(No Model.)

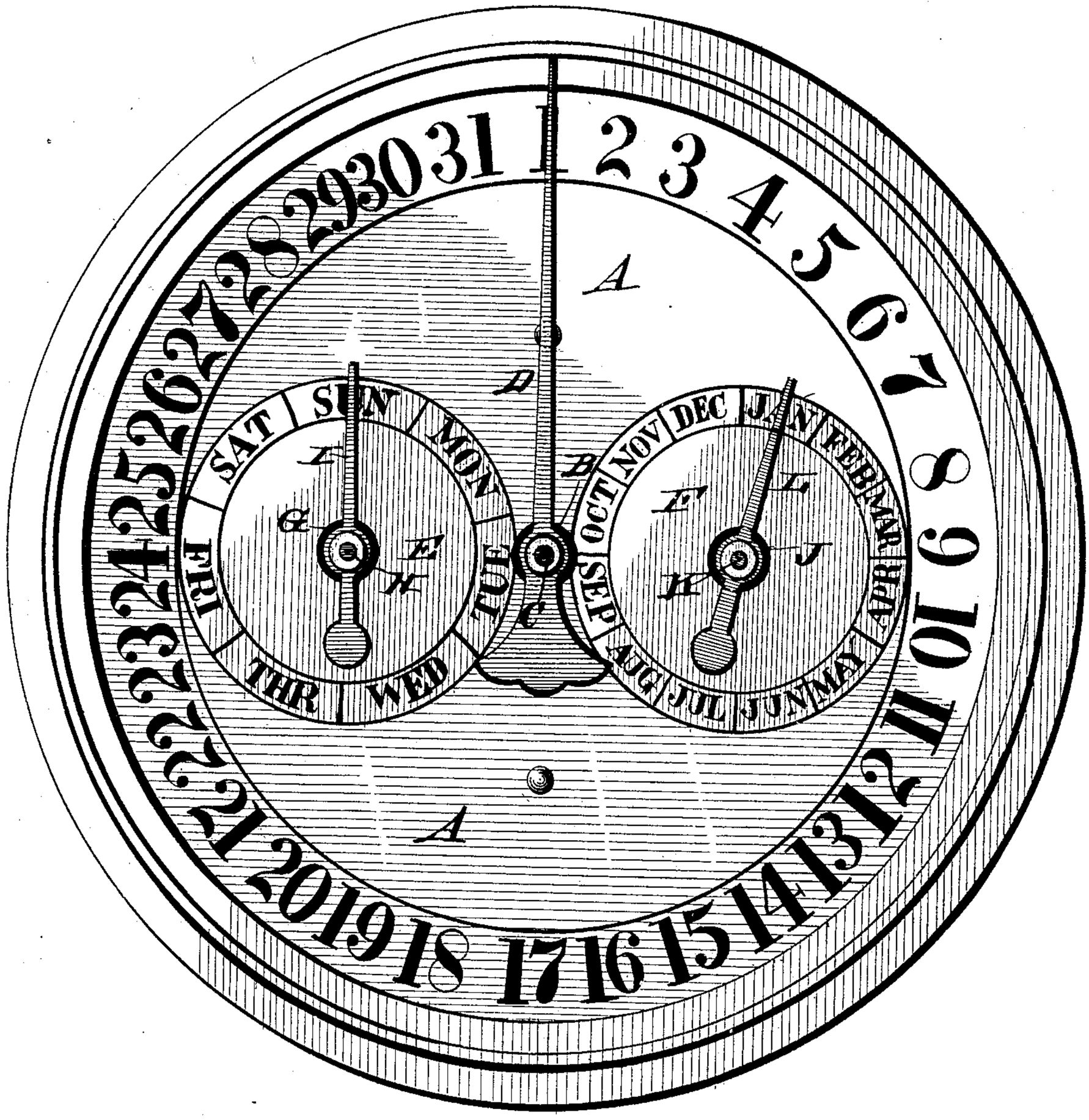
3 Sheets—Sheet 1.

D. J. GALE.

CALENDAR CLOCK.

No. 316,254. Patented Apr. 21, 1885.

Fig. 1.



WITNESSES:

Fred. L. Dieterich.

Wm. J. Decker

Daniel J. Gale

INVENTOR.

By Louis Bagger & Co

ATTORNEYS.

(No Model.)

3 Sheets—Sheet 2.

D. J. GALE.

CALENDAR CLOCK.

No. 316,254. Patented Apr. 21, 1885.

Fig. 2.

