2 Sheets—Sheet 1.

D. J. GALE.

CALENDAR-CLOCK.

No. 192,118. Patented June 19, 1877.

Fig. 1

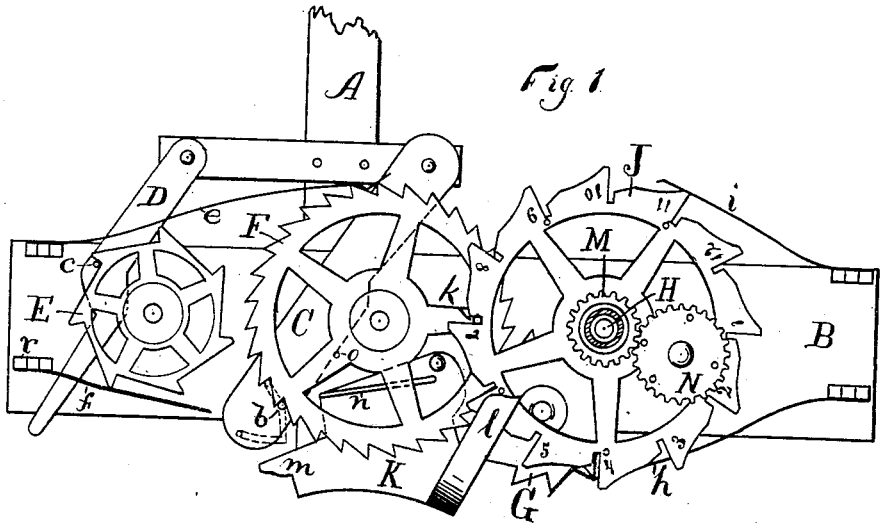
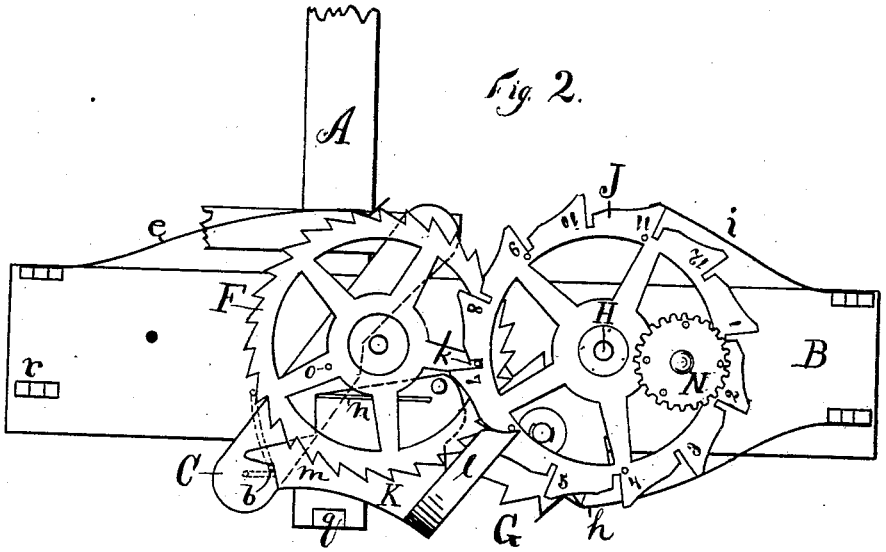


Fig. 2.



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2 Sheets—Sheet 2.

D. J. GALE.

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No. 192,118.

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Fig. 3.

