No. 890,926. PATENTED JUNE 16, 1908.

A. G. RAYMOND.

COMBINED PERPETUAL CALENDAR AND AUTOMATIC DATE INDICATOR.

APPLICATION FILED MAR. 21, 1906.

4 SHEETS—SHEET 1.

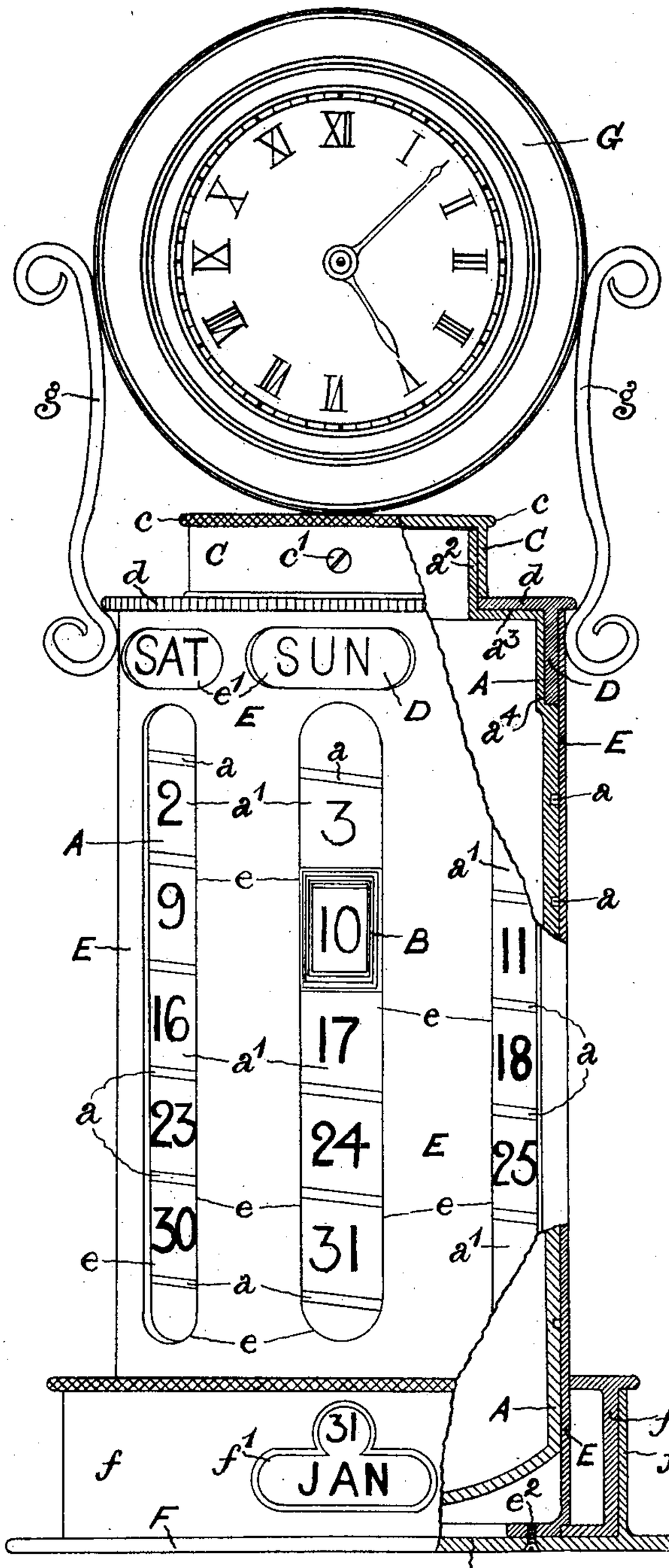

Fig. 1.

