(No Model.)

E. W. MORTON.

CALENDAR CLOCK.

No. 368,961. Patented Aug. 30, 1887.

FIG. 1.

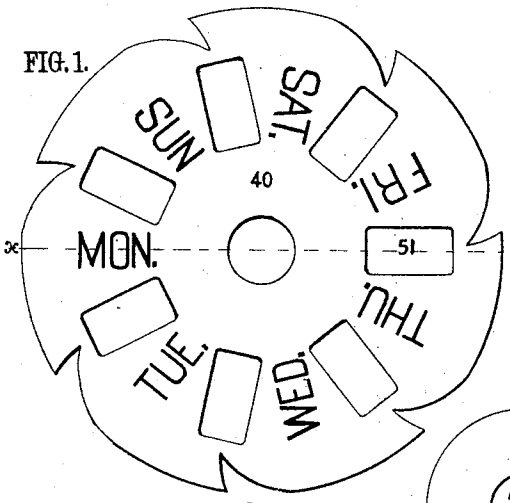


FIG. 2.

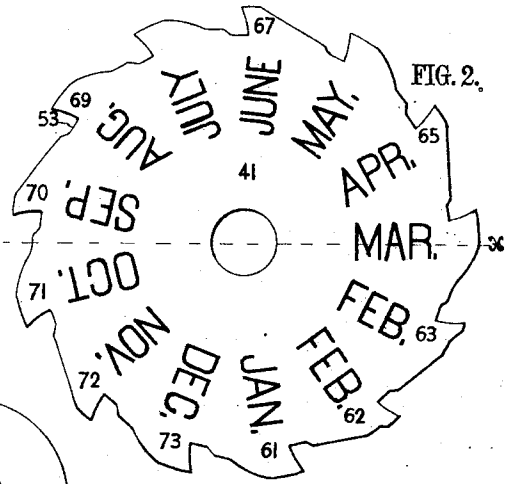


FIG. 3.

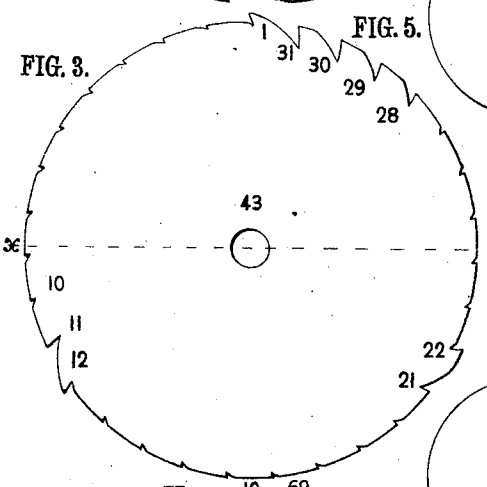


FIG. 5.

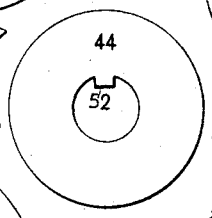
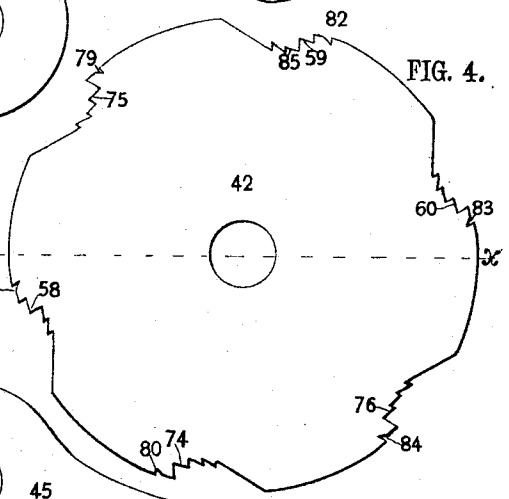


FIG. 4.



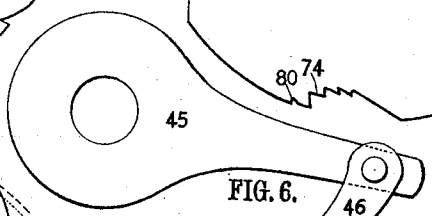


FIG. 6.

