T. T. STRODE.

Calendar Clock.

No. 30,166. Patented Sept. 25, 1860.

Fig 1.

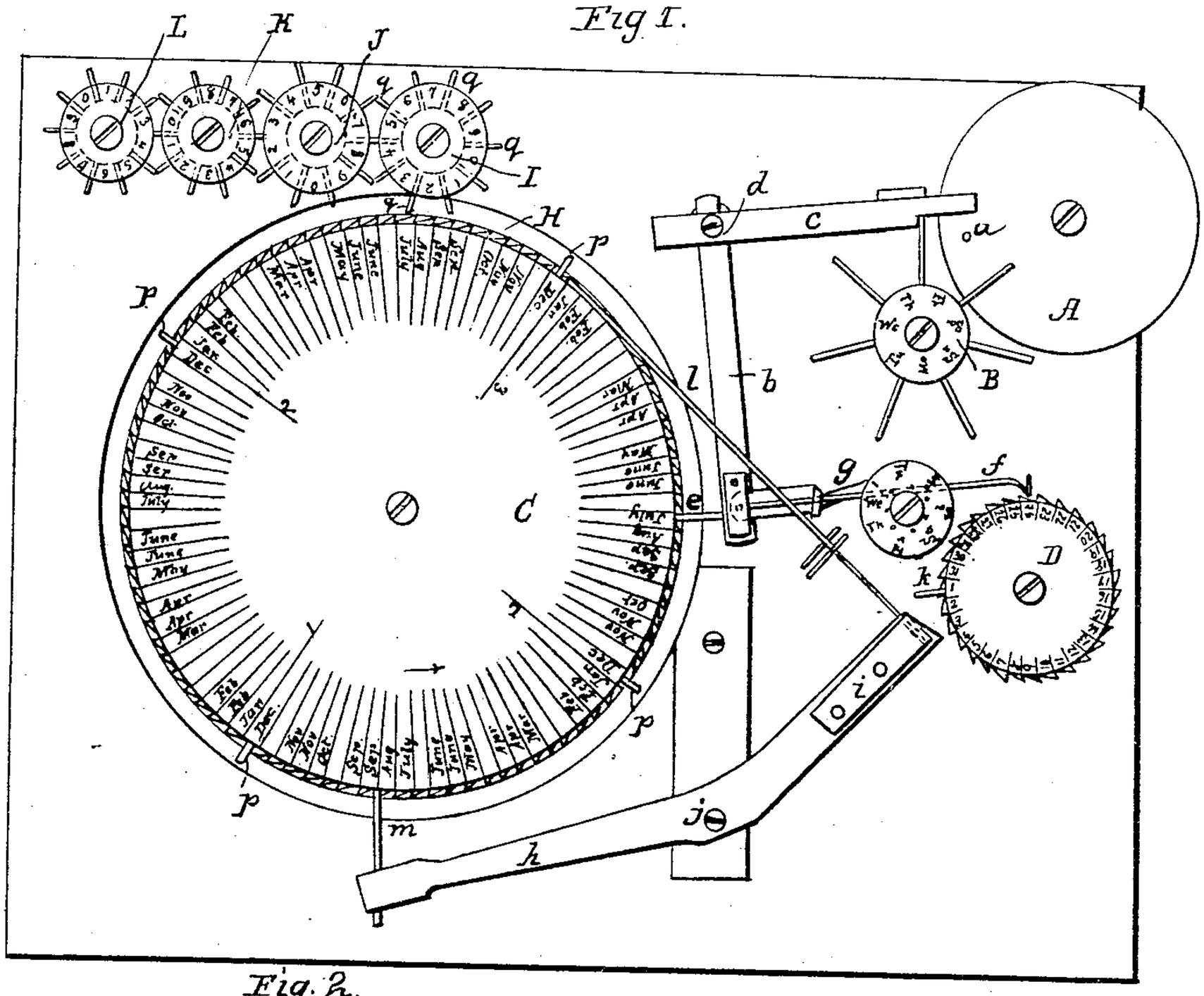


Fig. 2.