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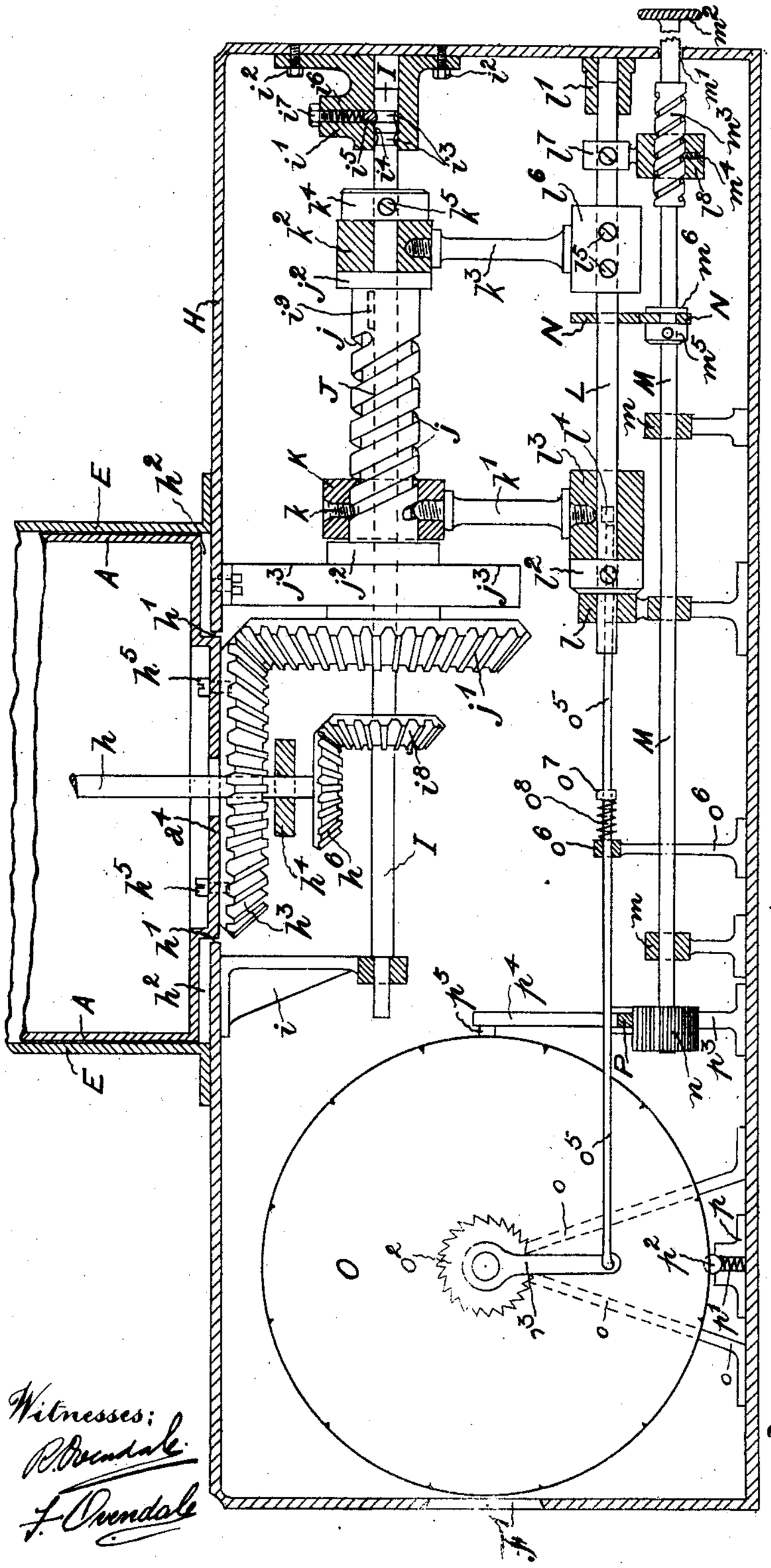

Fig. 2.

