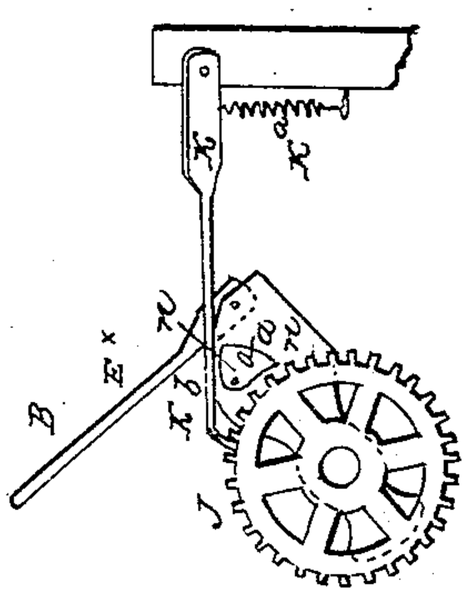
H. B. HORTON.

Calendar Clock.

No. 57,510. Patented Aug. 28, 1866.



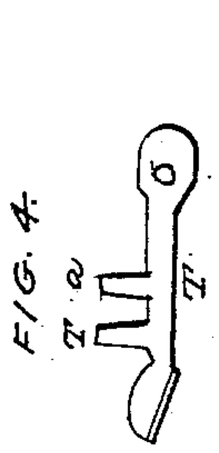
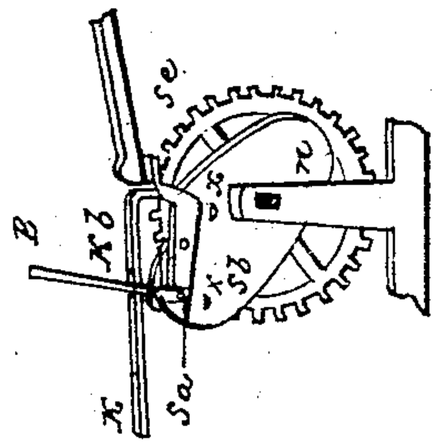
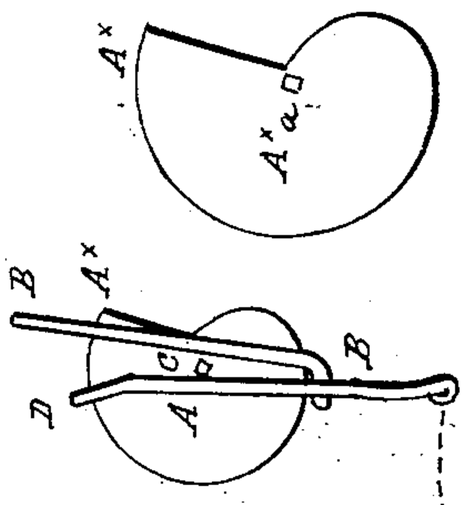


FIG. 4.





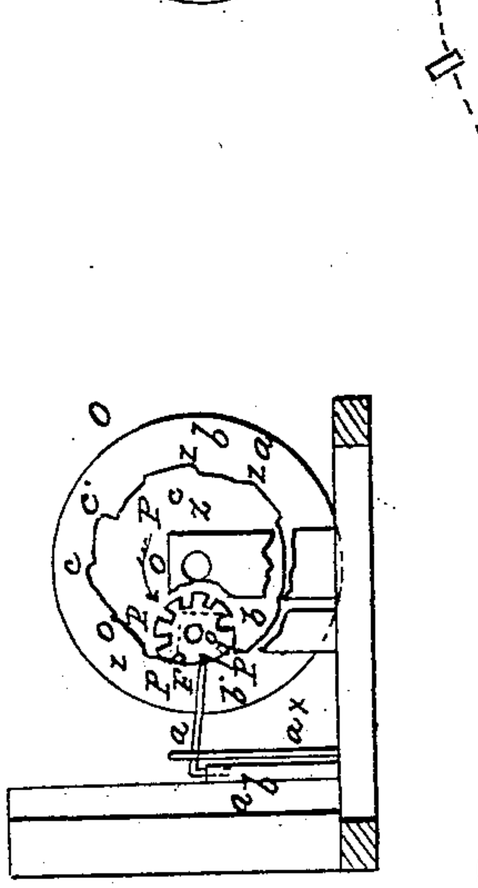


FIG. 3.