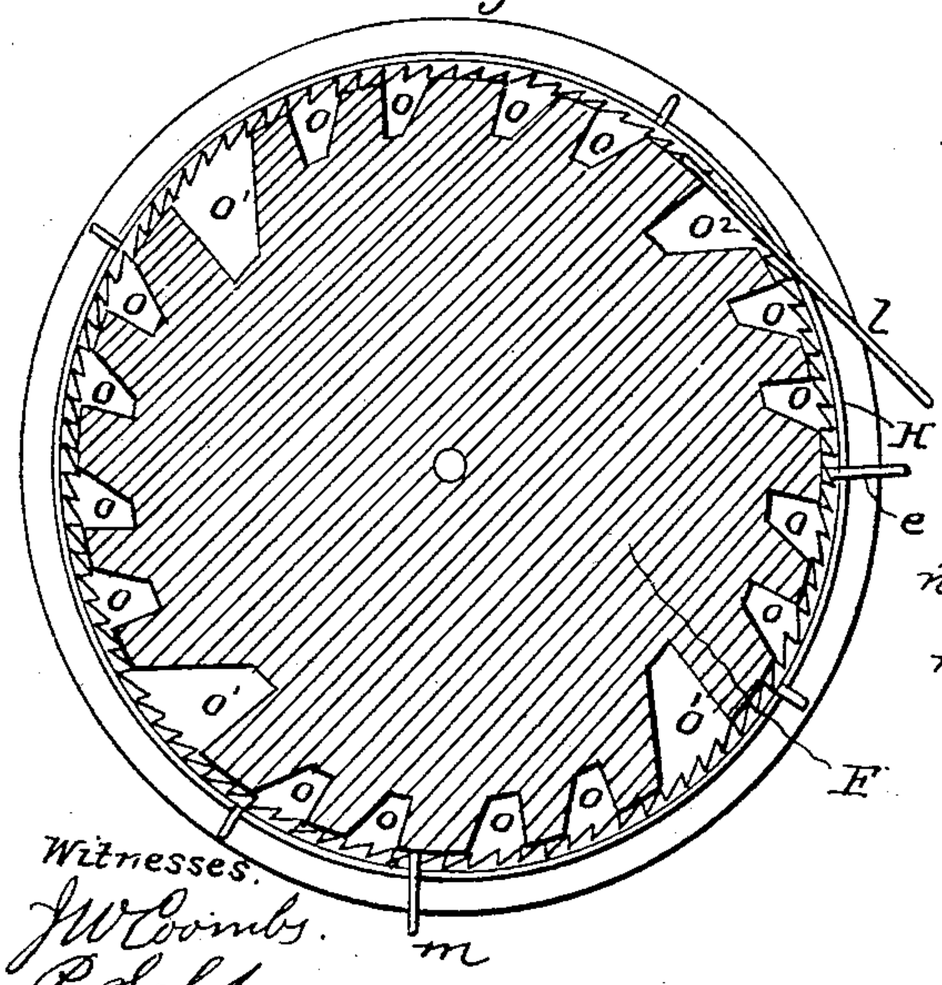
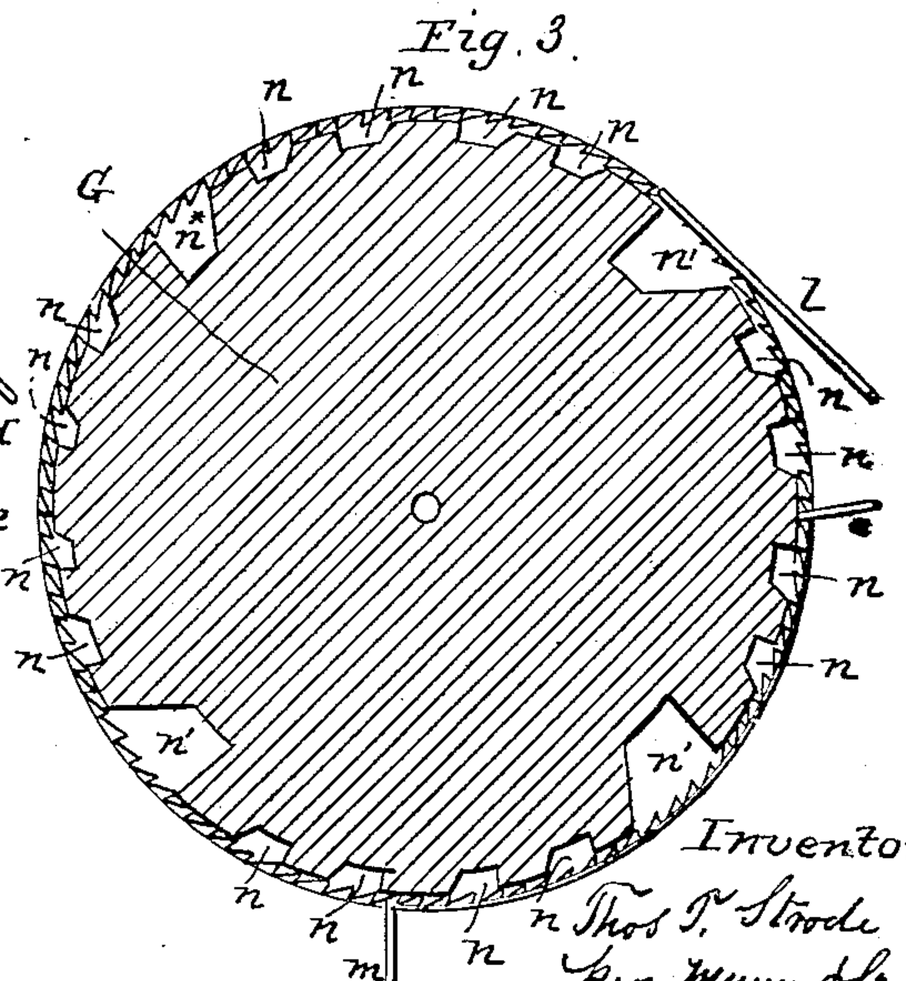