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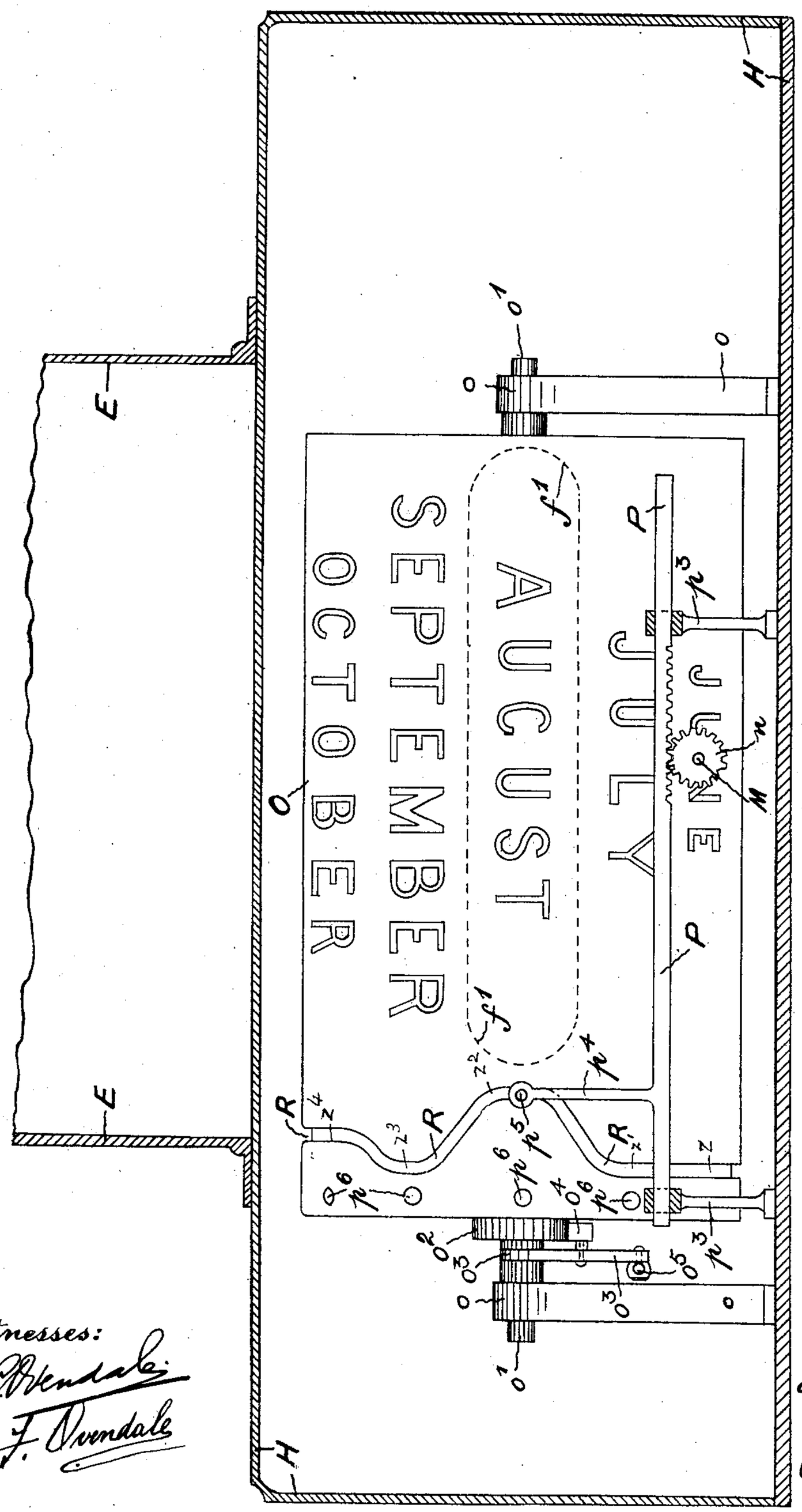

Fig. 3.

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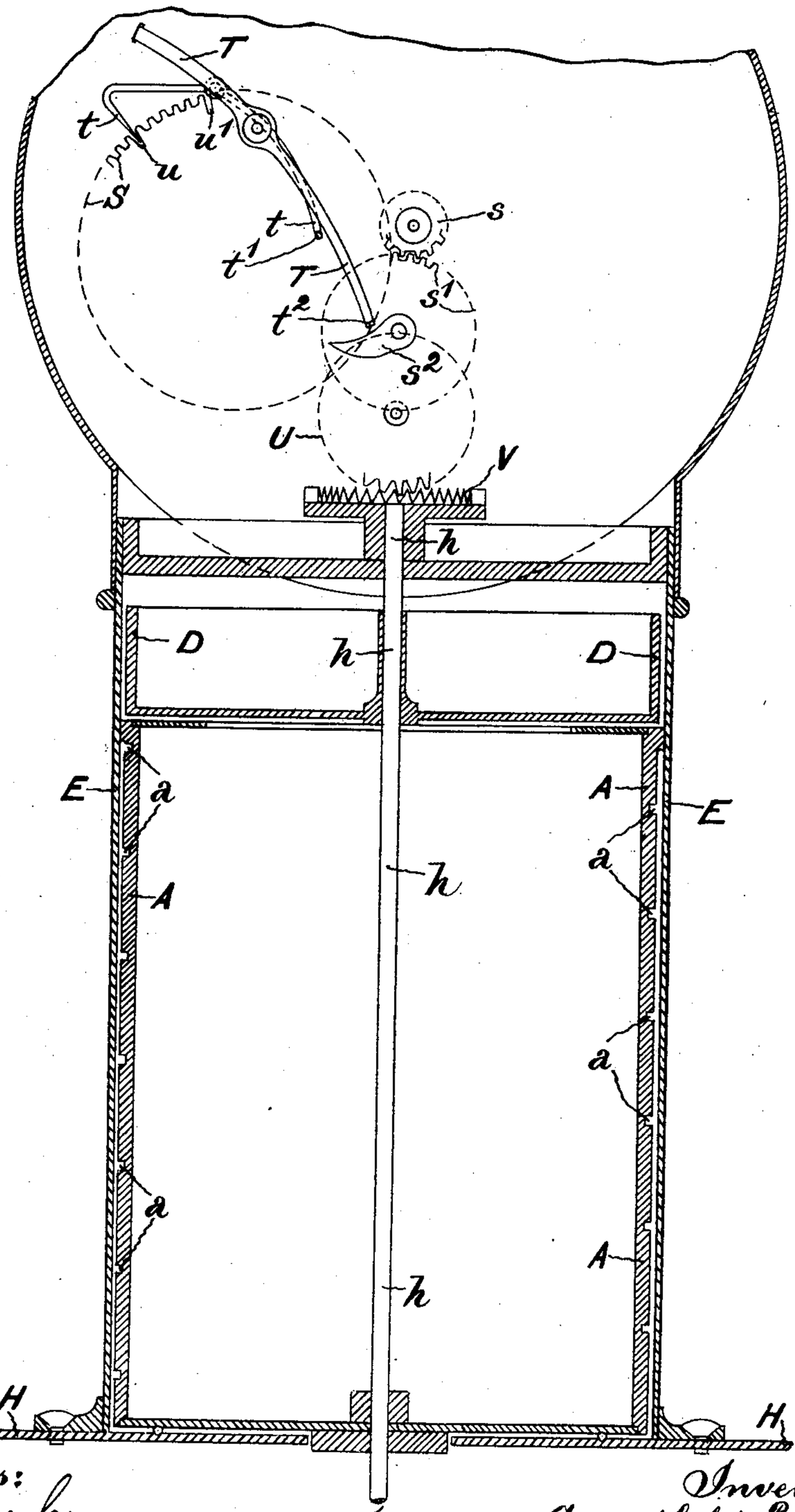