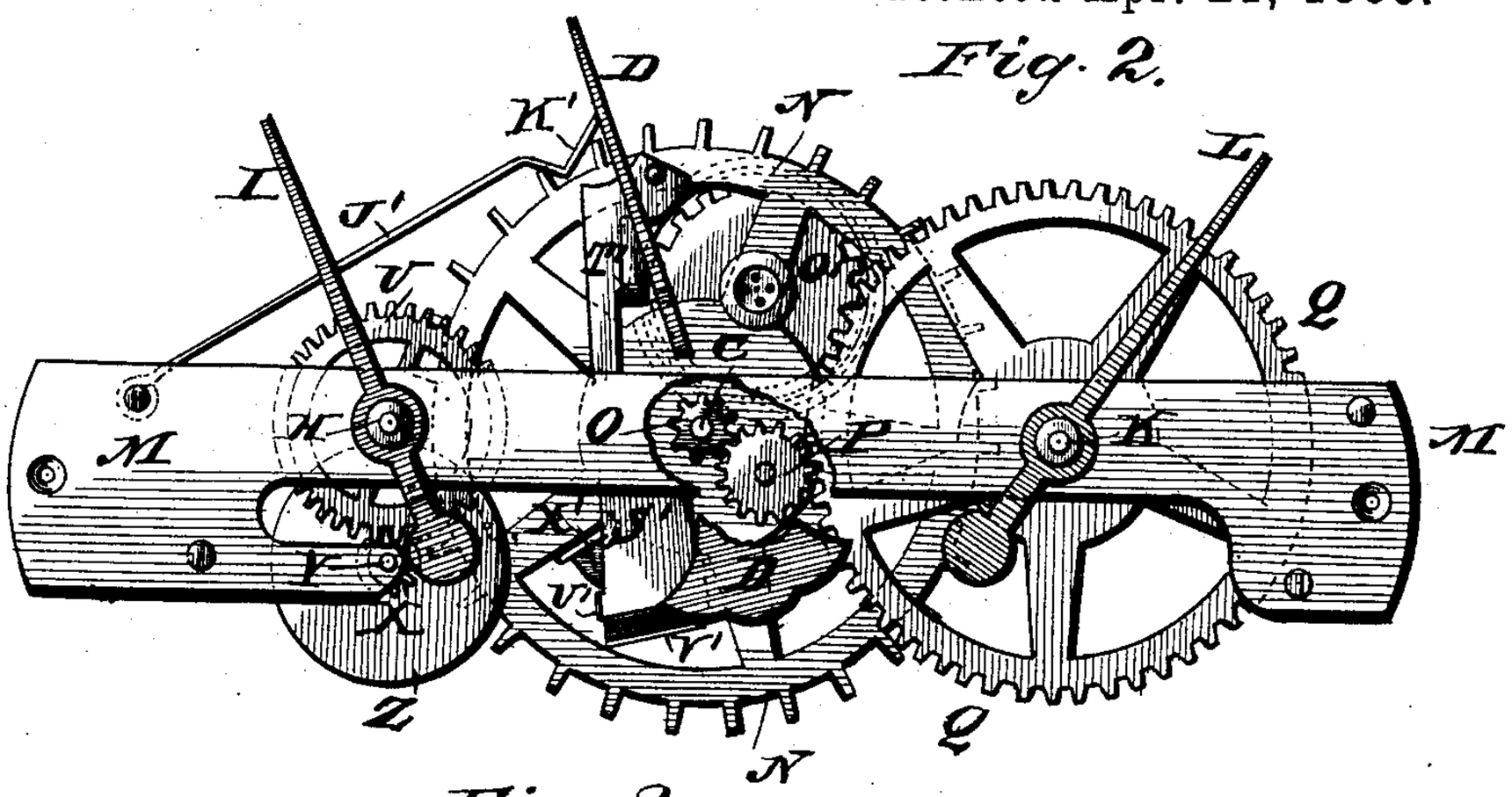


Fig. 3.