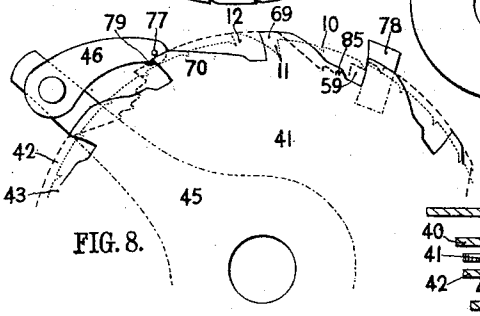
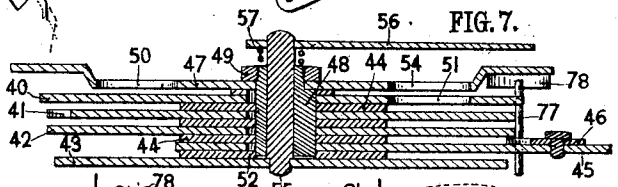


FIG. 8.

FIG. 7.



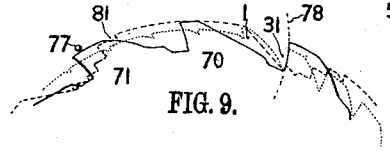


FIG. 9.

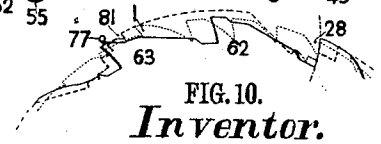


FIG. 10.

Witnesses.

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UNITED STATES PATENT OFFICE.

EDWIN W. MORTON, OF WHITE PLAINS, NEW YORK.

CALENDAR-CLOCK.

SPECIFICATION forming part of Letters Patent No. 368,961, dated August 30, 1887.

Application filed July 6, 1886. Serial No. 207,201. (No model.)

To all whom it may concern:

Be it known that I, EDWIN W. MORTON, a citizen of the United States, residing at White Plains, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Clock-Calendars, of which the following is a specification, reference being had therein to the accompanying drawings.

The object of my invention is to provide a calendar to be attached to clocks that will designate positively and accurately each day of the month, day of the week, and month of the year; and it consists in a number of disks revolving on a common center, all being operated by a single lever and pawl, said disks having notches cut in their peripheries, the position and size of which determine the time and amount of movement of each disk.

The invention also consists in details of construction and combination of parts, as will be fully described hereinafter.

In the drawings, Figure 1 is a detached face view of the day-of-the-week disk. Fig. 2 is a similar view of the month-disk. Fig. 3 is a view of the day-of-the-month disk. Fig. 4 is a view of the auxiliary disk which controls the movements of the other disks. Fig. 5 is a face view of a smaller disk or washer used to separate the other disks. Fig. 6 is a detached view of the operating lever and pawl. Fig. 7 is a central sectional view of the entire calendar, taken on the lines *x x* of disks 40, 41, 42, and 43. Fig. 8 is an outline plan of a portion of the disks 41 42 43 and lever and pawl 45 and 46, showing the position occupied by each just previous to the change of the day of the month. Fig. 9 is a similar view of the disks previous to the change of the day of the month from the thirty-first to the first, and also the change from one month to the month following. Fig. 10 is a similar view of the disks, showing the positions just previous to the change from the twenty-eighth day of February to the first day of March.

Similar figures refer to similar parts throughout the several views.

It is understood that the usual mechanism for imparting the stroke to the lever once in twenty-four hours will be present in the clock, although the calendar may be used independently of the clock-movement and operated by other means.