WITNESSES:

Samuel J. Parker

O. M. Bruch

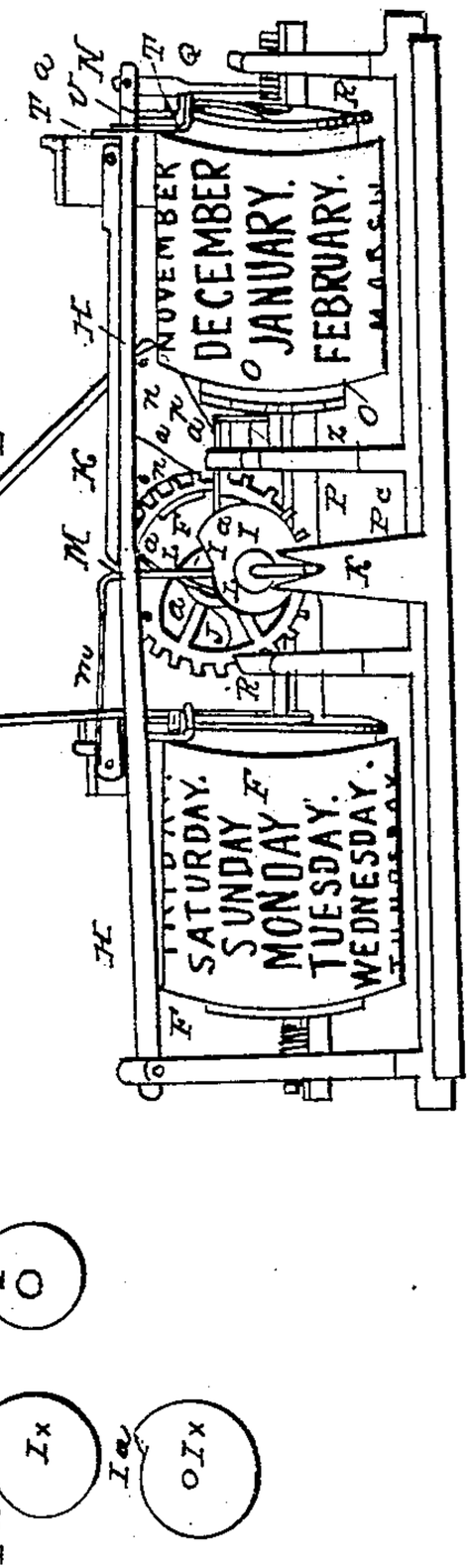


FIG. 1.

FIG. 2.

INVENTOR.

Henry B. Horton.

UNITED STATES PATENT OFFICE.

HENRY B. HORTON, OF ITHACA, NEW YORK.

IMPROVEMENT IN CALENDAR-CLOCKS.

Specification forming part of Letters Patent No. **57,510,** dated August 28, 1866.

To all whom it may concern:

Be it known that I, HENRY B. HORTON, of the town of Ithaca, in the county of Tompkins and State of New York, have invented certain Improvements in Calendar-Clocks; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

My general objects are expressed in a patent granted me April 18, 1865, to which this is somewhat supplementary. The letters of reference and parts referred to and terms used are nearly the same as in that patent.

My objects now are, first, to lessen the size of the eccentric that produces the changes in the thirty-one-day and week wheels and simplify the passage of the supernumerary days of the months when they occur; second, to insure greater certainty in the movement of the lever or connecting-rod between the month-cam eccentric and the year mechanism; third, to insure and simplify the devices which cause the changes of leap-year; fourth, to make more certain the movements of the weight-click of the thirty-one-day wheel; fifth, to facilitate the passage of the teeth of the thirty-one-day wheel and fix with more precision its movements. These objects I accomplish as follows: the first by a simple sliding or cam surface at a place on the month-eccentric cam where there was none before; the second by two studs on the pawl of the year-wheel; the third by the use of an eight-year wheel in connection with the year cam-wheel, yet separate from it, with slots in it, in which play both the pin that turns it and a part of the bent rod that acts on the movable cam attached to the thirty-one-day wheel for the purpose of passing the supernumerary days of the months when they occur; the fourth object by placing the click of the weight-lever of the thirty-one-day wheel under the stop-pawl of that wheel, so that it has both its own weight and that of the stop-pawl and its spring to act on it, and also so shaping its upper surface as to act as a cam and keep the weight-click and stop-pawl in constant mutual relation to each other; and the fifth by the use of a lever attached to the thirty-one-day-wheel weight-lever, which has the bent rod from the day-eccentric attached to the power end of it, and by its fulcrum is fast to the weight-lever, and on its weight end has a cam-surface that acts on the lower point or end of the stop-pawl of the thirty-one day wheel. This is seen in the drawings, where Figure 1 is a perspective view, and Figs. 2, 3, and 4 are parts of my devices.