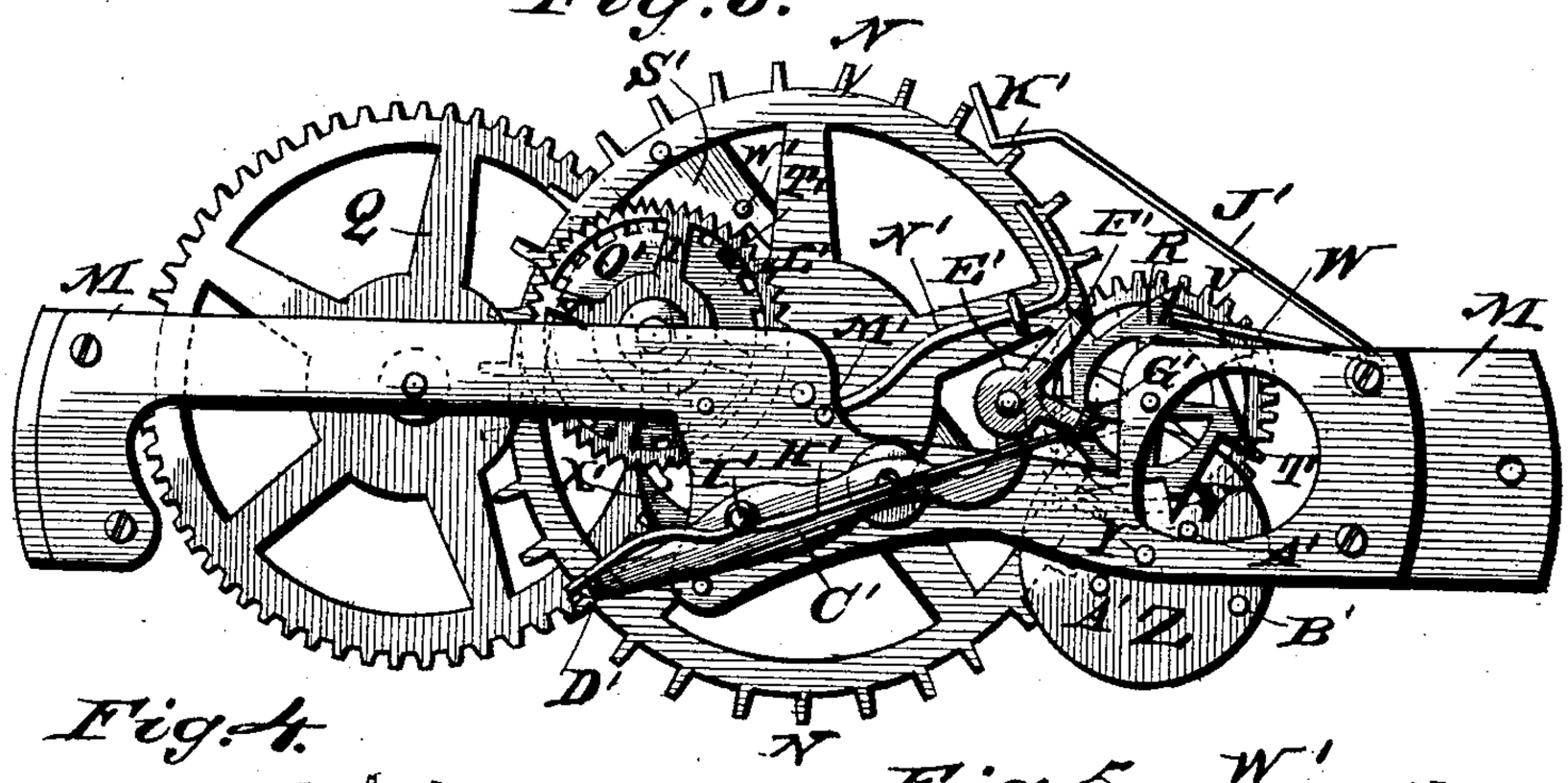


Fig. 4.

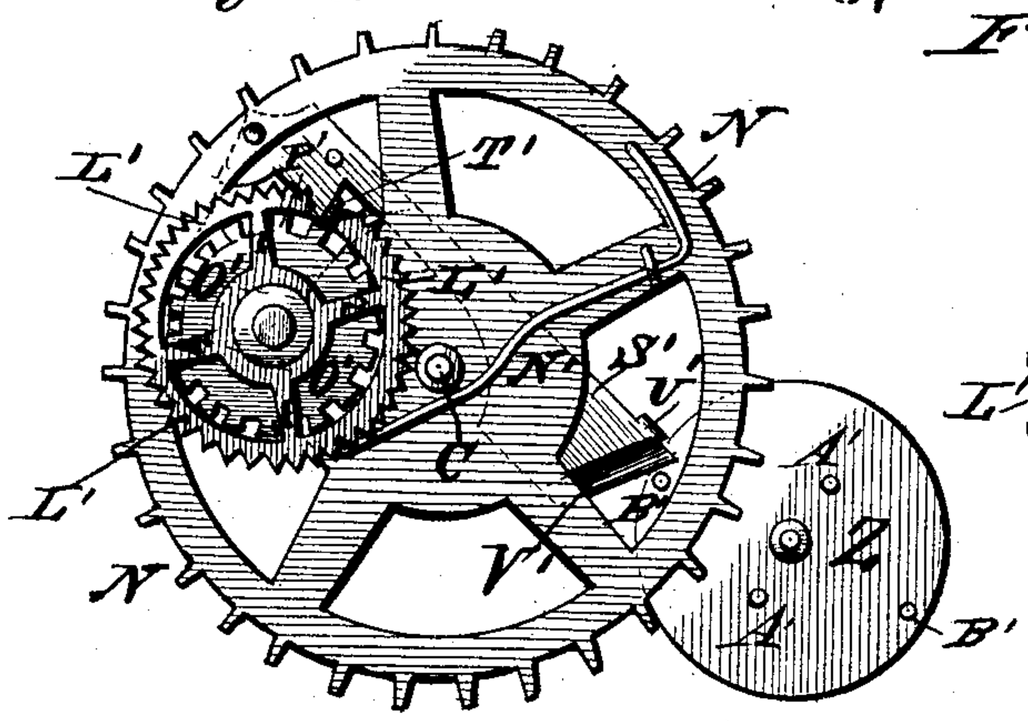
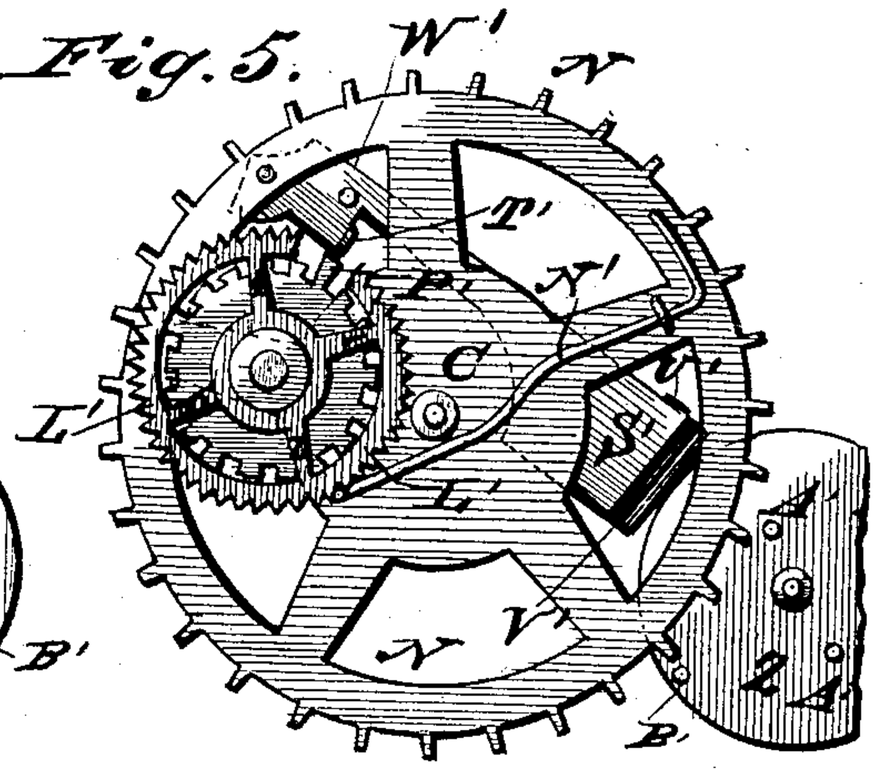