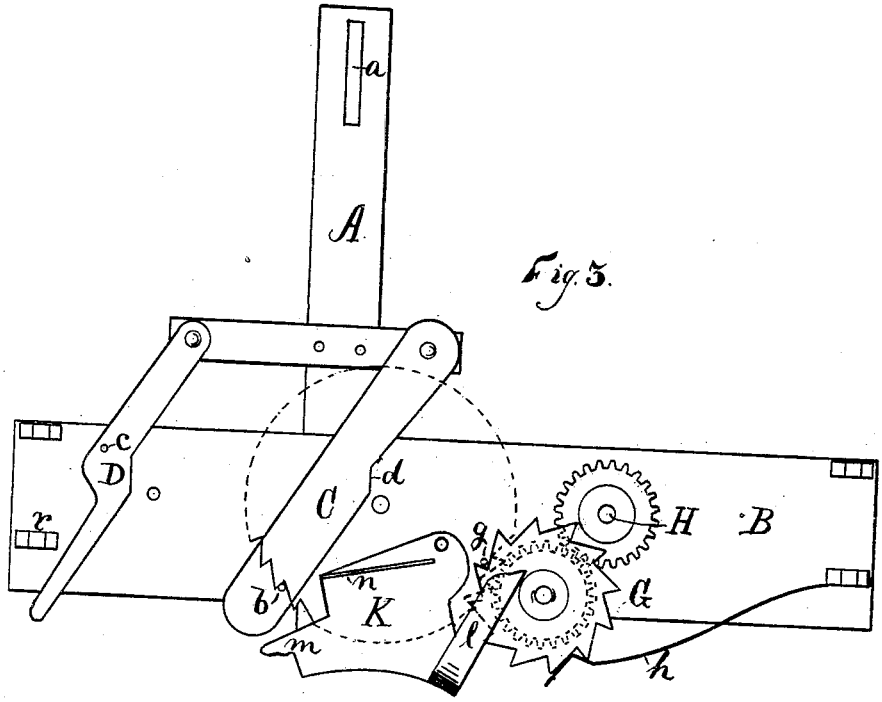
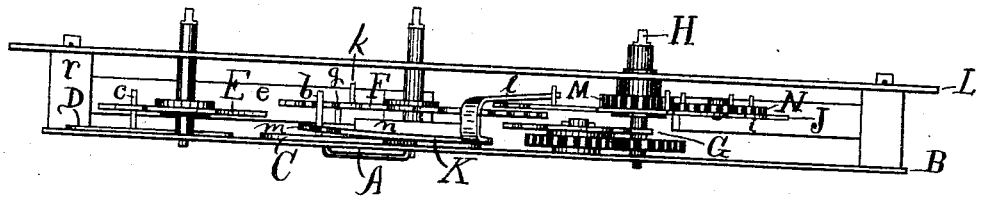


Fig. 4.



Witnesses,
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UNITED STATES PATENT OFFICE.

DANIEL J. GALE, OF BRISTOL, CONNECTICUT.

IMPROVEMENT IN CALENDAR-CLOCKS.

Specification forming part of Letters Patent No. **192,118**, dated June 19, 1877; application filed March 30, 1877.

To all whom it may concern:

Be it known that I, DANIEL J. GALE, of Bristol, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Clock-Calendars, of which the following is a specification:

My invention consists in the peculiar construction and operation of certain devices, and in the combination of parts, all as hereinafter described and claimed.

In the accompanying drawing, Figure 1 is a front elevation of a calendar-movement which embodies my invention, the same being represented with the front-plate removed, and showing the parts as they are about to change from the 29th to the 30th day of June. Fig. 2 is a like view of the same, showing the parts as they are about to change from June 30 to July 1. Fig. 3 is a like view of detached parts of the same, and Fig. 4 is an edge view of said calendar as viewed from the under side.

The invention relates to that class of calendars which are set in the lower part of the clock-case, and have a dial independent of the clock-dial.

A designates a slide which, once in twenty four hours, is lifted to a certain point by a pin or crank-wheel connected with the time movement of the clock, so as to revolve once in every twenty-four hours, in a well-known manner of connecting this class of calendars. This slide may be connected so as to move continuously with the twenty-four-hour wheel, in which case it will be twelve hours in moving upward and twelve hours in returning. I prefer to slot the side, as at *a*, Fig. 3, and connect it to the twenty-four-hour wheel by means of a pitman pinned to the slide by a pin which passes through the slot *a*, so that said pin may move upward with the pitman about six hours before it reaches the upper end of the slot, at which point it will take the slide A with it and carry it upward for the remaining six hours of the twelve hours of its rising movement, during which last six hours the entire change of the movement will occur. I prefer to have the changes made shortly after midnight.

