B. B. LEWIS.
Clock-Calendar.

No. 209,618. Patented Nov. 5, 1878.

Fig. 1.

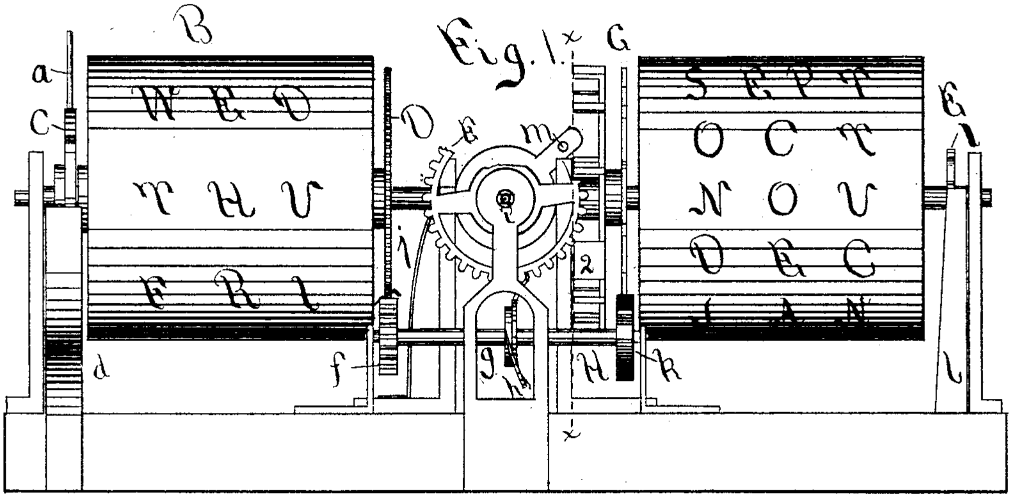
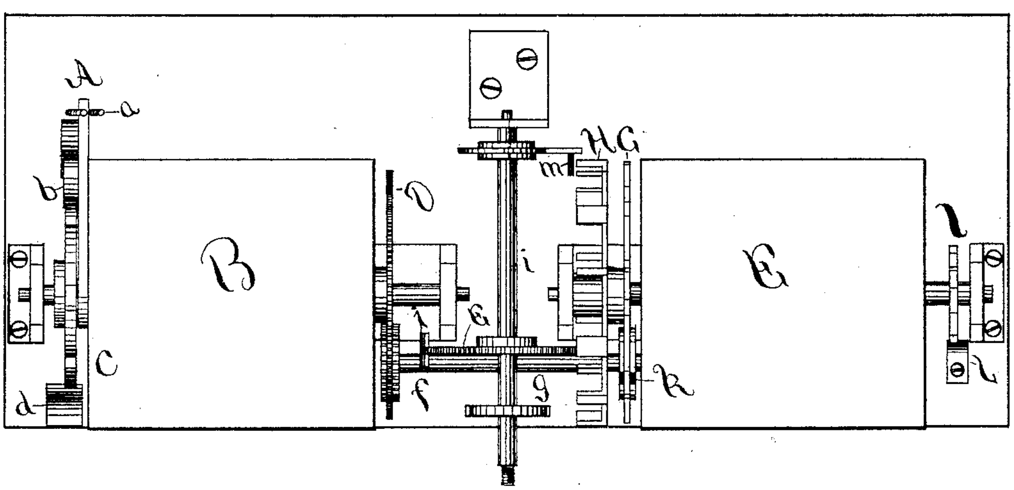


Fig. 2.



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BENJAMIN B. LEWIS, OF BRISTOL, CONNECTICUT.

IMPROVEMENT IN CLOCK-CALENDARS.

Specification forming part of Letters Patent No. **209,618**, dated November 5, 1878; application filed March 9, 1878.

To all whom it may concern:

Be it known that I, BENJAMIN B. LEWIS, 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:

The patent to Akins and Burritt, No. 11,711, September 19, 1854, shows a calendar in which the days of the week and months of the year are indicated by means of two revolving cylinders having respectively the names of the days of the week and months of the year on them, and mounted behind openings in the dial. Between said cylinders, and standing at right angles thereto, there was a revolving shaft, the front end of which extended through the dial and carried a pointer for indicating the days of the month, said dial having a circle divided into thirty-one spaces, respectively numbered from 1 to 31.