Fig. 5.



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(No Model.) 3 Sheets—Sheet 3.

D. J. GALE.

CALENDAR CLOCK.

No. 316,254. Patented Apr. 21, 1885.

Fig. 6.

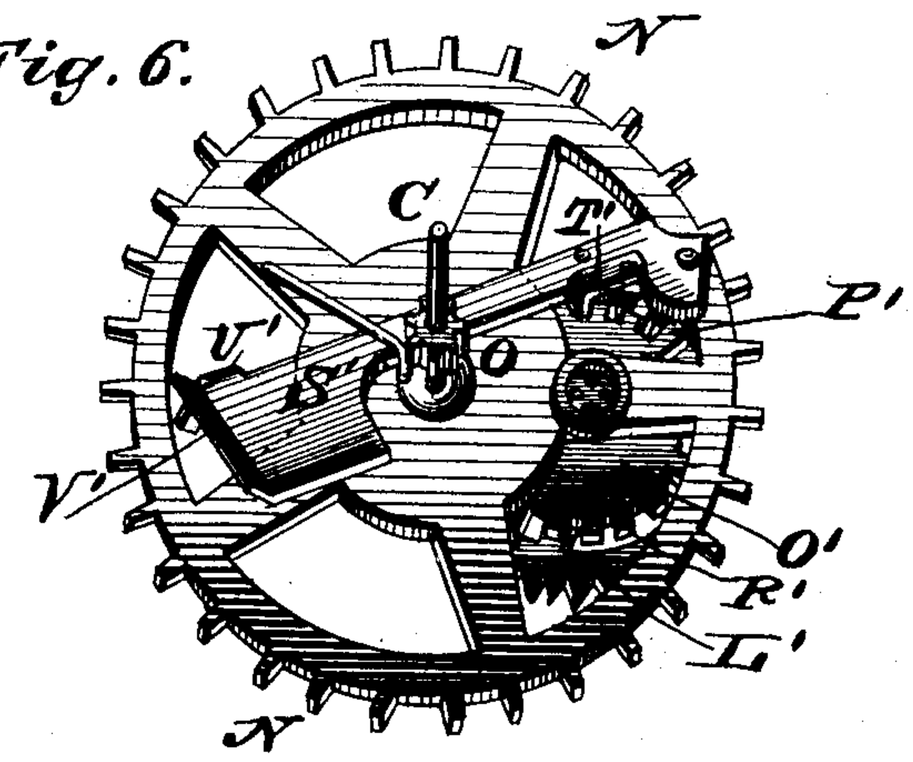


Fig. 7.

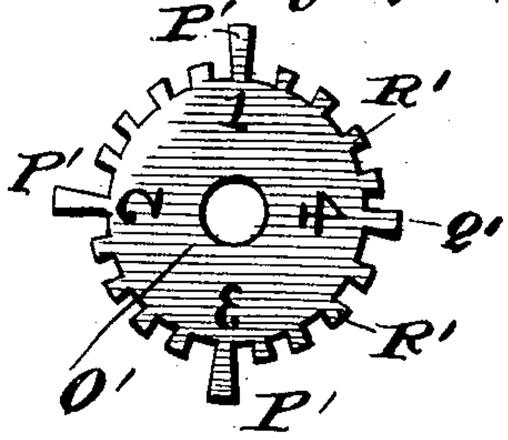


Fig. 8.