In Fig. 1, A *a* is a twenty-four-hour cam for the rod B, bent about the said cam, so made that the fall of the said rod from the point D off of its extreme edge A *x* is graduated for four days motion of the thirty-one-day wheel J—that is, the rod at D falls off the point A *x* down one-fourth of the distance of the straight line from A *x* toward the center A *a* in every day of a month which has thirty-one days, and one-half of the said distance in each month of thirty days, and the whole distance in every February of twenty-eight days. This is a large and somewhat inconvenient eccentric. To lessen it I have put part of the work on the month-eccentric I by beveling the surface I *a*, and thus the eccentric A is made a day less than A *a*, for the surface I *a* revolves the thirty-one-day wheel one day. At I, Fig. 2, is seen the cam before my device was added to it, and at I *x* with my inclined surface.

In Fig. 1 is also seen the eight-year wheel P, which can be made for four, eight, twelve, sixteen, or more years, though an eight-year wheel is perhaps the most convenient. The pin P *c* projects from the year-wheel, and once a year entering one of the slots in the eight-year wheel, turns it the distance of one-eighth of its circumference. The action of this wheel is more clearly seen in Fig. 2, where at P is seen an eight-year wheel separate by itself. In it are eight slots, one for each year, making it have but one revolution in eight years. At P *a* and P *a* are two of the spaces between the slots, with depressions cut out in them. The rest of the circumference, though divided by slots, is plain.

In Fig. 3 these same peculiarities are also seen, and in a slot in one side of the wheel lies the bent rod *a*, that aids in clearing the thirty-one-day wheel of its supernumerary days, which bent rod acts as a pawl or stop to the eight-year wheel; and in a slot on the oppo-

site side of the wheel plays once a year the pin P *c* of the year-cam, as indicated by the arrow. The periphery or circumference of the eight-year wheel is divided into eight parts, the uses of which are as follows: In the plain parts of the periphery, (marked P *b*, P *b*, &c.,) six in number, the use is to carry the bent rod *a* over the depression in the year-cam Z between the letters *c* and *c'*, which is the highest part of its circumference and is the February portion of the year-cam; and the other parts of the periphery of the eight-year wheel, two in number, (marked P *a* and P *a*,) have depressions in them a little deeper than in the year-cam Z. They are so shaped that, as the two wheels P and Z revolve, these two parts P *a* and P *a* of the wheel P do not act on the bent rod *a*, for the said rod acts on and rests on the year-cam Z, and follows the February surface of that cam from *c* to *c'*, and thus the eight year wheel allows but does not cause the month of February to have twenty-nine days in leap-year.

To show and explain this more clearly, at O, Fig. 3, is the cylinder on which are the names of the months of the year, and Z is the year-cam that controls the movement of the cylinder, having the spaces Z *a* and Z *a*, &c., for the months of thirty-one days, and *c c'* the space for February, and the spaces Z *b* and Z *b*, &c., for months of thirty days. The depression in *c c'* is for leap-year. The eight-year wheel P is divided in its periphery into eight parts—six marked P *b* and two marked P *a*—and has eight slots in it, and the bent rod *a* running from the post *a b*, in which it is hinged, is, on its way, acted on by the spring *a x*, and rests in a slot in the eight-year wheel, where its use is that of a pawl or stop to the said wheel. As the pin P *c* enters the slot indicated by the arrow, the prominence *c* on the February part of the year-cam throws out of its slot in the eight-year wheel the bent rod *a*, and the pin P *c* fixes the eight-year wheel so that it cannot move except as propelled by the said pin, which is the only means by which it revolves. As the pin P *c* finishes its office in turning the eight-year wheel one-eighth of its revolution, or the distance it moves in a year, the bent rod *a* enters the next slot of the eight-year wheel, which then comes within its reach, so that at no instant is the said wheel without control of its motion. In this slot the bent rod remains until the February cam-surface again comes round, having only the minor variations, while in the slots caused by the thirty and thirty-one-day parts of the cam Z, which do not throw it out of its slot. Thus year after year goes on as this device acts.

It will be seen that when any one of the six plain parts of the eight-year wheel comes in contact with the bent rod *a* it slides that rod over the depression in the February-cam between *c* and *c'*, and thus February has that year twenty-eight days; and when either of the two parts of the wheel P (marked P *a*) comes near the rod *a* the said rod does not touch these parts of the eight-year wheel, but the bent rod *a* rests on and is moved by the February-cam surface *c c'* of the cam Z, and thus February in those years has twenty-nine day, or is leap-year.