Fig. 4.

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UNITED STATES PATENT OFFICE.

ARMAND GALOIS RAYMOND, OF PRETORIA, TRANSVAAL.

COMBINED PERPETUAL CALENDAR AND AUTOMATIC DATE-INDICATOR.

No. 890,926. Specification of Letters Patent. Patented June 16, 1908.

Application filed March 21, 1906. Serial No. 307,228.

To all whom it may concern:

Be it known that I, ARMAND GALOIS RAYMOND, a subject of the King of Great Britain, residing at Pretoria, Transvaal, have invented a certain new and useful Improved Combined Perpetual Calendar and Automatic Date-Indicator, of which the following is a specification.

This invention relates to a new or improved combined perpetual calendar and automatic date indicator, or to means designed for indicating the date of each day of the month, and for indicating in a similar manner to a tabulated calendar or almanac, the dates of each day of the week for the current month. The month of the year may also be indicated.

In accordance with my invention I employ a cylinder in which is cut a circumferential helical groove. The circumference is subdivided into seven vertical and parallel sections and in each section and between the convolutions of the helical groove are marked or indicated the figures 1 to 31, arranged as in an ordinary calendar. At the top of the cylinder and above the numerals is arranged another cylinder or ring which is adapted to be rotated independently of as well as in unison with the date cylinder. On the circumference of the ring or cylinder is engraved or otherwise indicated the days of the week, which are so positioned that they may be brought into coincidence with the seven columns of numerals representing the dates of the month. The two cylinders carrying the dates of the month and the days of the week are arranged in a cylindrical frame which is formed with seven longitudinal, parallel and vertical slots which coincide with the seven columns of numerals. In one of these slots is arranged an indicator which incloses the numeral or numerals representing day by day the date of the month. This indicator is constructed so that it may slide vertically up and down in the longitudinal slot, and it is also engaged by the helical groove in the date cylinder, so that as the latter is each day rotated a seventh of a revolution, it is moved in a downward direction in the slot so that it coincides with the numeral or numerals corresponding to the next succeeding day and so on day by day throughout the calendar month.

The device may be constructed in a simple form to be actuated by hand day by day, or it may be constructed to work automatically and to be actuated by mechanism released or operated by a clock or clockwork so as to rotate the date and day cylinders a seventh of a revolution at midnight.

In order to simplify the further description of my invention I append three sheets of explanatory drawings marked with letters of reference corresponding to the following description.

Figure 1 represents in elevation, partly in section, one form of the invention. Fig. 2 is a sectional elevation showing the mechanism which serves for automatically and daily altering the calendar. Fig. 3 is an elevation of that portion of the mechanism which indicates the month of the year and for setting the mechanism according to the duration or number of days in each calendar month. Fig. 4 is a sectional elevation of the cylinders A E, illustrating the means for intermittently rotating the cylinder A every 24 hours by the timepiece.