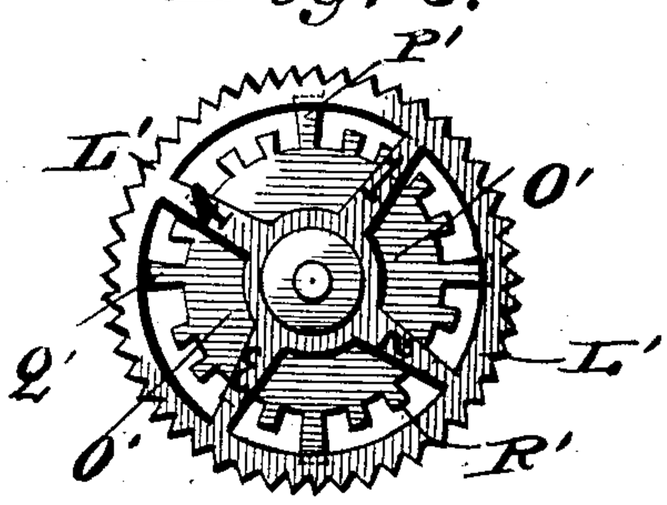
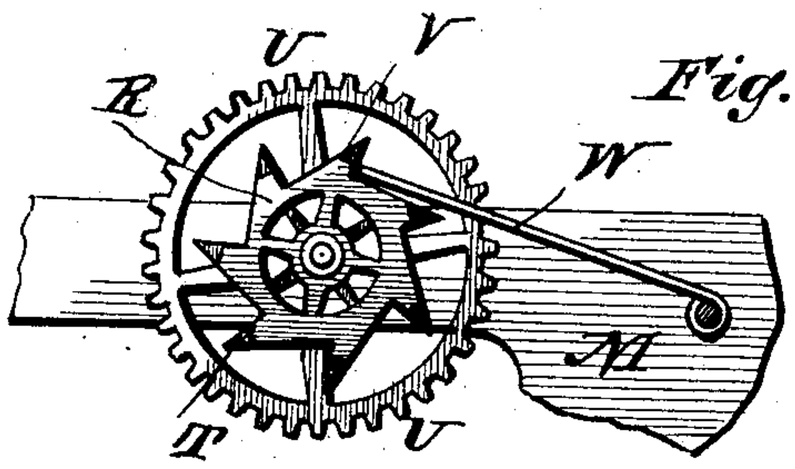
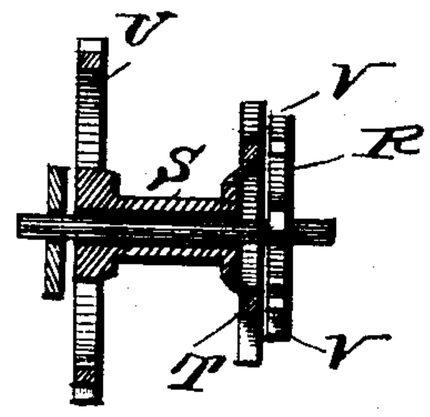


Fig. 9.





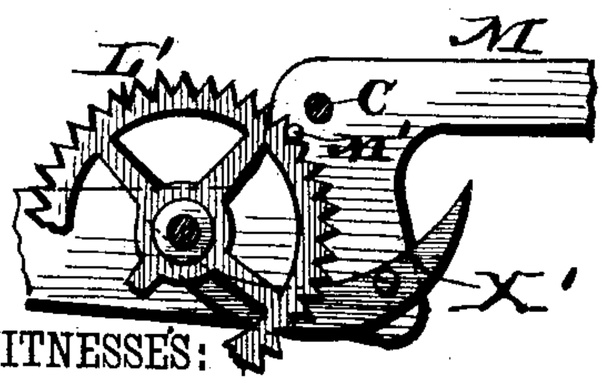
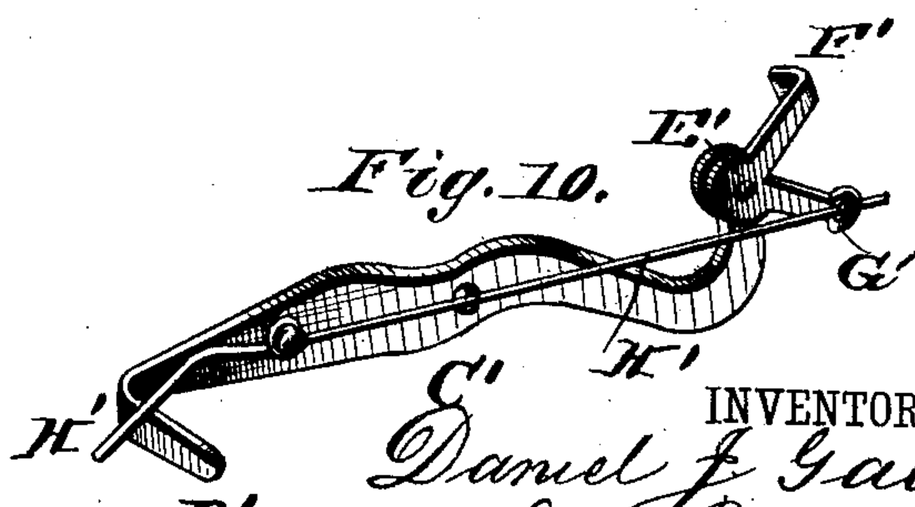


Fig. 10.



