 5, 6, 7. These wheels carry respectively the unit-year card U, the ten-year card V, and the hundred-year card W, of the indicating apparatus for showing the date of the year. The cards U, V, W, are shown in red outline in order to allow the wheels R, S, T, and other mechanism that is behind them to be seen.

X, is a spur wheel of twenty-four teeth arranged to turn freely on a fixed arbor *s*, and being moved the distance of one tooth or the twenty-fourth part of a rotation, once a month by means of a tooth 10, on the back of the month-wheel B. The wheel M, has two extra teeth 11, 11, on its backside, one of which every year comes into operation on a tooth of the wheel R, of the unit-year card U, and moves it the distance of one of its teeth or one tenth of its rotation.

Y, is a spur wheel, the number of whose teeth is immaterial, fitted to turn on a fixed arbor 12, and gearing with the spur wheel S, of the ten-year card V. This wheel Y, is moved the distance of one of its teeth at every rotation of the wheel R, or once in ten years by means of an extra tooth 13, on the back of the wheel R, and thus caused to move the wheel S, one tooth and give the ten-year card V, one tenth of a rotation.

Z, is a spur wheel the number of whose teeth is immaterial, turning on a fixed arbor 14, and gearing with the wheel T, of the hundred-year card W. This wheel Z, is moved the distance of one tooth during every rotation of the wheel S, or once in a hundred years, by means of an extra tooth 15, on the face of the wheel S, thus giving the hundred-year card one-tenth of a rotation.

By the above arrangement of the gearing for the indicating apparatus, the numbers though changed only at long intervals are changed with quick movements. The indicator cards U, V, W, are so arranged relatively to each other and have their numbers arranged in such positions as to present the hundreds, ten and unit to show the number of the year all together, so that all may be seen through the same opening in the dial as is illustrated by the formation of the number 1999, in Fig. 1. In that figure the indicator cards are all shown at once to change the number to 2000.

The arrangement of the mechanism by which the changes in the movement for the different lengths of the month is effected, is more certain in its operation and less liable to get out of order than the mechanism employed for the same purpose in other calendar movements and it will work in any position.

It may be observed that instead of the year wheel, a toothed ring may be secured to the change wheel, as the only duty of the year wheel is to impart to the change wheel, one-twelfth part of a rotation every month, thus giving it a complete rotation every year.

I do not claim the lever C, and stop pin *d*,

on the month wheel, as their equivalents are found in the calendar mechanism of John Williams, patented September 19, 1854; but

What I do claim as my invention and desire to secure by Letters Patent, is,

1. The change wheel E, and year wheel F, or its equivalent fitted, as described, to rotate with the month wheel B, and carrying the leap year wheel G, occupying such a position on the change wheel as to represent the month of February, said change-wheel receiving, every month, one twelfth part of a complete rotation on its axis, independently of the month-wheel and the leap-year wheel receiving, every year, in addition to its revolution around the axis of the change-wheel, one-fourth of a complete rotation on its own axis, the movement of the change-wheel and leap-year wheel being produced by any means equivalent to those described and the said wheels combined and operating upon the lever C, substantially as and for the purpose described.

2. The internally notched ring P, on the driving wheel M, or its equivalent that transmits motion from the month wheel to the yearly rotating month card, combined with the lever Q, and its locking pin *i*, and the pin *x*, on the month wheel, the whole operating substantially as described to lock the wheel M, or its equivalent, and through it, the month card, till the time for moving the same and then unlocking it as long as is required to effect the movement.

EDWIN ALLEN.

Witnesses:
W. TUSCH,
J. F. BUCKLEY.