My calendar contains parts corresponding to the old parts above named. It is old to operate the day-of-the-week mechanism and day-of-the-month mechanism by means of a single operating device having two separate connections; but the day-of-the-month mechanism was not operated through the medium of the day-of-the-week mechanism in said old device.

My invention consists in the peculiar manner of and mechanism for operating the two cylinders and pointer-shaft, as hereinafter described.

In the accompanying drawing, Figure 1 is a front elevation of a clock-calendar which embodies my invention, the same being represented with the dial removed. Fig. 2 is a plan view of the same. Fig. 3 is an end view of the day-of-the-week mechanism of said calendar. Fig. 4 is a partial sectional view on line *x x* of Fig. 1. Fig. 5 is a side elevation of detached parts thereof; and Figs. 6, 7, and 8 are front elevations of detached parts in different positions.

As in ordinary calendars, a twenty-four-hour wheel is connected with the clock-mechanism, from which wheel a rod, *a*, depends, the same being connected to the lever A, so as to make it rise and fall once in every twenty-four hours, the downward movement of the lever being assisted, if desired, by the spring *c*. This one rod *a* is the only connection which my calendar has with the twenty-four-hour wheel or operating device. The lever A is mounted on the axle or shaft of the day-of-the-week cylinder or roller B. Permanently secured to the shaft of roller B is a notched disk or ratchet-wheel, C, with which a spring-pawl or click, *b*, on the lever A engages, said ratchet-wheel having seven teeth to represent the days of the week, the names of which are affixed to the periphery of the roller B.

If desired, the roller B could bear the names of the days for two weeks, in which case the ratchet-wheel C would have fourteen teeth, the only difference being that it would take said roller two weeks instead of one to make a complete revolution.

A small spring, *d*, rests upon the periphery of the ratchet-wheel to engage its teeth and prevent a backward motion, as in ordinary calendars.

Upon the standard which supports one end of the roller B there is a fixed pin, *e*, whose office is twofold—viz., first, to arrest the downward movement of the lever A, and, second, to arrest the forward motion of the roller B. This stop-pin *e* engages the back edge of the pawl *b*, and holds it firmly against the ratchet-wheel with its inside edge bearing upon the bottom of the notch therein, and thereby prevents the roller from moving forward beyond that point.

In Fig. 3 the parts are represented as having reached their most advanced position and ready for the return movement of the lever.

The upper part of the standard which supports the roller B is represented as broken away in order to better represent the other parts.

The lever rises until the end of the pawl drops into the first notch in the rear of the notch last engaged, or perhaps passes by it a little, and then returns, bringing the parts again into the position shown in Fig. 3, and imparting one-seventh of a revolution to the roller B.

At the other end of the roller B is a gear-wheel, D, Figs. 1 and 2, which meshes into the pinion *f* of shaft *g*, the number of teeth in said wheel and pinion being so proportioned that the movement imparted to the roller B by one up-and-downward movement of the lever A will move the shaft *g* one-half of a revolution. The shaft *g* has a double cam-wheel, *h*, the two operative edges of which are thin and inclined laterally, something after the manner of two segments of a screw-thread, the shape of the said cam being most clearly shown in Fig. 5. Above the cam *h* is the day-of-the-month shaft *i*, the front end of which extends through the dial, and is adapted, by ordinary means, to receive the pointer, which indicates the day of the month on said dial. The shaft *i* is provided with a gear-wheel, E, bearing thirty-one teeth, said wheel being represented as partially broken away in Fig. 1 in order to better show other parts. A friction-spring, *j*, bears against the teeth of said wheel to prevent an accidental movement of the same, as is quite common in calendars. The edges of the double cam *h* are so thin that they can readily pass through between the teeth of the wheel E, and their lateral incline is equal to one-thirty-first of the circumference of said wheel. Therefore, when the shaft *g* makes one-half of a revolution, the half of said cam *h* which engages the wheel E will move it one-thirty-first of a revolution, and its pointer will indicate the succeeding day on the dial. At the next movement of the shaft *g* the other half of the cam *h* engages the wheel E, and another day is indicated, and so on until the last day of the month.