WITNESSES:

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UNITED STATES PATENT OFFICE.

DANIEL JACKSON GALE, OF BRISTOL, CONNECTICUT.

CALENDAR-CLOCK.

SPECIFICATION forming part of Letters Patent No. 316,254, dated April 21, 1885.

Application filed December 22, 1884. (No model.)

To all whom it may concern:

Be it known that I, DANIEL J. GALE, a citizen of the United States, and a resident of Bristol, in the county of Hartford and State of Connecticut, 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 invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification, and in which—

Figure 1 is a face view of the dial for my improved calendar-clock. Fig. 2 is a front view of the works of the same. Fig. 3 is a rear view showing the "short-month" lever in position to allow the day-of-the-month wheel to travel forward, moving only its regular space of one day. Figs. 4 and 5 are rear views of a portion of the works, showing the short-month lever in position to move the day-of-the-month wheel respectively past one day-space and three day-spaces, as in a month having thirty days and in a month having twenty-eight days. Fig. 6 is a perspective detail view of the day-of-the-month wheel and its appurtenances. Fig. 7 is a view of the pattern-wheel. Fig. 8 is a view of the planet-wheel and the pattern-wheel. Fig. 9 is a view of the ratchet-shaped day-of-the-week wheels and their spring-pawl, and Fig. 10 is a view of the lifting-lever.

Similar letters of reference indicate corresponding parts in all the figures.

My invention has relation to that class of calendar-clocks in which the calendar mechanism is placed in a separate frame below the clock-works proper, connected to the same by means of a rod or similar means; and it consists in the improved construction and combination of parts of such a calendar mechanism in which the works automatically adapt themselves to the additional day in February of leap-year, as hereinafter more fully described and claimed.

In the accompanying drawings, the letter A indicates the dial, which has the days of the month inscribed around its periphery, having a perforation, B, at its center for the passage of the day-of-the-month shaft C, which carries the day-of-the month hand D, and two dials, E and F, are marked at both sides of the central perforation of the dial, one, E, having the days of the week inscribed in its periphery, having a central perforation, G, for the day-of-the-week shaft H, which carries the day-of-the-week hand I, while the other small dial, F, has the months of the year inscribed in its periphery, and has a central perforation, J, for the passage of the month-shaft K, carrying the month-hand L.

The day-of-the-month shaft, the day-of-the-week shaft, and the month-shaft are journaled in bearings in a frame, M, suitably supported in the clock-case, and the day-of-the-month wheel N, which is provided with thirty-one equidistant teeth or cogs, is secured upon the day-of-the-month shaft, and has a pinion, O, which meshes with another pinion, P, which again meshes with the month-wheel Q, the pinions and wheel having a number of teeth or cogs, which will cause the month-wheel to revolve once while the day-of-the-month wheel has made twelve revolutions.

The day-of-the-week shaft has a ratchet-wheel, R, provided with seven teeth secured upon it, and has a sleeve, S, turning upon it, one end of which sleeve is provided with a seven-toothed ratchet-wheel, T, which corresponds in size and location of teeth to the ratchet-wheel R, while the sleeve is provided at the other end with a cog-wheel, U. The ends of the teeth of the wheel upon the day-of-the-week shaft are cut off, making them slightly shorter than the teeth of the wheel T, as shown at V, and the two ratchet-wheels are prevented from being revolved backward by a flat spring, W, engaging them with its free end, and it will be seen that the day-of-the-week shaft and its ratchet-wheel may be revolved forward without interfering with the ratchet-wheel T, the shorter teeth upon the wheel R allowing it to slip under the spring-pawl without raising the said pawl so far as to allow the other wheel to move.

The cog-wheel U engages a pinion, X, upon a shaft, Y, carrying the drive wheel or disk Z, the cog-wheel and the pinion having such a number of teeth that the drive-disk will make one half-revolution for each tooth upon the ratchet-wheels.

The drive-disk has two diametrically-opposite pins, A′, upon its face, which engage the

teeth of the day-of-the-month wheel, and two diametrically-opposite shorter pins, B′, placed nearer to the periphery of the disk and slightly in advance of the longer pins, A′, serve to engage the short-month lever when the latter is tilted out upon the day-of-the-month wheel, as will be more fully described hereinafter.

C′ is the lifting-lever, which is pivoted upon the frame and has one end bent outward, as shown at D′, which end is engaged by a rod, pitman, or other suitable connection projecting downward from the clock-works, serving to raise the bent end of the lifting-lever once in every twenty-four hours.

A bell-crank-shaped lever, E′, is pivoted upon the other end of the lifting-lever, and has its upper arm, F′, bent inward and engaging the teeth of the ratchet-wheels P and T, moving the said wheels the space of one tooth every time the lifting-lever is tilted and the bell-crank lever pulled down, and the lower arm of the said bell-crank lever is formed with an eye, G′, into which the end of a spring-wire, H′, projects, the other end of which wire is twisted around a stud, I′, and thereupon placed to bear against the outwardly-bent end of the lifting-lever, the said wire serving to allow the bell-crank lever to slip over the teeth of the ratchet-wheels, and to force the bent end of the lifting-lever downward after it has been raised by the connection to the clock-works.