In Fig. 1 the action of the thirty-one-day-wheel lever *n* and its pawl *n a* is partly manifest. But in Fig. 4 this is more clearly seen, where E *x* is the part of the twenty-four hour rod B that comes from the connecting-eye and the time-cam, (marked E and A, Fig. 1.) The weight-lever *n* falls in all cases at least one-fourth of the capacity it has, and in other cases the other parts of the capacity of the cam, as has been described.

Now, to render the action on the thirty-one-day wheel more sure, I shape the upper part or surface of the pawl or click *n a* so that it is always in contact with the under side of the stop-pawl K, and thus it receives the action of that pawl and its spring K *a*, and is thereby rendered certain in its action on the teeth of the thirty-one-day wheel.

To render the movement of the thirty-one-day wheel still more precise, I attach to the back part of the weight-lever *n* another lever, which subserves another end. This other lever is seen at S in the lower right-hand figure of Figs. 4. At S *a* is fastened to this lever the rod B from the twenty-four-hour cam A, Fig. 1. This lever has its fulcrum at S *b*. At S *c* the weight end of the lever is a rounded cam-surface that at times acts on the stop-pawl K. Two pins in the weight-lever *n*, at *x* and *x*, one at each end of the lever, limit its motions. Its action is, that when the rod B is drawn upward the weight end of the lever S rests on the pin *x*, and then there is no action on the stop-pawl K; but when the rod B falls off of the twenty-four-hour eccentric A, Fig. 1, the lever S is depressed, and in the act of being depressed it acts on the end of the stop-pawl K by its cam-surface S *c*, and throws that stop-pawl over one tooth of the thirty-one-day wheel. It must be also observed that this lever S also acts in harmony with the weight-click *n a* and the movable cam L, Fig. 1, of the thirty-one-day wheel, and by the latter aids in the passage of the supernumerary days of the thirty-one-day wheel when they occur. The effect of the lever, in connection with the other levers and pawls, is that the thirty-one-day wheel is at no instant without control, and its motion is therefore at all times with precision.

The same device, by mere mechanical arrangement, will raise or tilt the stop-pawls of the day-of-the-week wheel over its teeth, and also of the year cylinder or wheel over its teeth—a device so plain as to need no further description; and still further to aid in these adjustments, the said stop-pawls can be pivoted at various points, so that they will be either raised or tilted over the teeth of the said wheels.

In Fig. 1, at T *a*, are seen two points or studs rising from the pawl T of the year-cylinder.

This is seen more clearly at T *a* on T in Figs. 4, where T is the said pawl or stop, and T *a* are the two points or studs, having a slot or space between them, in which rests the lever H, Fig. 1, that moves the year mechanism O, Fig. 1, by the month-cam I, Fig. 1. The object of this is to prevent all extreme motion or variations in this lever, which it does.

The other parts and uses of my clock are indicated in my patent above alluded to, being the same or equivalents thereunto, and both there and in this specification are sufficiently apparent to those skilled in the art to which they appertain.

I claim—

1. The cam or sliding surface on the month-cam I, for the purpose of sliding or revolving the thirty-one-day wheel the distance of one day, for the objects described, and the said surface for one day's advance of the said wheel, for any other purpose connected with the supernumerary days of a calendar-clock.

2. Making a four, eight, twelve, or more year wheel, containing virtually the uses and position of the wheel P, moved by the pin or part P *c*, or equivalent, and controlled by the bent rod *a*, or equivalent, and its surfaces P *a* and P *b*, &c., as described; also, the wheel P, when made of eight slots, six plain and two irregular surfaces, as described, or other correlative number of parts, periphery, slots, and surfaces, when made substantially as described; also, the February-cam *c c'*, constructed on the year-cam Z for leap-year, as described, both when used in combination with the wheel P and when used with any other device or mechanism in place of the wheel P.

3. The immediate contact or other suitable connection of the pawl *n a* with the pawl K, for the purpose of rendering its action more sure, as described, and the so shaping the upper surface of the pawl *n a* as to act as a cam-surface with the pawl K, and thus be in mutual relation at all times to each other, as described.

4. Attaching the lever S to the weight-lever *n* in such a manner as to receive the action of the eccentric A by the rod B, and by its cam-surface S *c* carry the pawl K over the teeth of the thirty-one-day wheel, as described; also, the lever S, or its equivalent, for the purpose of raising a pawl over one tooth of the thirty-one-day wheel, and also of the year-wheel and of the day-of-the-week wheel while in the act of making their changes; also, the rising or tilting of the stop-pawl K, or correlative pawls of the week and year wheels, over the teeth acted on by the same, when produced by the fall, in changing, of their respective rods or levers.

5. Making the pawl T with a slot in it for receiving the lever of the month-cam, thus simplifying and making more sure in action the devices connected therewith.

HENRY B. HORTON.

Witnesses:

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