Fig. 3.



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UNITED STATES PATENT OFFICE.

THOMAS T. STRODE, OF MORTONVILLE, PENNSYLVANIA.

CALENDAR-CLOCK.

Specification of Letters Patent No. 30,166, dated September 25, 1860.

To all whom it may concern:

Be it known that I, THOMAS T. STRODE, of Mortonville, in the county of Chester and State of Pennsylvania, have invented certain new and useful Improvements 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 drawings, forming a part of this specification, in which—

Figure 1 represents a front elevation of my invention, the face having been removed to expose the working parts of the clock; Fig. 2 is a sectional front elevation of the year wheel, the top plate having been removed so as to expose the grooves which govern the motion of the year wheel. Fig. 3 is a sectional rear elevation of the same, the bottom plate having been removed in order to expose the grooves which govern the motion of the month wheel.

Similar characters of reference in the three views indicate corresponding parts.

The object of this invention is to produce a calendar clock which by a simple arrangement of parts shows the number of the current year, the name of the current month, the days of the month and the days of the week, and also the leap year and the years between leap years, by Figs. 1, 2 and 3, for a period of 9,999 years or for any desired number of years by an addition of wheels for showing the date of the year. All the changes from long months to short ones and vice versa and long years to short ones, and vice versa, are produced by a double series of grooves of varying depth in the circumference of the year wheel, said grooves being so arranged that the same govern the position of two levers and pawls, which latter serve to impart an intermittent rotary motion to the year wheel and to the month wheel.

To enable those skilled in the art to make and use my invention I will proceed to describe its construction and operation with reference to the drawing.

The wheel A, which represents the 24 hour wheel of an ordinary clock movement, imparts motion once in 24 hours by means of a pin *a*, in its face, to the wheel B, which is provided with seven arms, and on the face of which are marked the names of the week days in such a manner that one of the names after the other is brought before an opening in the face of the clock. The pin *a*, on the twenty four hour wheel A, gives also motion to the bell crank lever *b*, *c*, which is fulcrated in the pivot *d*. The arm *b*, of this lever is loaded or subjected to the action of a suitable spring so as to bring a pin *e*, which is inserted into one side of the arm *b*, of the lever *b*, *c*, in contact with the circumference of the year wheel C. From the other side of the arm *b*, extends a pawl *f*, which serves to impart motion to the month wheel D. This wheel has cut in its circumference 31, ratchet teeth and on its face are marked the numbers from 1 to 31, and whenever the pin *a*, comes in contact with the arm *c* of the lever *b*, *c*, the month wheel D is moved one or more cogs according to the position of the pin *e*, on the circumference of the year wheel C, which will be presently more fully explained. A second pawl *g*, which is secured to the arm *b*, of the lever *b*, *c*, turns the wheel E, one seventh of one revolution for each stroke of the lever *b*, *c*, or for each 24 hours and this wheel is marked on its face with the names of the week days the same as the wheel B, thus producing a second week day wheel, and either of the two or both may be used.

The year wheel C is intended to make 1, revolution in four years and it consists of the three parts, viz.; the upper disk F, the lower disk G, and the ratchet wheel H, which are fastened together firmly by means of screws or in any other desirable manner. The ratchet wheel is provided with 95, teeth which number is obtained in the following manner: At the end of each of the long months, January, March, May, July, August, October, and December the year wheel C, is turned one tooth giving 7 teeth in all; at the end of each month having 30 days, the year wheel is turned 3 teeth, giving for the four months April, June, September and November 12 teeth and at the end of the month of February of an ordinary year the wheel C is turned 5 teeth and in leap years, when the month of February has 29 days, the wheel C, is turned four teeth, thus giving for ordinary years $7+12+5=24$ and for the leap year $7+12+4=23$, teeth and as the wheel C, is intended to make one revolution in 3, ordinary years and one leap year, the number of the teeth of the ratchet wheel has to be three times 24 plus 23, which gives 95.