It will thus be seen that, the lifting-lever being raised at its bent end once in every twenty-four hours, the bell-crank lever upon the end of the said lever will move the day-of-the-week ratchet-wheels one-seventh of a revolution every day, moving the day-of-the-week hand from the inscription of one day upon the day-of-the-week dial to the inscription of the following day, and that the cog-wheel upon the day-of-the-week sleeve S will cause the drive-disk to make one-half of a revolution, causing one of the studs to engage one tooth of the day-of-the-month wheel, and thus to move it one space forward, the hand upon the day-of-the-month shaft moving from one date to the following, a flat spring-pawl, J′, engaging with its angularly-bent end K′ the spaces between the teeth upon the day-of-the-month wheel, and preventing it from either moving too far forward or backward.

By the mechanism described in the foregoing the hands upon the three shafts will be moved forward, the day-hands one space every twenty-four hours, and the month-hand will be moved gradually, so as to pass from the inscription of one month to the inscription of the following month as the day-of-the-month wheel makes one revolution; but the months being of unequal length, and the month of February having twenty-nine days once in every four years, provision must be made for moving the day-of-the-month wheel sufficiently forward at the end of the short months so as to enable the day-of-the-month hand to show the correct date, and this mechanism I will now proceed to describe.

A planet-wheel, L′, having forty-eight teeth upon its periphery, is journaled upon a stud upon one of the arms of the day-of-the-month wheel, the forty-eight teeth corresponding to the number of months in four years, this being the time consumed in one revolution of the planet-wheel, and the teeth of this wheel are engaged once in each monthly revolution of the day-of-the-month wheel by a lug or pin, M′, projecting inward from the frame near the center of the day-of-the-month wheel, thus causing it to move the space of one tooth each month, and for the purpose of preventing the planet-wheel from moving more than the space of one tooth the teeth are engaged by the bent end of a spring-wire, N′, secured upon the face of the day-of-the-month wheel.

A pattern-wheel, O′, is journaled concentric with the planet-wheel upon the same stud between the planet-wheel and the rear face of the day-of-the-month wheel, and is secured to the planet-wheel, and the periphery of the pattern-wheel is cut out to form four equidistant cogs, three of which (marked P′) are of the same length, while the fourth cog, Q′, is somewhat shorter, the four cogs representing the month of February in the four years, and the shorter cog of the four representing the month of February in the leap-year, and between each of the four cogs are four smaller cogs, R′, representing the other short months of each year, the spaces between the November and February cogs and between the July and August cogs being equal to two of the spaces between the other cogs. The planet-wheel and the pattern-wheel have the figures from 1 to 4 stamped upon their faces at the four cardinal points, the figures registering with each other, and the said figures serve to indicate the number of the year in the cycle of four years, the leap-year being numbered 4, so that in setting the mechanism, when it is to be started, the person setting the same may be able to set the planet-wheel and pattern-wheel at the appropriate month in the proper year.

A flat lever, S′, is pivoted at one end at the periphery of the front face of the day-of-the-month wheel, and has a rearwardly-projecting lug, T′, a short distance from its pivotal point, which lug may rest either in a space between two cogs upon the pattern-wheel or upon the end of one of the cogs, and the lever extends across the face of the wheel, bearing with a rearwardly-projecting lug, U′, at its outer end against the inner edge of the rim of the said wheel, and has its outer end cut off obliquely and bent slightly up, forming an oblique and inclined flange, V′.

A pin or lug, W′, projects rearward from the inner end of the flat lever, and a curved cam-plate, X′, is secured upon the inner side of the rear frame-piece, presenting its convex edge downward, and as the day-of-the-month wheel revolves the said lug or pin upon the lever will slide along the edge of the cam-plate at the lower part of its revolution, when the said

cam-plate will force the pin and the lever to swing out toward the periphery of the wheel, which will disengage the lug T′ from its engagement with the cogs of the pattern-wheel and allow the said pattern-wheel to be revolved, together with the planet-wheel, by the inwardly-projecting lug upon the frame near the bearing for the day-of-the-month shaft. The flat lever, which is the so called "short-month lever," will at the end of a month having thirty-one days rest with its lug in a space between two cogs upon the pattern-wheel, and its oblique flanged end will not project far enough out to be engaged by one of the short pins upon the face of the drive-disk; but at the end of a short month the lug of the lever will rest upon the end of one of the cogs, and its outer flanged end will be projected so far out that it will be engaged by one of the short lugs upon the drive-disk on the end of the thirtieth day, and be carried over the thirty-first day to the first day of the next month, the short pins upon the drive-disk being so much farther from the center of the same, and consequently having a so much longer sweep in a one-half revolution than the longer pins, and consequently carrying the day-of-the-month wheel so much farther forward.