The calendar consists of a dial or face, 47, (see Fig. 7,) the center of which is depressed, so as to form a raised ring around the outer edge, having thereon a circle of figures from 1 to 31, inclusive, representing the days of the month. To the center of the dial 47 the hollow stud 48 is fixed by means of the nut 49. Placed loosely on the stud next to the dial is the disk 40, having the names of the days of the week printed thereon, which are viewed through a suitable opening, 50, made in the depressed part of the dial. On the stud 48, and next to the disk 40, is placed a smaller disk or washer, 44, the hole through which is provided with an inward-projection, 52, which fits in a slot cut longitudinally through one side of the stud 48. This keeps the washer from revolving, and when placed between the larger disks prevents the movement of one being communicated to the other. There are four of these washers used for dividing the disks and separating them from the lever. Next to the washer 44 is placed the disk 41, having upon its face the names of the months, which are viewed through the openings 54 in the dial and 51 in the disk 40. The disk 42 and lever 45 are then put in place, with a washer between each of them, as shown in Fig. 7. The disk 43, having fixed to its center the shaft 55, is then put in place by passing the shaft through the hollow stud, a washer being put between the disk 43 and the lever. The shaft 55 carries at its outer end a hand or pointer, 56, for pointing out the day of the month on the dial. Between the central portion of the hand 56 and the end of the stud 48 is a short open spiral spring, 57, which, through the medium of shaft 55 and disk 43, exerts a slight pressure on all the disks, preventing their being moved accidentally or when the pawl is making its backward stroke, and is clearly shown in Fig. 7.

The day-of-the-week disk 40 (see Fig. 1) is slightly larger than the other disks and is divided into seven equal parts, and has on its face the names of the days of the week. Diametrically opposite the name of each day is an opening, 51, through which the name of the month is seen when the disks are in posi-

tion, as shown in Fig. 7. There are cut in the periphery of this disk seven notches of equal distance apart, one for each day.

The month-disk 41 (see Fig. 2) is a little smaller than the disk 40, and the periphery is divided into thirteen equal parts—one for each month except February, which has two. It will be noticed that the tops of the teeth for those months having but thirty days are partly cut away, while those having thirty-one days are not, as shown, in teeth 65, 67, 70, and 72, and the two teeth for February are cut away still more, the object of which is to allow the pawl to catch the high tooth 1 on the day-of-the-month disk 43 early enough to move it three or four days in February, or two days for a month having thirty days, as the case might be. The bottom of each notch is also cut away to allow the pawl to catch the lower notches, one at a time, on disk 42, as shown at 53, Figs. 2 and 8.

The day-of-the-month disk 43 (see Fig. 3) is provided with thirty-one notches or teeth, there being one for each day of the month. The diameter of the disk at the tops of the teeth 1, 12, and 22 is exactly the same as the month-disk 41. The rest of the disk is of smaller diameter, as shown in Fig. 7. All the notches in this disk, except 11, 21, 28, 29, 30, and 31, are of the same depth, and are only just deep enough to allow the pawl to catch them and not deep enough for it to engage any but the highest teeth on disk 42. Notch 21 is made a little deeper to allow the pawl to catch tooth 58 or 59 of disk 42. Notch 28 is still a little deeper than 21, to allow the pawl to catch teeth 60, 74, or 75 of disk 42, and notches 11 and 29 are deep enough for the pawl to catch the teeth 60, 74, 75, or 76; and when the pawl drops in notches 30 or 31 it can engage either of the two lower teeth, one at a time, in disk 42.

Disk 42 (see Fig. 4) is of exactly the same diameter as the month-disk 41, and has six equal divisions, each of which is provided with a series of notches and teeth varying in height. The notches 79 and 80 are not deep enough to let the rod 77 in pawl 46 catch the tooth 62 in the month-disk 41, that tooth being a little shorter than the others. Notches 81, 82, 83, and 84 are deep enough for the pawl to engage all the teeth on the month-disk.

The disk 42 makes one-sixth of a revolution at the change of each month, and in the case of February it also moves one-sixth at the change of the twelfth day, and twice in four years it also moves one-sixth at the change of the twenty-second day. The small teeth in each division are used to advance it step by step until in position to be caught by the first tooth of the next series. The lever 45 (see Fig. 6) has an enlarged disk-shaped center in order to keep it steady and in place between the washers 44, and has pivoted to its outer end a pawl, 46. Through the end of this pawl a rod, 77, is fixed. (Shown clearly in Fig. 7.) This rod rests on the edges of the disks and imparts motion to each and all of them at the proper time by means of the teeth and notches with which they are provided. The pawl is kept in contact with the disks by a suitable spring attached to the lever. Fixed to the under side of the dial 47 is a small block or stop, 78, which limits the forward movement of the pawl, insuring each notch or tooth operated upon in the several disks being brought to the right position.