The face of the wheel C, is divided into four parts marked 1, 2, 3 and L, to represent the first, second and third, ordinary

year and the leap year, and the space between the 1 and the 2 comprises 24 of the teeth of the ratchet wheel, the space 2 and 3, also 24, the space between 3 and L, also 24 and the space between L, and 1, only 23, teeth, and each space is marked with the names of the months, the names of the long months being marked once and those of the short months twice in each space, and it will be noticed that no interval exists between the name of a long month and the next succeeding name, whereas 3 spaces are left empty between the February of the ordinary years and March, two between the February of the leap year and March, one space between April and May, one between June and July, one between September and October and one between November and December.

Motion is imparted to the year wheel C, through the agency of a double armed bent lever *h*, *i*, which has its fulcrum on a pin *j*, and to which a rocking motion is imparted by a single tooth *k*, which is inserted into the circumference of the month wheel D. A pawl *l*, which is inserted into the arm *i*, of the lever *h i*, engages with the teeth of the ratchet wheel H, and the position of the lever *h i*, is governed by a pin *m*, which is inserted into the arm *h*, of the lever *h i*, and which sweeps over the circumference of the year wheel C, being kept in contact with said circumference by a weight attached to the arm *i*, or by any other suitable means, such as a spring.

The manner in which the daily motion of the month wheel D is governed by the pin *e*, on the bell crank lever *b c*, and the monthly motion of the year wheel C, by the pin *m*, on the bent lever *h*, *i*, is as follows: The pin *e*, sweeps over the circumference of the lower disk G of the year wheel and if this circumference would be made smooth and even, the pawl *f*, would take one tooth at the end of every 24 hours and no allowance would be made for the variation of the length of the different months. In order to produce the required variations in the motion of the month wheel, the disk G, is provided on its circumference with 20 grooves *n*, *n′*, and *n** of unequal depth (see Fig. 3,). It is obvious, that if the pin *e*, sinks down into one of these grooves, the upper end of the lever *b c*, is brought in contact with the pin *a*, at an earlier stage of the revolution of the wheel A, than if the pin *e* rests on the projections between said grooves and the pawl *f*, which is so adjusted that it takes only one tooth of the month wheel D, if the pin *e*, is on one of the projections between the grooves *n*, *n′*, *n**, will take 2 or more teeth of said month wheel, if the pin *e*, drops down in one of the grooves, the number of teeth being governed by the depth of the grooves. Each quarter of the circumference of the disk contains 5 grooves, four marked *n* to represent the four months of 30 days and one to represent the month of February. Three of these latter grooves are marked *n′* and represent the month of February in ordinary years and the last one marked *n**, represents the month of February of a leap year. The grooves *n*, are all of the same depth so that if the pin *e*, sinks down to the bottom of one of these grooves, the pawl *f*, turns the month wheel D, two teeth and the grooves *n′*, are so adjusted that if the pin *e*, sinks down to their bottom, the pawl *f* takes four teeth of the month wheel D, and the groove *n**, is so adjusted that if the pin *e*, sinks down to its bottom the pawl *f* takes three teeth of the month wheel. Thus at the end of a month of thirty days the month wheel will be propelled two teeth and skipping over the figure 31, will bring the figure 1 before the respective apertures in the face of the clock immediately after the figure 30. In the same manner, by turning the month wheel at the end of the month of February of an ordinary year over the space of four teeth, the figures 29, 30, and 31, are passed over and the figure 1, is brought in view immediately after the figure 28, and at the end of the month of February of a leap year, the figures 30 and 31 are skipped over and the figure 1, is brought opposite the respective aperture in the face of the clock immediately after the figure 29. By these means the motion of the month wheel is regulated according to the varying length of the different months.