As the crank and pitman of the twenty-four-hour wheel descend the slide descends with them for six hours, when it reaches its lowermost point and is stopped by means of a stop, not shown, coming in contact with the back-plate B of the calendar movement. During the remaining downward movement of the pitman the connecting-pin merely rides down the slot *a* without moving the slide. Two levers, C D, are loosely hung to said slide by a hinge-pin, so as to turn thereon by their own weight, the lever C bearing a projecting-pin, *b*, and the lever D a pin, *c*. These levers are both set slightly inclined to one side, as shown, and work just in front of the rear plate B, the lever D moving back of the day-of-the-week wheel E, bearing seven teeth, and the lever C moving back of the day-of-the-month wheel F, bearing thirty-one teeth. This lever is provided with a vertical shoulder, *d*, (Fig. 3,) at its lower edge, which rests upon the axle of the wheel F, when not lifted off by other mechanism, hereafter described.

In Figs. 1 and 2, the slide A and levers C D have been lifted until the pins *b* and *c* have each engaged with their respective wheels, but the day-of-the-month wheel F has not been moved by said engagement.

Upon the further upward movement of the slide A the lever C turns on its hinged end and the pin *b*, by reason of being in contact with the edge of wheel F, moves on in a circular path, as indicated by the broken lines in Fig. 1, and rotates the wheel F just one tooth, or one thirty-first of a revolution, and the shaft of said wheel carrying a proper index or pointer, said pointer will indicate the change of one day upon the month-dial, the spring *e* bearing against the teeth of the day-of-the-month wheel, holding it in place in a well-known manner. A like spring, *f*, Fig. 1, bears against the wheel E to hold it in place, and also to assist its forward movement after the lever and pin *c* have moved it a little beyond the point shown in Fig. 1. The lever D and its pin *c*, of course, move upward with the slide A, and simultaneously with the lever C and pin *b*, before described; but the pin *c* acts upon its wheel sooner than does the pin *b*, because the former has to carry the wheel one seventh of a revolution instead of one thirty-first.

As represented in Fig. 1, the pin has already given a partial movement to the wheel

E, which is completed by the farther upward movement of the slide A, and the pointer, or any proper index, connected to the shaft of wheel E indicates the succeeding day of the week upon the dial. When the slide A descends the pin *c* slides down the sloping edge of one tooth and over its end, ready to turn the wheel another one-seventh of a revolution. The pin *b* on lever C also falls downward, substantially in a vertical line, until the vertical shoulder *d* passes the axle of wheel F. The lower edge of the lever C then engages with said axle, and carries the lower end of said lever and its pin outward as the upper end falls downward when the pin is in the positon indicated by the small broken circle in Fig. 1. This is also the position that the pin was in prior to the last upward movement of the slide A, the parallel broken lines indicating the path of the pin during the said upward movement of the slide, the movement of the pin to the right being made when the lower edge of C rests upon the axle of wheel F, the upward path when the vertical shoulder is resting against and passing said axle, and the circular path after the pin has come into contact with the edge of the wheel F.

The operation above described takes place on every day in which one thirty-first of a revolution will properly indicate the day of the month upon the dial.

Upon the back of the day-of-the-month wheel F there is a pin or arm, *g*, Figs. 3 and 4, which at every revolution of said wheel engages with the month-of-the-year wheel G and imparts to it one-twelfth of a revolution. Back of this wheel G, and moving with it, is a gear-wheel, (shown in Fig. 4, and also indicated in broken lines in Fig. 3,) and meshing into this gear-wheel is a like wheel upon the shaft H by means of which wheels one-twelfth of a revolution is also imparted to said shaft, so that a pointer or index attached thereto will indicate another month upon the dial for every twelfth revolution of the wheel G, which wheel like the others is retained in place by a spring, *h*, bearing on its edge.