The operation is as follows: The lever and pawl when brought to the end of the backward stroke will occupy the position in relation to the disks as shown in Fig. 8, which represents a portion of disks 41, 42, and 43, lever 45, pawl 46, and the stop 78, the day-of-the-week disk being omitted for the sake of clearness. It is understood, however, that as the lever and pawl travel a distance equal to the distance apart of the teeth on the day-of-the-week disk, and as its diameter is a little larger than any of the other disks, it will be moved one-seventh of a revolution at each stroke of the lever. Referring again to the position of the pawl 46, it will be noticed that the rod 77, forming the working end of the pawl, is resting on the end of tooth 70 of the month-disk 41, and also on the plain circumference of disk 42, just forward of the notch 79. Now, as it moves forward it slides over the edges of these disks without moving them, the plain part of disk 42 preventing it from catching tooth 12 of the disk 43, likewise tooth 69 of the month-disk. It then slides down the inclined portion of tooth 69 and catches in notch 10 of the day-of-the-month disk and carries that disk forward the distance of one notch, (said notch 10 not being deep enough to allow the pawl to catch the tooth 59 of disk 42.) This movement is repeated for each day in the month until it reaches the deeper notch 11, when the pawl also catches the tooth 59 of disk 42 and moves it forward to the stop-block 78. There are then no further changes in the disk 41 or 42 (except during the month of February) until it reaches the notch 30 of the day-of-the-month disk 43, the depth of which allows the pawl to catch the tooth 85 of disk 42. This moves it forward far enough for the pawl during its next stroke to catch in notch 79 in disk 42. In case of a thirty-one-day month, however, it would not catch the notch 79 until the disk 42 had been moved one tooth farther ahead, (on account of the longer space on the tops of the teeth for the thirty-one-day months, as shown at 61 73 71, &c.,) which would be done when the pawl dropped into the deep notch 31 of the day-of-the-month disk, when the disks would occupy the positions shown in Fig. 9, which represents them as they appear on the thirty-first day of October, or other thirty-one-day months, just previous to the change to the first of the month following. Now, as the rod 77, fixed to the pawl, advances it catches notch 81 of disk 42 and carries that disk forward until it reaches tooth 70 of the

month-disk. It then carries both disks ahead until it strikes tooth 1 of the day-of-the-month disk, when all three are carried forward as far as the stop 78, when the month "November" will appear at the opening 54 in the dial, and the hand 56 will point at figure 1 on the face of the dial.

Fig. 10 shows the position of the disks 41, 42, and 43 just previous to the change from the twenty-eighth day of February to the first day of March. The pawl having last operated on notch 28 of the day-of-the-month disk, and at the same time having moved the disk 42 one tooth, it brings the notch 81 in position to be caught by the pawl on its next forward stroke, owing to the fact that the top of the February-tooth is nearly all cut away, as shown at 63, Fig. 2. The pawl then advances forward, as previously explained, but engages the tooth 1 of the day-of-the-month disk earlier than is the case with other months, carrying it forward four notches to the stop 78. It also catches the tooth 62 of the month-disk and revolves that disk, changing the month from February to March.

The twenty-ninth day of February in leap-year is accomplished by means of a combination of the short tooth 76 of disk 42 and tooth 63 of the month-disk, which occurs but once in four years. It will be noticed that there are two teeth on the month-disk assigned to February, and that there are two high teeth, 12 and 22, and two deep notches, 11 and 21, on the day-of-the-month disk. These are used to move the month-disk the space of one extra tooth in February, but as the disk has on its face two names of that month the result at the dial is not changed.