The motion of the year wheel C, on the other hand is regulated by a series of grooves *o o′*, *o**, in the circumference of the upper disk F, (see Fig. 2.) These grooves govern the position of the lever *h i*, and it will be easily understood by referring to Fig. 1, that the end of the arm *i*, is brought in contact with the single tooth *k*, at an earlier stage of the revolution of the month wheel if the pin *m*, sinks down into one of the grooves *o*, *o′*, *o**, and later if the pin is raised on one of the projections between said grooves. The pin *m*, is so adjusted, that, if the same stands on the top of one of the projections between the grooves *o*, *o′*, *o**, the pawl *l*, turns the year wheel one tooth whenever the tooth *k*, at the end of the month is brought in contact with the end of the arm *i*, and the disk F, is so adjusted that the pin *m*, stands on one of the projections between the grooves *o*, *o′*, *o**, during each of the long months so that at the end of each of these months the year wheel is turned only one tooth. By this motion the name of the long month, which during the entire duration of said month stood opposite the respective aperture in the face of the clock, is brought out of sight and the name of the next succeeding month comes opposite the aperture in the face of the clock. If this month happens

to be again a long month, the projection between the grooves o, o', o^*, which kept the pin m up, is made wide enough to prevent said pin sinking down in one of the grooves o, o', o^*, and at the end of this month the year wheel C, is again turned only one tooth as before. But if the succeeding month happens to be a short month, the year wheel, as it moves one tooth at the end of the long month is brought in such a position, that the pin m, is allowed to sink down into one of the grooves o, o', o^*, and by this motion the lever h, i, is so adjusted that the tooth k, comes in contact with the arm i, of said lever on the last day but one of the month and the year wheel is turned one tooth as the month wheel by the action of the pawl f, is turned from the last day but one to the last day of the month. This motion would throw the name of the month out of sight if it had not been marked on two consecutive spaces of the face of the year wheel and during the last day of such a month the second one of the two names of said month appears opposite the aperture in the face of the clock, whereas on the preceding days the first name had been visible. At the same time, by moving the year wheel one tooth at the end of the last day but one of each short month, the pin e, of the bell crank lever b c, which during the previous days of said month stood on one of the projections between the grooves n, n', n^*, in the disk G, is allowed to drop into one of these grooves, thereby causing the pawl f, at the end of the last day of the month to take two or more teeth of this month wheel D, and to move this wheel far enough to bring the number 1, on its face opposite to the respective aperture in the face of the clock. Besides this the effect of this increased motion of the month wheel on the lever h i, is such, that by the action of the tooth k, on the arm i, of said lever the year wheel is moved two or more teeth thus causing the same to skip over the empty spaces between the names of the months on its face, and bring the name of the next succeeding month opposite their respective aperture in the face of the clock.

The grooves o, o', o^*, are arranged on the circumference of the disk F, similar to the grooves n, n', n^*, on the disk G. The four grooves o, on each quadrant of the disk F, represent the motion of the year wheel at the end of those months which contain 30 days, the grooves o', represent the motion of the year wheel at the end of the month of February in ordinary years, and the groove o^*, represents the motion of the year wheel for the month of February on a leap year.

By these means the motion of the year wheel and of the month wheel is controlled altogether by the grooves in the disks F, and G, and by adding 3 wheels and two levers to the clock movement the days of the week, the days of the months, the names of the months and the years together with all the changes necessary by the varying length of the months and of the years are produced. In order to show also the date of the year, I have attached to the circumference of the year wheel, four pins p, which by coming in contact with the pins q, of the registering wheel I, produce a motion of this wheel at the end of every year. The wheel I, represents the unit wheel and it connects by suitable cogs with the wheels J, K, L, etc. which represent the tens, the hundreds, the thousands etc., of an ordinary registering apparatus. The faces of these wheels are marked with the appropriate figures from 0 to 9, and suitable apertures in the face of the clock exhibit those figures, a combination of which constitutes the date of the year.

The simplicity of this calendar movement is unsurpassed; it can be made with little trouble and if once a correct pattern has been made of the several parts of the year wheel, it can be cast and put together at little expense, and all the parts are so constructed, that it can not easily get out of order.

What I claim as new and desire to secure by Letters Patent, is—

1. The arrangement and combination of the year wheel C, with grooves n, n', n^*, and o o' o^* or their equivalents, the month wheel D, the levers h i, and b c, the pins m, and e, and the pawls l and f, constructed and operating substantially in the manner and for the purpose herein described.

2. The arrangement of the grooves n, n', n^*, pin e and pawl f, substantially as set forth for the purpose of controlling the motions of the month wheel according to the variations in the length of the months.

3. The arrangement of the grooves o, o', o^*, pin m and pawl l, substantially as herein specified for the purpose of controlling the motions of the year wheel.

4. The manner in which the names of the months are arranged on the face of the year wheel, viz., marking the name of each long month once, and the name of each short month twice in two consecutive spaces as and for the purpose set forth.

5. The employment of the year wheel C, constructed substantially as herein specified for the purpose of controlling its own motion and that of the month wheel D.

THOMAS T. STRODE.

Witnesses:

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