In order to compensate for the short months I provide, first, a twelve-toothed wheel bearing pins for each of the five short months, which wheel, for convenience sake, I will term the pattern-wheel J; said wheel is loosely fitted on shaft H, so as to be rotated independently and is prevented from any accidental movement by means of the spring *i*. A pin, *k*, upon the front of the wheel F engages the teeth of this pattern-wheel, and imparts to it one-twelfth of a revolution for every revolution of the wheel F.

To the back plate B I pin or hinge, so as to turn freely, a peculiar lever, which I will term the "short-month" lever, K, the same being most clearly shown in Fig. 3. In Figs. 1 and 2 the pin or pattern for June is engaged with the arm *l*. In Fig. 1 it is on the 29th day of June, and in Fig. 2 it is represented as on the 30th day of said month. In the act of making the change (represented by these two figures) the short-month lever K has been turned on its stationary axis, thereby lifting its left-hand arm *m* into a position slightly above the sidewise path of the pin *b*. Therefore, when the slide A and lever C are again lifted the pin *b* moves to the right, and under the arm *m*, in the path indicated by the transverse broken lines in Fig. 2, into the position shown in said figure, when it is stopped from farther movement to the right by contact with a properly-formed shoulder upon the arm *m*, as shown. Upon the farther upward movement of the slide A the arm swings upward, carrying the pin in a circular path, as indicated by the upward projecting broken lines, the shoulder in said arm *m* holding the pin so far to the left that it will not engage with the teeth of the wheel F, but in the progress of its upward movement the flange *n*, on the short-month lever K, engages with the pin *o* upon the back of the wheel F, and after thus engaging moves far enough to carry the said wheel two-thirty-first of a revolution instead of one, and thereby carrying the index over two spaces upon the dial, to wit, from June 30 over thirty-one on the dial to the first of the next month, the pin *g* meanwhile tripping the month-of-the-year wheel G, so as to properly indicate the month upon the dial. When the slide A drops again the pattern-wheel has revolved so far as to carry the pattern for June out of reach of the arm *l*, so that the parts assume their normal positions and count only one day, as before described, until the arm *l* engages with the pattern for the succeeding short month. In like manner the change from the last day of all the thirty-day months to the first of the succeeding month is made.

The pins or patterns for February are necessarily made adjustable to compensate for leap-year. Upon the front plate L, Fig. 4, and surrounding the shaft H, I place a stationary wheel, M, (see also Fig. 1,) having eighteen teeth, and upon a spoke of the pattern-wheel J I secure a wheel, N, having twenty-four teeth, so that it may revolve on its own axis, and also around the stationary wheel M into which it meshes. Said wheel N carries four pins or patterns—three for the years in which February has only twenty-eight days, and one for leap-year—the differential movement of the wheels M N causing the latter pin to be operative only once in four years, in a well-known manner in clock-calendars. When the ordinary February patterns or pins engage with the arm *l* the arm *m* is lifted two days sooner than it is in a thirty-day month, and thereby the flange *n* strikes the pin *o* immediately after it begins to lift, and the wheel F is moved four-thirty-first of a revolution, carrying the index on the dial from the 28th of February to the 1st day of March. The leap-year pattern or pin is so set as to cause the short-month lever K to be caught upward one day later than in an ordinary February, thereby moving the wheel three-thirty-first of a revo-

lution, and carrying the index from twenty-nine on the dial over thirty and thirty-one to the figure one.

