(No Model.)

2 Sheets—Sheet 1.

P. F. NILSON.

CALENDAR CLOCK.

No. 387,005. Patented July 31, 1888.

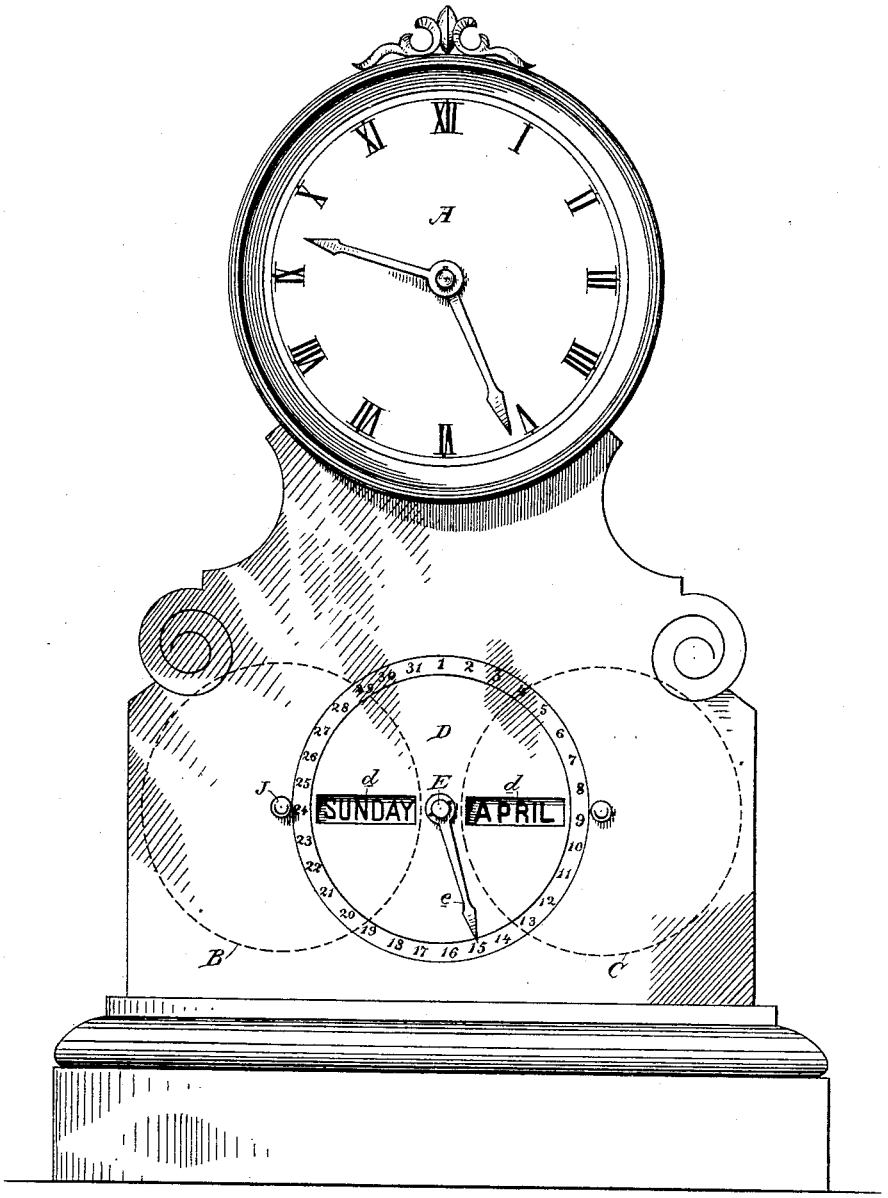


Fig. 1.

Witnesses,
Geo. H. Strong,
J. B. Morse.

Inventor,
P. F. Nilson.
By Dewey & Co.
attys

(No Model.)

2 Sheets—Sheet 2.

P. F. NILSON.

CALENDAR CLOCK.

No. 387,005. Patented July 31, 1888.

Fig. 2.