Referring first to the construction shown in Fig. 1, I will describe in connection therewith the apparatus as constructed to be altered by hand day by day. In this construction A designates the date cylinder, in the circumference of which is cut the helical groove *a*. The circumference of this cylinder A is subdivided into seven parallel and vertical sections a^1 interspaced with blank strips. In these several vertical sections a^1 and between the convolutions of the helical groove *a* are engraved or otherwise suitably depicted numerals from 1 to 31, running in helical formation from top to bottom of the cylinder A. The numerals being placed in seven parallel rows, it will be perceived that each section a^1 represents the date of the month for each particular day of the week for example, as shown, the first Saturday of the month is indicated as having fallen on the 2nd, and the succeeding Saturdays of the month as falling on the 9th, 16th, 23rd and 30th.

In the center slot *e* at the front of the calendar is arranged the indicator B which consists of a rectangular frame adapted to inclose the numeral corresponding to the particular day of the month. This frame B is shown inclosing the 10th thereby indicating that the 10th of January is the date of the month and that the corresponding day of the week is Sunday. This frame B is adapted to traverse or move vertically up and down in

the central slot *e*. It is constructed at the back with a projection or projections which are adapted to engage the helical groove *a* so that in the event of the cylinder A being rotated it causes the indicator B to move upwards or downwards in the vertical slot *e* according to the direction of rotation of the cylinder. With each succeeding day the frame B is gradually lowered in the slot *e*, starting at the top with the first day of the month and terminating at the bottom with the last day of the month, if the latter should be the 31st. This movement of the frame B is accomplished by rotating the cylinder A to the right or in the direction of the hands of a clock. The rotation of this cylinder A is effected by means of a ring or cylinder C formed with a milled edge *c* which is fixed by means of screws c^1 to a reduced upper portion a^2 of the cylinder A. Encircling the upper portion of the cylinder A is another concentric cylinder D, on the circumference of which is engraved or otherwise represented the days of the week. This cylinder D is constructed with an inward projection or flange *d* at the top which rests upon the annular shoulder a^3 formed by the reduced upper portion a^2 of the cylinder A. It is also preferably constructed with a milled edge to permit of its being rotated independently of the cylinder A, when necessary. Ordinarily this cylinder D rotates with the cylinder A. The days of the week are engraved on the circumference of the cylinder D in such positions that they will coincide with the seven vertical and parallel rows of numerals on the cylinder A.

The cylinders A D are placed in an outer cylindrical frame E, which latter is formed with seven vertical, parallel and longitudinal slots *e* so positioned therein that they coincide with the seven rows of numerals on the circumference of the cylinder A. The cylinder E is also constructed at the top with seven horizontal slots e^1, one at the top of each of the vertical slots *e*. These horizontal slots e^1 are so positioned and made of such a width that they expose to view the days of the week engraved on the circumference of the cylinder D so that they are seen at the head of each of the columns of numerals.

The outer cylindrical frame E is fixed by means of screws e^2 to a circular base plate F which is formed with an upwardly directed flange or cylindrical projection *f*. In this flange *f* and preferably beneath the central aperture *e* in which the indicator B works, is formed a slot or aperture f^1, which may be of the configuration shown or of any other suitable shape. Arranged round the base of the frame or stationary cylinder E and inside the flange *f*, is another cylinder f^2 which at the top is formed with a milled edge, by means of which it may be rotated. On the exterior of this cylinder f^2 are engraved or otherwise represented the names of the twelve calendar months, and if desired, above the month, numerals representing the number of days in each particular calendar month.

If desired this calendar may be surmounted by means of a timepiece G fixed to the stationary cylinder or frame E by means of brackets or other suitable supports *g*.

This calendar is operated by hand day by day by rotating through a seventh of a revolution the top cap C which rotates the date and day cylinders A D respectively and causes the indicator B to be lowered in the slot *e* to inclose or coincide with the numeral representing each succeeding day. At the end of the month the cylinder A is rotated in the opposite direction which causes the indicator B to move upwards in the slot *e* or back to the numeral 1. The day cylinder D is then rotated to place the days of the week over their respective numerals for the next succeeding month and the two cylinders A D are then rotated in unison by means of the cap C as previously described. The bottom cylinder f^2 is also rotated a twelfth of a revolution to bring the next succeeding month to view in the aperture f^1.