I provide the pattern-wheel J with a series of numbers, from one to twelve, as shown, to indicate the months of the year. As the numbers are located in the drawings, the arm *l* constitutes an index, and whatever number is under said arm is the number of the month then being counted by the calendar, and so soon as the tooth bearing said number has wholly passed said arm another month is indicated upon the dial. By the aid of these numbers and some particular point or mark for an index, it can readily and at a glance be seen what month is about to be counted—for instance, as shown in Figs. 1 and 2, the pattern for the sixth month, viz., June, is about to pass the arm *l*, which informs one that the calendar is about to change from June to July. Such information, by some means, is absolutely necessary in setting up the dial, in order to properly adjust the pointers. Without such numbers and index the position of the calendar movement is ascertained either by hand manipulation and watching its movement or observing the several pins or patterns, and following them around to see which short month is about to engage the other parts before putting on the pointer.

I propose to make a small hole in the dial, and in the front plate L immediately in front of the end of arm *l*, so that the numbers as they pass said arm may be readily discerned, thereby enabling the pointer to be put on correctly.

If desired, the hole in the front plate L and in the dial may be made to take the place of the end of the arm *l*, so far as it acts as an index, and said hole may be located in the dial at any point over the rim of the pattern-wheel J; but when so located the numbers must also be correspondingly located—that is, the Fig. 2 must be placed in such a position that it will be under the hole in the dial when the arm *l* is engaging with or about to engage with the February pattern, and the Fig. 4 for April when said arm is about to engage with the April pattern, and in like manner for all the months.

A stop, *q*, Fig. 2, is placed upon the slide A, to prevent it from ever being lifted beyond a certain point.

The shaft H, bearing the month-of-the-year index, and the shafts of the wheels E F, bearing the day-of-the-week and day-of-the-month indexes, are all placed in one frame, whereby the same are in very convenient position to make, and also the shaft of the wheel F, requiring thirty-one divisions of the dial, and therefore the largest circle of figures, may be located in the center, and the shafts carrying the indexes for the day of the week and month in the year, requiring seven and twelve divisions, and therefore smaller circles, may be arranged upon either side of the wheel F, and may be located within the day-of-the month circle upon the dial.

The lever D has a downward projecting arm, which passes near the post *r*, so as to prevent the pin *c* of said lever from being lifted out of engagement with the teeth of the wheel E, except when said lever is in its most depressed position.

The flange *n* is extended both to the right and left so far that in case the wheel F shall be rotated in either direction, when the short-month lever K is lifted by hand or otherwise, the pin *o* will not pass by the end of said flange and engage with the back side of it, but will always come in contact with its face and throw the lever K back into its proper position.

The wheel F may be rotated in either direction, as desired, except near the last of the month.

The month-of-the-year wheel G and its pointer may also be turned in either direction, except the last of each month, which could not be the case if the pointer was carried by the pattern-wheel J, which has the same forward movement.

I claim as my invention—

1. The slide A, lever D, bearing-pin *c*, in combination with post *r*, and day-of-the-week wheel E, substantially as described, and for the purpose specified.

2. The combination of the day-of-the-week wheel E, day-of-the-month wheel F, and pins *c b*, both connected to the same operating mechanism, substantially as described, and for the purpose specified.

3. The lever which operates the month-wheel, provided with the vertical shoulder *d*, and hung to turn freely on the slide A, in combination with the axle which acts as a guide to impart the peculiar motion to the engaging-point *b* of said lever, substantially as described, and for the purpose specified.

4. The short-month lever K, hung on a stationary axis, and provided with the arms *l* and *m*, and the flange *n*, substantially as described, and for the purpose specified.

5. The combination of the pattern-wheel J, short-month lever K, wheel F, bearing-pins *k* and *o*, and the lever and slide C A, operating together substantially as described, and for the purpose specified.

6. The combination of the month-of-the-year wheel G, arranged on an independent axis, so as to be rotated in either direction, with pattern-wheel J, short-month lever K, wheel F, bearing-pins *g*, *k*, and *o*, the lever C, and slide A, all operating together substantially as described, and for the purpose specified.

DANIEL J. GALE.

Witnesses:
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