F designates the month-of-the-year roller or cylinder, the same bearing the names of the respective months at regular intervals thereon. At the inner end of said roller is a wheel, G, firmly secured to the shaft of the roller, so as to rotate therewith. Said wheel has twelve long and narrow teeth, with quite a space between, the points of all and the whole of two of which teeth are shown in Fig. 4. By the side of wheel G, and rotating therewith, is the gage-wheel H, for regulating the length of the months. This wheel has twelve laterally-projecting arms or gages, the same being of different widths, and representing, respectively, the twelve months in the year. A face view of said wheel and edge view of its gages are shown in Fig. 4, and the gages are designated by the numbers 1 to 12, inclusive, beginning with 1 for January, and so on to December. A portion of this wheel is broken away in Fig. 4 in order to better expose the teeth of wheel G, whereby the gages 3 and 4 for March and April are not represented; but they are the same size or width, respectively, as the gages for May and June, so that it is considered unnecessary to show them. Upon the shaft *g*, and between the pointed teeth of wheel G, there is a wheel, *k*, whose peculiar shape is clearly shown in Fig. 4. Its main shape, in side view, is circular, but it has two deep notches on opposite sides. Its position on the shaft and its size are such that it can rotate between any two teeth of the wheel G without imparting motion to said wheel, and when at rest the circular portion of its edge on one side fills the space between the two teeth of wheel G, then over it, so that said wheel cannot be rotated in either direction without first starting the wheel *k*. On the opposite end of the shaft of roller F there is a ratchet-wheel, I, having twelve teeth, against which a friction-spring, *l*, rests, to retain said shaft in proper position.

Upon the rear end of the day-of-the-month shaft *i* is an arm carrying a pin, *m*, which moves in such a path as to engage the laterally-projecting gages 1 to 12, inclusive, of wheel H, when, in turn, they come to the rear side of said wheel. At about the end of the thirtieth day of each long month the pin *m* on shaft *i* just reaches the gage for said month, but does not move it. When the lever A begins to descend at the end of the thirty-first day, and imparts motion to the shaft *g* through the medium of the roller B, the pin *m* is started by the cams *h* and wheel E; and as said pin has already reached the gage for that month, the gage-wheel H, wheel G, and roller F must necessarily be moved by the pin *m*.

The wheel *k* moves with the cam *h*, so that it gets out of the way of the teeth on G just as the pin *m* begins to move said wheel, and keeps out of the way while the cam *h* is carrying the shaft *i* just one-thirty-first of a revolution. By that time the tooth of G on the rear side of wheel *k* is caught in one of the notches therein, and the wheel G, together with wheel H and roller F, is carried on by said wheel *k* far enough to rotate them in all just one-twelfth of a revolution, when the front edge of the succeeding gage overtakes the pin *m*, but does not move it. At the next movement of cam *h* and shaft *i* the pin *m* passes away from the gage, when the roller B and day-of-the-month shaft move one division daily until the end of the next month. The gages are so spaced on the wheel that the distance between their front or forward edges is uniform throughout; but the distance between their confronting edges varies with the length of the month, which difference is made by adding to their width at the rear edge.

In Figs. 6, 7, and 8 I have shown the pin *m* and a segment of the rim of wheel H, bearing the gages for January, February, and March, the same being viewed from the front and detached from other parts. The February gage herein shown is for a leap-year February of twenty-nine days.

Fig. 6 shows said parts in the position they take on the end of February 28, when the pin *m* has just overtaken the February gage 2, but has not moved it. This pin sustains the same relation to the thirty-day-month gages at the end of the 29th day of April, June, September, and November, and to all the thirty-one-day months at the end of the thirtieth day, excepting that the pin will be more advanced or lower down before reaching the narrow gages than it is when it overtakes the wide February gage.