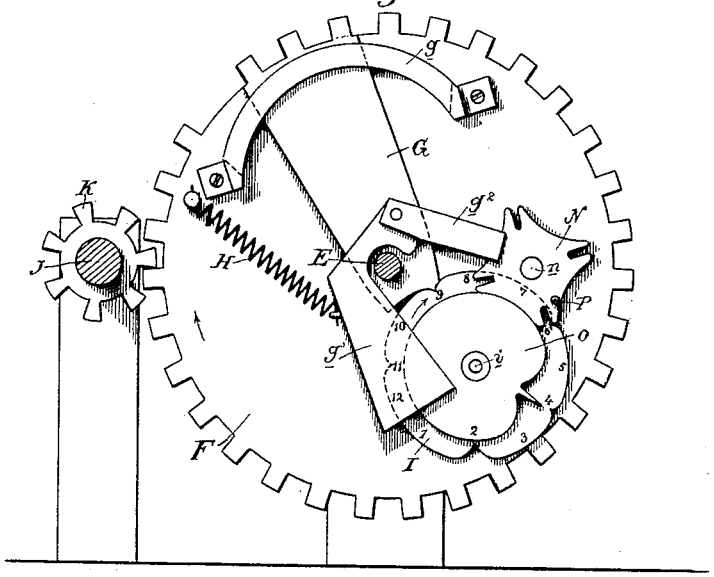
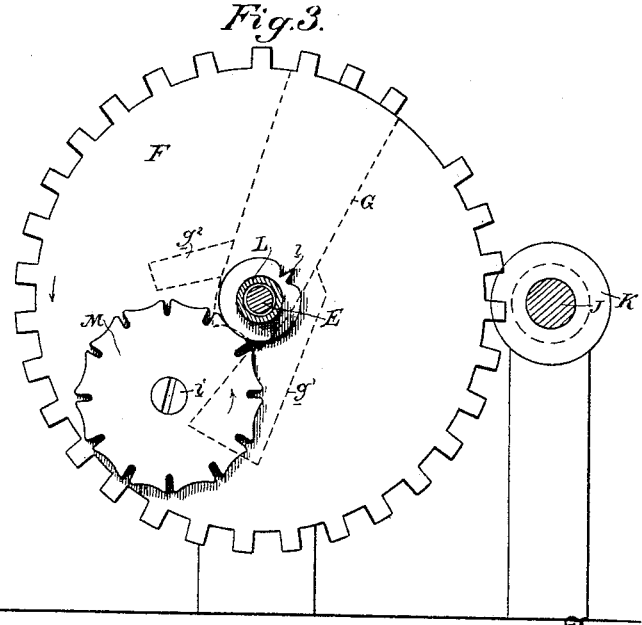


Fig. 3.



Witnesses,
Geo. H. Strong
J. B. Howard

Inventor,
P. F. Nilson.
By Dewey & Co.
attys

UNITED STATES PATENT OFFICE.

PETER F. NILSON, OF PHŒNIX, ARIZONA TERRITORY.

CALENDAR-CLOCK.

SPECIFICATION forming part of Letters Patent No. 387,005, dated July 31, 1888.

Application filed April 11, 1888. Serial No. 270,352. (No model.)

To all whom it may concern:

Be it known that I, PETER F. NILSON, of Phœnix, Maricopa county, Arizona Territory, have invented an improvement in Calendar-Clocks; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of calendars designed to be operated by clock-work and known as "calendar-clocks." In these calendars, in addition to the clock for indicating the time of day, there are indicators for the month, for the day of the week, and for the day of the month, all these being operated by the clock-work mechanism. The proper indication of the day of the month presents, obviously, the most serious problem, for provision must be made for months containing thirty-one days, thirty days, and twenty-eight days, and in leap-year twenty-nine days. Now, my invention has for its object the provision of mechanism which will automatically effect this necessary indication, said mechanism being adapted for use in any calendar of this class without particular reference to the character of the other indicating mechanisms, which, though I shall hereinafter refer for general perspicuity to certain forms of them, constitute no part of my invention.

My invention may be briefly stated to consist of a thirty-one-tooth wheel having a monthly period of rotation, three of the teeth of said wheel being on a pivoted spring-actuated arm or slide occupying a radial plane on the side of the wheel and adapted to move so as to bring either one, two, or three of its teeth into position or alignment on the side of one, two, or three of the fixed teeth, whereby the number of teeth are reduced from thirty-one to thirty, twenty-nine, or twenty-eight, as the case may be. A peculiar cam-disk carried by the wheel has its movement timed so as to regulate and control the movement of the arm or slide acting under the influence of the spring, whereby it is held firmly to complete the full number of teeth—to-wit, thirty-one—or is allowed to slip so as to reduce the number to thirty or to twenty-eight; while a second disk carried by the wheel and having a period of revolution of four years is adapted by contact to control the arm or slide, so as to reduce the number of teeth to twenty-nine for the month of February of leap-year.