It is evident that if there were but twelve teeth on the month-disk, and the disk 42 made one-sixth of a revolution every month, the combination between the February-tooth and the short tooth 76 on disk 42 would occur once in twelve months. To avoid this, the month-disk is provided with thirteen teeth, and the extra tooth is moved between the first and twenty-eighth of February; but this brings the combination once in fifty months, and to remedy this the tooth 62 of the month-disk is made a little shorter than the others and the two notches 79 and 80 in disk 42 are made shallower than the notches 81, 82, 83, and 84. This allows the pawl to move the disk 42 one-sixth of a revolution when it reaches notch 12 of disk 43 without catching on the tooth 62 of the month-disk, (see Fig. 10,) and the extra February-notch on the month-disk is not then moved till the pawl reaches notch 22 of the disk 43, when all the disks are turned simultaneously and the second February is shown at the dial. This combination occurs twice in four years, which corrects the error above noted and causes the tooth 76 of disk 42 and tooth 63 of the month-disk 41 to come opposite one another once in forty-eight months, and the tooth 76, being shorter than the teeth 58, 59, 60, 74, or 75, it allows the pawl to pass over it without catching while operating in the notch 28 of the day-of-the-month disk. The twenty-ninth notch being deeper, however, the tooth 76 is caught and moved when it reaches that date, and the disks are again brought in position for the change of the month. It is not essential, however, that the twenty-ninth day of February be taken into account for the cheaper class of calendars, occurring, as it does, but once in four years, in which case each series of notches in disk 42 would be alike and the raised tooth and deep notch 22 would be omitted, and the tooth 62 of disk 41 be made the same height as the other teeth on that disk.

It is not necessary, either, for the proper working of the calendar that the day-of-the-week disk should be used, as it works perfectly without it, except in that case the days of the week are not designated on the dial.

I do not confine myself to the particular arrangement of parts described in this specification, the gist of the invention being in constructing and operating a calendar composed of disks placed one back of the other, all having a common center.

What I claim as my invention, and wish to secure by Letters Patent, is—

1. The combination, in a calendar-clock, of the dial 47, having openings 50 and 54, disk 40, having the names of the days of the week on its face, and openings, as 51, alternating with the names, disk 41, having the names of the months on its face, auxiliary disk 42, day-of-the-month disk 43, operating-lever 45, and pawl 46, having extended end, as 77, when all are concentrically arranged, substantially as shown and described, and for the purpose set forth.

2. The combination, in a calendar-clock composed of several concentrically and independently mounted notched disks, a lever mounted concentrically therewith, and a pawl, as 46, having a broad end or rod, as 77, arranged to co-operate directly with and rotate the several disks, motion being imparted to said disks only through the direct contact of said pawl with the notches therein, one of said disks, as 43, having thirty-one notches to designate the days of the month, several of which notches are made deeper than the others, as 28, 29, 30, and 31, and followed by a tooth projecting beyond the periphery of the disk, as 1, substantially as shown and described, and for the purpose set forth.

3. In a calendar-clock, the combination, with the dial 47 and the stud 48, fixed rigidly thereto, of the disks 41 42 and lever 45, all mounted independently upon and arranged to oscillate or revolve around said stud, and the disk 43, arranged to revolve concentrically therewith, all being operated by a single pawl attached to said lever, substantially as shown and described, and for the purpose set forth.

4. In a calendar-clock, the dial 47, having stud 48 fixed rigidly thereto, the disks 41 42, and lever 45, all mounted independently upon

and arranged to oscillate or revolve around said stud, the disk 43, arranged concentrically with the other disks, and all being operated by a single pawl, as 46, attached to said lever, combined with the day-of-the-week disk 40, substantially as shown and described, and for the purpose set forth.

5. The combination of the dial 47, having depressed center, the stud 48, rigidly fixed thereto, having a hole made through it longitudinally, the disks 40 41 42, lever 45, and non-revolving separating washers 44, all placed on the outside of said stud, and the disk 43, having fixed thereto the shaft 55, passing through said hollow stud, motion being imparted to said disks by the pawl 46, substantially as shown and described.

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Witnesses:
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