When the cam *h* moves the shaft *i* and pin *m* on the 29th day of February it carries the wheel H with said pin, and the pin stops at the end of one-thirty-first of a revolution of its shaft in the position shown in Fig. 7, leaving the pointer at thirty on the dial; but the wheel H, being then caught and carried on by means of wheel *k*, the March gage 3, moving with wheel H, overtakes the pin *m*, and in making its remaining part of one-twelfth of a revolution carries the pin *m* so far as to move shaft *i* two-thirty-firsts of a revolution, leaving the parts in the position represented in Fig. 8, and carrying the pointer from 30 over 31 on the dial to the 1st of March. The February gage has now so far advanced as to be wholly out of the way of the pin *m* when it shall make its next forward movement.

Whenever the pointer reaches the figure 1 on the dial in either the long or the short months, the gage for the month then being indicated overtakes the pin *m* and stops in the position shown in Fig. 8, the only difference in the different months being that at the end of the long months the gage overtakes the pin merely without moving it, while at the end of the short months it overtakes and moves it from one to three days, according to the length of the month, and stops moving it when the pointer reaches the figure 1 on the dial. The movement of the shaft *i*, through the medium of the gage-wheel H, always takes place when neither of the operative faces of the cam *h* are engaged with the teeth of the wheel E.

Heretofore, so far as I know, the same mechanism which first started the pointer at the last day of a short month retained its hold thereon and carried the pointer over to the first day of the succeeding month; but in my calendar the mechanism which moves the pointer daily takes the pointer at the end of the short month and moves it one space on the dial, when another mechanism—to wit, the gage-wheel—takes it up and moves it the remaining spaces required to carry it over to the first day of the next month.

A supplemental device may be added to engage the pin *m* and move the gage-wheel H one day sooner in February for three successive years, when the pointer will be carried one day farther by said gage-wheel than with the February-gage herein described, thereby moving the pointer on the dial four days at the end of February instead of three; or if it is not desired to count leap-year, then the February gage may be built up to make the pin overtake it one day sooner and all leap-year mechanism omitted, when the calendar will count correctly except in February on leap-year, when the mechanism may be set one day back by hand or reset to the proper date.

The roller B and day-of-the-month pointer are moved simultaneously and daily through the lever A until the end of a short month, when the mechanism before described moves the day-of-the-month shaft and its pointer from two to four divisions, according to the length of the month, for one division of the roller B, and yet this is all done through the medium of said roller.

I claim as my invention—

1. The day-of-the-week roller provided with mechanism for moving it daily one division, in combination with the day-of-the-month shaft *i* and connecting operative mechanism, the latter receiving its impulse through the medium of the day-of-the-week mechanism, substantially as described, and for the purpose specified.

2. The day-of-the-week roller provided with mechanism for moving it one division daily, in combination with the wheel D, pinion *f*, shaft *g*, cam *h*, and wheel E on the day-of-the-month shaft, substantially as described, and for the purpose specified.

3. The day-of-the-month shaft *i*, carrying an arm and pin, *m*, and provided with mechanism for moving one division daily, in combination with the month-of-the-year mechanism, acting upon the pin *m* to take it up at the end of its first movement after the last day of each short month and carry it forward to the first day of the succeeding month, substantially as described, and for the purpose specified.

4. The month-of-the-year wheel G and gage-wheel H, in combination with the day-of-the-month shaft *i*, bearing pin *m*, the shaft *g*, bearing wheel *k*, and mechanism for operating said shafts *g* and *i*, substantially as described, and for the purpose specified.

5. In a calendar mechanism, the gage-wheel H, provided with twelve projecting gages representing the twelve months of the year, the same having their front edges at a uniform distance from each other, but widened at the rear edge more or less, according to the lengths of the respective months, substantially as described, and for the purpose specified.

6. The shaft *g*, bearing wheel *k*, and mechanism for moving it daily one-half of a revolution, in combination with wheel G, gage-wheel H, and mechanism for imparting an impulse to the gage-wheel at the end of each month simultaneously with the movement of the shaft *g*, substantially as described, and for the purpose specified.

7. The day-of-the-week roller provided with mechanism for moving it one division daily, in combination with gearing D *f*, shaft *g*, bearing cam *h*, and wheel *k*, the shaft *i*, bearing wheel E and pin *m*, the roller F, wheel G, and gage-wheel H, substantially as described, and for the purpose specified.

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