Referring now to the arrangement shown in Figs. 2 and 3, which is designed to work automatically, E represents the outer stationary frame constructed as hereinbefore described and A represents the date cylinder. This latter, as in the previous construction, has fitted round it the concentric ring or cylinder D carrying the days of the week coinciding with the several columns representing the dates of the month.

The frame or outer cylinder E and the date cylinder A are mounted upon a hollow base or support H in which is arranged the actuating mechanism. The mechanism consists of a central vertically disposed spindle *h* which may be driven by an escapement arrangement and spring released at twelve o'clock midnight and arranged to rotate said spindle one seventh of a revolution. The base H is constructed with a central hole h^1 and the bottom of the date cylinder A is constructed with a slight cylindrical projection or boss a^4 of slightly less diameter than said hole h^1, in which it fits. The date cylinder A is supported above the top of the base H as indicated at h^2 so as not to impede the rotation of the cylinder by the mechanism. To the bottom of the date cylinder A and projecting into the hollow base H is fixed, as indicated, by means of set screws h^5, a bevel wheel h^3. The spindle *h* passes through a hole in the center of the bevel wheel h^3 and is free to rotate independently of said wheel. In the base H and below the bevel wheel h^3 is arranged a bridge piece h^4 which affords a bearing and support for the bevel wheel h^3 and also the date cylinder A, as well as a means for maintaining the spindle *h* (which projects through a hole in it) truly vertical.

On the lower extremity of the spindle h is fixed a smaller bevel wheel h^6. Inside the base H is arranged a horizontal spindle I which is carried at one extremity in a hanger or bracket i and at the other end in a wall bracket i^1 fixed to the inside of the base H by means of the set screws i^2. This spindle I is adapted to move longitudinally of its axis within certain limits in its bearings. In that portion of the spindle I which projects into the wall bracket i^1 are formed two annular grooves i^3 and the annular projection formed between the grooves is rounded off at the sides as indicated at i^4. In a hole in the wall bracket i^1 is placed a pin i^5 which is adapted to engage either of the grooves i^3 when the spindle I is in its alternative positions. In the hole above the pin i^5 is placed a spiral spring i^6 and screwed into the hole above the spring i^6 is a stud i^7 which serves for placing said spring under suitable compression, or so that it will maintain the pin i^5 in contact with either of the grooves i^3 while permitting the spindle I to slide longitudinally into either of its alternative positions, while affording sufficient resistance to prevent longitudinal movement of the spindle I except by the actuating mechanism.

On the spindle I is keyed or otherwise suitably fixed a bevel wheel i^8 which meshes with the bevel wheel h^6 on the lower extremity of the vertical spindle h. Surrounding a portion of the spindle I is a hollow screw or cylinder J formed with a helical groove j. To one end of this screw J is attached a bevel wheel j^1 which meshes with the bevel wheel h^3 fixed to the bottom of the date cylinder A. On the ends of the screw J are arranged wearing collars j^2. To the top of the base H on the inside is fixed one end of a coiled spring j^3 which surrounds the end of the screw J to which the bevel wheel j^1 is fixed, which spring j^3 at its other end is connected to the screw J or bevel wheel j^1 and is gradually wound up as said wheel j^1 is intermittently rotated every twenty-four hours by the timepiece to move the date indicator B. This spring serves, as hereinafter described, for returning the indicator B to the top of the slot e or to the numeral 1 at the completion of each calendar month.

In Fig. 4 I show the means for intermittently rotating the spindle h by the timepiece, S representing the ordinary power wheel of the striking mechanism, which latter is utilized for this purpose. s is an additional toothed wheel fixed to the hour hand of the clock and s' is another toothed wheel with which s meshes. The wheels s and s' are so calculated that s' completes one revolution for every two revolutions of s. Attached to s' is a cam s^2. T is the lever which controls the ordinary mechanism giving the "warning" before the striking of the hours in a striking clock, and t the pawl or catch which at one extremity engages the power wheel S of the striking mechanism and at the other is formed with a projection t' so that it is actuated by means of the lever T. The lever T is formed with a projection t^2 which is engaged by cam s^2 so that the lever is moved once every 24 hours, or once for each revolution of wheel s'. U is another toothed wheel which meshes with the power wheel S. This wheel U drives another toothed wheel V fixed to the upper extremity of the spindle h. The wheels U V are so calculated that they rotate the spindle h and with it the cylinder A one seventh of a revolution while the power wheel S, when constructed as shown, rotates a distance of six teeth or from one recess u to the next corresponding recess u' with which the pawl or catch t engages to arrest the movement of the power wheel S.