When the lug of the short-month lever rests upon the end of one of the long cogs of the pattern-wheel, which happens on every twenty-eighth of February of the three years falling between leap-years, the lever is projected so much farther out that it will be engaged by the short lug upon the drive-disk sooner than when the lug rests upon one of the shorter cogs, and consequently the day-of-the-month wheel will be revolved sooner than in the other short months, and when the lever rests with its lug upon the leap-year cog the lever will be projected less far than by the other February lugs, but farther than by the short-month lugs upon the pattern-wheel, and the end of the lever will therefore be engaged by the short lug sooner than in the other short months, and not as soon as in February of the other three years. It will be seen that the month-of-the-year hand will be gradually moved as the month wheel and shaft are revolved, and the names of the months inscribed upon the month-dial are therefore separated by means of radial lines, which the hand will cross at the end of each month, the location of the month-hand indicating perfectly what part of the month is indicated by the day-of-the-month hand.

It will be seen that the entire mechanism of this calendar-movement is very simple of construction and not liable to be subject to much wear or to become out of order, by reason of the slow and gradual revolutions of the several parts, as well as by the simplicity of their construction.

The movement may be set to start by turning the month-hand upon its shaft to the month in which the movement is to be started, preferably having the day-of-the-month hand pointing at 1 when the month-hand is pointed at the beginning of the space for the month. The pattern and planet wheel are now set so as to bring the lug of the short-month lever to rest upon its appropriate cog or in its appropriate space in the proper year, the numbers upon the said wheels assisting in finding the proper year, and the day-of-the-month wheel is turned so as to bring the day-of-the-month hand to point to the date when the movement is to be started.

The day-of-the-week shaft and hand may be turned forward independent of the remaining mechanism, as hereinbefore described, by reason of the teeth of the ratchet-wheel upon the shaft being cut off shorter than the teeth of the wheel upon the sleeve, and thus the entire set of hands may be set pointing to their appropriate points, when the movement may be started by connecting it to the clock-movement.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. The combination of the day-of-the-week shaft having the ratchet-wheel R, having the ends of its teeth cut off, the sleeve having the ratchet-wheel T and the cog-wheel U, the drive-pinion X, meshing with the cog-wheel U, the flat spring-pawl W, and the bell-crank-shaped lever E′ F′, pivoted upon the lifting-lever and engaging the registering-teeth of the ratchet-wheels, as and for the purpose shown and set forth.

2. The combination of a driving-disk making one half-revolution each day, and having two long pins upon its face diametrically opposite to each other, and two shorter pins diametrically opposite to each other near the periphery of the disk and slightly in advance of the long pins, the day-of-the-month wheel having thirty-one teeth engaging the long pins upon the driving-disk, a short-month lever pivoted at one end near the periphery of the day-of-the-month wheel, having a lug at its outer end abutting against the inner edge of the rim of the said wheel, and having its outer end provided with an oblique upturned flange engaging the short pins of the driving-disk, and means, substantially as shown, for projecting the flanged end of the short-month lever more or less outward at the ends of the short months, as and for the purpose shown and set forth.

3. The combination of the driving disk having the long pins diametrically opposite to each other upon its face near its arbor, and having the short pins near the periphery diametrically opposite to each other and slightly in advance of the long pins, the day-of-the-month wheel having thirty-one teeth upon its periphery engaging the long pins upon the driving-disk, the short-month lever having the oblique flanged free end abutting with a lug against the inner edge of the periphery of the day-of-the-month wheel, and having the rearwardly-projecting lugs T′ and W′ near its

other end, which is pivoted near the periphery of the day-of-the-month wheel, the planet-wheel having forty-eight teeth, and the pattern-wheel having the three long February cogs, the shorter February cog, and the four short-month cogs in each interval between a February cog, and the inwardly-projecting pin upon the frame of the movement near the arbor of the day-of-the-month wheel engaging the teeth of the planet-wheel once in a month, as and for the purpose shown and set forth.

4. The combination of the day-of-the-month wheel, the planet-wheel having forty-eight teeth, having the pattern-wheel secured to it, and pivoted upon one of the arms of the day-of-the-month wheel, the said pattern-wheel having the differently-sized short-month teeth, the inwardly-projecting pin upon the movement-frame near the arbor of the day-of-the month wheel, the short-month lever having the inwardly-projecting lug engaging the pattern-wheel and the inwardly-projecting lug W′, and the cam-plate secured upon the movement-frame at the lower half of the day-of-the-month wheel, engaging the lug W′ with its curved lower edge, as and for the purpose shown and set forth.

5. The combination, with the seven-toothed day-of-the-week ratchet-wheel, of the lifting-lever pivoted upon the movement-frame, means for raising its bent free end once in every twenty-four hours, the bell-crank-shaped lever pivoted upon the end of the lifting-lever, having its upper arm bent inward to engage the ratchet-wheel, and having its lower arm formed with an outwardly-bent eye, and the spring-wire secured at one end in the eye of the bell-crank lever, wrapped around a stud upon the lifting-lever, and bearing with its other end against the bent end of the lifting-lever, as and for the purpose shown and set forth.

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

DANIEL JACKSON GALE.

Witnesses:

GEORGE W. MITCHELL,

SOLOMON C. SPRING.