In connection with the accompanying drawings I shall give a more detailed description of my invention.

Figure 1 is a front elevation of my calendar-clock. Fig. 2 is a front elevation of the thirty-one-tooth wheel and its connections, the movable arm or slide being turned to reduce the teeth to thirty for September, the ninth month, as indicated on disk I. Fig. 3 is a rear elevation of the thirty-one tooth wheel.

A is a clock.

B is a dial bearing the names of the days of the week.

C is a dial bearing the names of the months. These names are observable as they successively appear behind the apertures *d* made in the face-plate D, and the dials are rotated by means of suitable connections with the clock mechanism, the proper period of rotation being given to each. These connections I have not herein deemed it necessary to particularize, as they form no part of my invention and would only confuse the description and drawings.

Mounted in frame standards about the center of the device is a shaft, E, the outer end of which passes through the face-plate D and carries a hand or pointer, *e*, which moves over its dial, said dial being numbered from 1 to 31, inclusive, and indicating the days of the month. Upon this shaft is firmly fixed the toothed wheel F, the whole number of whose teeth is thirty-one. Of these, twenty-eight are fixed or rigid and three are movable. These three are on an arm or slide, G, which occupies a radial plane on the side of the wheel, its inner end being pivoted on the shaft E and its outer end being guided in a curved bracket, *g*, the closed ends of which act as limiting-stops to the movement of said arm or slide. The rim of the wheel F, where the slide-teeth are, is cut out for a distance sufficient to admit the three movable teeth, in order to complete the full number, the said slide or arm when occupying this position being at one limit of its movement and held by the closed end of the bracket. The bracket is long enough to allow the arm or slide to move to the other side an equal distance before being again lim-

ited by the closed end of the bracket, and when thus secured the teeth of said arm or slide occupy positions beside or in line with three of the fixed teeth, being thus practically eliminated and leaving an open space or gap in the rim of the wheel. It will now be seen that when the slide is moved so as to close up this gap with its three teeth the wheel has thirty-one teeth, and when it is moved to fully uncover the gap it has but twenty-eight teeth. When moved to have but one of its teeth brought into line with one of the fixed teeth, the wheel has thirty teeth, and it has but twenty-nine when moved so that two of its teeth line up with two of the fixed teeth.

H is a spring attached at one end to the wheel F and at the other end to an extension, *g'*, on the arm or slide G, at a point beyond its pivotal center. The power of this spring is directed to so pull the arm or slide as to cause it to fully uncover the gap in the wheel-rim, the three movable teeth then aligning with three of the fixed teeth and reducing the number of teeth of wheel F to twenty-eight, and if the spring had no opposing or controlling force such would be the constant condition of said wheel. Now, by reference to Fig. 2, a disk, I, will be seen having the following construction, by which it is rendered a cam for the proper regulation and control of the arm or slide G. It will be seen that its periphery consists of full or arc portions and of notched or indented portions. Beginning with one of the full or arc portions, I have designated it by the figure 1, which stands for January, the first month. The succeeding indented portion I have designated by the figure 2, and this stands for February, the second month. A peculiarity of indentation 2 is to be noted—namely, that it is a larger one than any of the other indentations, which are all equal in size. The succeeding full portion is designated by 3, for March; the next indented portion by 4, for April; the next full portion by 5, for May; the next indented portion by 6, for June; the next full portion by 7, for July, and the next portion is also full and designated by 8, for August; the next indented portion by 9, for September; the next full portion by 10, for October; the next indented portion by 11, for November; and the next full portion by 12, for December, said full portion joining the full portion 1, for January, and making the circle complete. It will be seen that in two instances the full portions join each other directly—namely, 7 and 8, for July and August, and 12 and 1, for December and January, and therefore these portions show double length. The full portions therefore represent the months having thirty-one days each, the larger indented portion represents February with twenty-eight days, (or twenty-nine, as will presently appear,) and the other indented portions represent the months having thirty days each. Now, if this disk be arranged in such a manner as to present each of these portions successively to the end of the slide or arm G, carrying the three movable teeth, and the shape of the contacting-surfaces be properly made, the said slide can be forced and held against the power of spring H, so as to cause its teeth to fully cover, or partially cover, or fully uncover, the gap in the wheel to vary the number of its teeth, as heretofore described. This is done as a matter of fact, for the full portions of the disk operate to hold the slide G, so that its teeth close up the gap and make thirty-one in all, while the indented portions allow said slide or arm sufficient play to permit the spring H to throw it over, so as to partially or fully uncover the gap, the equal indentations allowing it only play enough to cause one of its teeth to line up with one of the fixed teeth, thus making the number thirty, while the large indentation for February permits it play enough to cause it to line up all of its teeth with three of the fixed teeth, thus making the number twenty-eight. This play in the large indentation is in leap-year limited sufficiently to increase the teeth to twenty-nine by means I shall presently describe. In order to effect these results I mount the disk I on a small shaft, *i*, journaled in the body of the wheel F, the disk being so placed as to engage the inner end of the arm or slide G, and I impart to said disk a yearly period of revolution, accomplished in twelve separate movements, so as to bring its full and indented portions into action at the proper times. This motion and that of the wheel F is accomplished as follows:

On a cross-shaft, J, from which the power is transmitted to operate the week-day dial, is a pinion, K, having seven teeth, and this pinion meshes with and drives the wheel F. The pinion makes a complete revolution in one week, and therefore defines the period of wheel F, making it twenty-eight days when it presents twenty-eight teeth, twenty-nine days when it has twenty-nine teeth, thirty days when it has thirty teeth, and thirty-one days when it has its full number of teeth. When the gap in the rim of wheel F presents itself to the pinion, the wheel makes a jump, being so balanced. The wheel F therefore makes one complete revolution each month, and through the shaft E moves the hand *e* over the dial in order to indicate the day of the month.

Around the shaft E back of wheel F is fitted a sleeve, L, which is fixed to the frame-standard and is held stationary. Its end next to the wheel is provided with a single tooth, *l*.

Upon the back end of shaft *i* is secured a wheel, M, having twelve notches in its rim, said wheel being adapted to engage the fixed tooth *l* of sleeve L. Now, as the notched wheel, M is carried around by the main wheel F it engages the fixed tooth *l* with one of its notches at each complete revolution of wheel F. It thus is given a movement on its own axis one-twelfth of a complete rotation for each engagement and each complete revolution of wheel F and requiring a year for its complete rotation. This movement of the wheel M imparts through shaft *i* a corresponding movement to

the disk I to effect the result, heretofore described, of causing said disk to engage with its full and indented portions the end of slide G at the proper time to cause it to increase or decrease the number of teeth of wheel F according to the particular month to be indicated.

Now, in order to provide for February of leap-year I have but to limit the motion of the slide or arm G by reducing the play which it usually has in the large indentation 2 of the disk I. This I do by means of a small wheel, N, mounted on a pin, *n*, carried by the wheel F. This wheel has four notches in it which engage with a single-toothed flange, O, secured to the face of disk I. As disk I has a period of one year its single-toothed flange O will turn the wheel N one-fourth of a revolution each year, thus making its full period four years. The wheel N has a pin, P, projecting from its face, and the slide or arm G has a lug, g^2, and the arrangement of the parts is such that when February of a leap-year comes around and the slide or arm G would naturally have so much play in the large indentation 2 of disk I that the spring H would pull it over to reduce the number of teeth in wheel F to twenty-eight, the wheel N has been turned to such a position that its pin P stands in the way of the lug g^2 on the slide or arm G and allows said slide or arm G to move over only far enough to reduce the number of teeth of wheel F to twenty-nine instead of to twenty-eight.

I have not herein shown the mechanism by which the power of the clock is transmitted to the pinion K, as this would only complicate the drawings and burden the description, and the same may be said of the mechanism for the month and week dials.

I am aware that a calendar-clock has been suggested in which a thirty-one tooth-wheel finds place, but in that case it was proposed to have all the teeth fixed, whereas in mine three of them are on a properly-controlled slide, and are movable to provide for the necessities of the case.

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

1. In a calendar-clock, a thirty-one-tooth wheel having a portion of its teeth movable and arranged to align beside one or more of the fixed teeth, whereby the number of acting teeth in the wheel may be varied, substantially as herein described.

2. In a calendar-clock, a thirty-one-tooth wheel having a portion of its teeth movable and arranged to align beside one or more of the fixed teeth, whereby the number of acting teeth in the wheel may be varied, said wheel having a monthly period of revolution, in combination with a shaft on which the wheel is mounted and a hand carried by the shaft and moving over a dial to indicate the day of the month, substantially as herein described.