On the screw J is mounted a nut consisting of a hollow cylindrical piece K into which is screwed a screw k to engage the helical groove j. Into this nut K is screwed one end of a rod k^1, the screwed extremity of which may serve also for engaging the helical groove j to cause the nut K to traverse longitudinally of the screw J when the latter is rotated. The spindle I is formed or provided with a feather i^9 which fits a featherway formed in the screw J. By this means the screw J is compelled to rotate with the spindle I. On the spindle I beyond the wearing collar j^2 is loosely mounted a collar k^2, whose function will be hereinafter explained. Into the loose collar k^2 is screwed one end of a rod k^3. On the spindle I beyond the loose collar k^2 is placed a collar k^4 fixed by means of set screws k^5.

Arranged beneath the spindle I and supported at one end in a bracket l and at the other end in a wall bracket or support l^1, is a rod or bar L which is adapted to slide longitudinally. On this bar L at one end is fixed a collar l^2. Loosely surrounding the rod L is a sliding piece l^3 which is attached to the nut K through the medium of the rod k^1, the lower extremity of which is screwed into it. This sliding piece l^3 is constructed with a projection l^4 at one side. On the sliding bar L is fixed by means of screws l^5, another piece l^6 which is attached to the loose collar k^2 by means of the rod k^3, the extremity of which is screwed into the piece l^6. On the sliding rod L is fixed a small collar l^7 which is formed in one piece with or has attached to it a downwardly depending nut l^8. In the bottom of the base H beneath the sliding bar L, is another rotatable spindle M which is journaled in brackets m. One end of this spindle M projects through a hole m^1 in the base H to the outside and at its outer extremity it has fixed to it a milled nut or head m^2 which serves for rotating said spindle M by hand to adjust the mechanism as may be required according to

the number of days in the month. On the spindle M inside the casing H is formed or fitted a worm or screw m^3 which is engaged by the nut l^8 fixed to the sliding rod L.

m^4 is a screw screwed through the nut 18 into engagement with the worm m^3.

On the spindle M between a collar m^5 fixed thereon and an enlargement m^6 is placed a tappet or upwardly projecting piece N through which a hole is formed so that the tappet may slide on the rod L. On the other extremity of the spindle M is fixed a wide pinion n.

In that part of the base H in which the aperture f^1 is provided and through which the month is exposed, is arranged a cylinder or drum O journaled in brackets o. At regular intervals on the circumference of the drum O are represented the names of the twelve months. On the axle o^1 of the drum O at one end, is fixed a ratchet wheel o^2. On the axle o^1 next the ratchet wheel o^2 is loosely mounted a lever o^3 which as shown in Fig. 3, carries a ratchet or pawl o^4, which engages the teeth of the ratchet wheel o^2. To the lower extremity of the ratchet lever o^3 is pivotally connected one extremity of a rod o^5. This rod o^5 is slidably supported in a bracket o^6 and at its free extremity projects into such a position that it is engaged by the projection l^4 on the sliding piece l^3 when the latter is traversed in a rearward direction through the medium of the nut K. On the rod o^5 is fixed a small collar o^7 and encircling the rod o^5 between the collar o^7 and the bracket o^6 is a spiral spring o^8 which keeps the rod o^5 pressed forward and in position to be engaged by the projection l^4 on the sliding piece l^3. When this rod o^5 is engaged by said projection l^4 it rotates the months' drum O through one twelfth of a revolution and so changes the month simultaneously with the return of the indicator B to the top of the helical groove a or to the numeral 1.

To the base H beneath one end of the drum O is fixed a small bracket p in which is located a spiral spring p^1 against which works a projecting pin or ball p^2 which is adapted to engage recesses p^6 formed at regular intervals round the circumference of the drum O so as to insure the drum being brought into coincidence or to place the month centrally of the aperture f^1 by serving as a steadying device for the drum O and preventing movement thereof when the name of the month is central of the aperture f^1. The pawl p^2 is depressed against the spring p^1 by the motion of the drum O when the latter commences to rotate to change the name of the month appearing through the aperture f^1.