3. In a calendar-clock, a thirty-one-tooth wheel having a portion of its teeth carried by a pivoted slide or arm occupying a radial plane on the side of the wheel, whereby one or more of its teeth may be aligned beside one or more of the fixed teeth to vary the number of acting teeth in the wheel, substantially as herein described.

4. In a calendar-clock, a thirty-one-tooth wheel having a portion of its teeth carried by a pivoted slide or arm on the side of the wheel, whereby one or more of its teeth may be aligned beside one or more of the fixed teeth to vary the number of acting teeth in the wheel, in combination with a cam-disk acting on said slide or arm to regulate its movement to present the required number of acting teeth for each month, substantially as herein described.

5. In a calendar-clock, a thirty-one-tooth wheel having a portion of its teeth carried by a pivoted slide or arm on the side of the wheel, whereby one or more of its teeth may be aligned beside one or more of the fixed teeth to vary the number of acting teeth in the wheel, in combination with a cam-disk acting on said slide or arm to regulate its movement to present the required number of acting teeth for each month, and a spring secured to the slide or arm for moving it, substantially as herein described.

6. In a calendar-clock, a thirty-one-tooth wheel having a portion of its teeth carried by a pivoted slide or arm on the side of the wheel, whereby one or more of its teeth may be aligned beside one or more of the fixed teeth to vary the number of acting teeth in the wheel, in combination with the rotary cam-disk carried by the wheel and having its rim composed of a series of cam-surfaces successively acting against the butt of the slide or arm to regulate its movement to present the required number of acting teeth for each month, substantially as herein described.

7. In a calendar-clock, a thirty-one-tooth wheel having a portion of its teeth carried by a pivoted slide or arm on the side of the wheel, whereby one or more of its teeth may be aligned beside one or more of the fixed teeth to vary the number of acting teeth in the wheel, in combination with a rotary cam-disk carried by the wheel, and having its rim composed of a series of cam-surfaces successively acting against the butt of the slide or arm to regulate its movement to present the required number of acting teeth for each month, and a spring secured to the wheel and to the slide or arm, whereby said slide or arm is moved to position, substantially as herein described.

8. In a calendar-clock, a thirty-one-tooth wheel having a portion of its teeth carried by a pivoted slide or arm on the side of the wheel, whereby one or more of its teeth may be aligned beside one or more of the fixed teeth to vary the number of acting teeth in the wheel, in combination with the cam-disk I, carried by the wheel, and having its rim composed of a series of cam-surfaces successively acting against the slide or arm to regulate and control its movement, as described, and the mech-

anism for imparting to said cam-disk its rotary motion, consisting of the shaft on which it is mounted, the notched wheel on said shaft, and the fixed tooth engaging said wheel, substantially as herein described.

9. In a calendar-clock, a thirty-one tooth wheel having a portion of its teeth carried by spring-actuated pivoted slide or arm on the side of the wheel, whereby one or more of its teeth may be aligned beside one or more of the fixed teeth to vary the number of acting teeth in the wheel, in combination with the rotary cam-disk carried by the wheel, and having its rim composed of a series of cam-surfaces for regulating and controlling the movement of the slide or arm, as described, the toothed flange on said cam-disk, the notched wheel engaging said flange and having a pin, and the lug on the slide or arm for coming in contact with the pin, whereby for February in leap-year the movement of the slide or arm is limited, substantially as herein described.

10. In a calendar-clock, a thirty-one-tooth wheel having a portion of its teeth carried by a spring-actuated pivoted slide or arm on the side of the wheel, whereby one or more of its teeth can be aligned beside one or more of the fixed teeth to vary the number of acting teeth in the wheel, and the guide-bracket on the wheel in which the slide or arm works and by which its movement at each end is limited, in combination with the cam-disk acting on the butt of the slide or arm, as described, the shaft, notched wheel, and fixed tooth, whereby the cam disk is rotated, the toothed flange on said disk, the notched wheel engaging said flange and having a pin, and the contact-lug on the slide or arm, all arranged and adapted to operate as described.

11. In a calendar-clock, the thirty one-tooth wheel having the movable slide or arm with three teeth, whereby one or more of said teeth may be aligned beside one or more of the fixed teeth to vary the number of acting teeth in the wheel, in combination with the seven-tooth pinion of the week day-indicating mechanism engaging said wheel, substantially as herein described.

In witness whereof I have hereunto set my hand

PETER F. NILSON.

Witnesses:
G. F. SPANGENBERG,
A. ASHER.