Arranged parallel with the axis of the drum O and at the back thereof and slidably supported in brackets p^3, is a rack P. The pinion n on the end of spindle M meshes with the teeth of the rack P see Fig. 3. The rack P is provided with an arm or member p^4 which at its outer extremity carries a projection p^5 which latter works in a suitably shaped cam groove R formed in the circumference of the drum O in proximity to one end thereof. By suitably shaping the groove R the mechanism above described serves for moving the rack in either direction and so rotating the pinion n in gear with it, which by screwing the worm m^3 through the nut l^8, automatically adjusts the tappet N to bring about the reversal of motion of the screw J to return the indicator B to the numeral 1 after it has reached the particular numeral representing the last day of any particular month. For example, in the case of the month of September, the cam groove R in the months' drum O, through the medium of the rack P and pinion n, places the tappet N in such a position that it is engaged by the sliding piece l^3 carried by the nut K traversing the screw J, that it engages the tappet N 24 hours after the indicator B has reached the numerals 30. In like manner the tappet N is automatically set according to the number of days in each month of the year.

The part of the cam groove R between the points z, z' would represent the months of December and January, and the part z^2 of the groove in which the projection p^5 is shown engaging—in Fig. 3—would represent the month of February (which will be visible through the aperture f^1 with the drum in the position in which it is shown in Fig. 3) and the part z^3 of the groove R would represent the month of March, this part being in alinement with the part z, z', (the months of December, January and March each having 31 days) and the part z^4 would represent the month of April. With the projection p^5 engaging the cam groove R at the point z^2 the rack P through pinion n will have placed the tappet N in such a position that the sliding piece l^3 will engage the tappet N 24 hours after the indicator B has reached the numerals 28.

The operation of the mechanism will be understood from the foregoing description but may be briefly described as follows:— When the timepiece or clockwork reaches the hour of midnight the power wheel S through wheels U V releases the same, which rotates the spindle h one seventh of a revolution. This, through the medium of the bevel wheels h^6 i^8, rotates the spindle I to a corresponding extent. The screw J and with it the bevel wheel j^1 are also rotated and the latter meshing with the bevel wheel h^3 rotates the date cylinder A through one seventh of a revolution. This causes the indicator B to pass from one numeral to the next and to be lowered correspondingly in the central slot e. This operation is repeated each time the power wheel S is released by the

clockwork, the changes in the days and dates being accordingly automatically effected at midnight each day. The convolutions of the screw J corresponding to the helical groove *a*, the nut K is traversed along said screw in consonance with the travel of the indicator B in the helical groove *a* in the cylinder A. Ultimately, when the indicator B reaches the date of the last day of any particular month, the tappet N (which as previously explained has been automatically set by the mechanism from the drum O through the cam groove R) is engaged by the sliding piece l^3, and the spindle M carrying the tappet N is moved in a rearward direction; this also moves the sliding rod L by means of the nut l^8 and collar l^7 and the sliding rod L having attached to it the collar l^6 and through the latter the collar k^2 on the spindle I, the latter spindle I is also moved in a rearward direction by the collar k^2 engaging the fixed collar k^4. This throws the bevel wheel i^8 out of gear with the bevel wheel h^6 on the vertical spindle *h*, whereupon the spring j^3 rotates the bevel wheel j^1 and screw J in the reverse direction to that in which it is moved by the clockwork, and the bevel wheel h^3 rotates the date cylinder A in the reverse direction and causes the indicator B to travel in an upward direction in the slot *e* until it comes to the numeral 1. Simultaneously the nut K travels backwards along the screw J and just before reaching the end of its stroke, the projection l^4 on the sliding piece l^3 engages the rod o^5 and moves it against the spring o^8 and actuates the pawl o^4 and ratchet o^2 and rotates the months' drum O one twelfth of a revolution, so placing the next succeeding month in front of the aperture f^1. This cycle of operations is repeated day by day and month by month.

What I claim as my invention and desire to protect by Letters Patent is:—

1. In a calendar and automatic date indicator, the combination with a revoluble cylinder having a circumferential helical groove therein, between the convolutions of which are numerals representing the dates of the month, a casing inclosing said cylinder formed with a plurality of vertical slots corresponding to the columns of numerals, an indicator engaging the helical groove in the date cylinder and sliding in one of the vertical grooves in the casing, a ring or cylinder adapted to be rotated either independent of the date cylinder or in unison therewith, said ring or cylinder having represented on its circumference the days of the month which are adapted to be brought into coincidence with the columns of numerals on the date cylinder, a timepiece or clockwork mechanism adapted to rotate the date cylinder to cause the indicator to traverse the groove and slot in the cylinder and casing respectively to pass successively from date to date, a cylinder or drum on the circumference of which are represented the names of the months, and means actuated from the timepiece or clockwork mechanism for rotating the drum or cylinder when the indicator reaches the last date of the month, substantially as described.

2. In a calendar and automatic date indicator, the combination of a revoluble cylinder having a circumferential helical groove therein, between the convolutions of which are numerals representing the dates of the month, a casing inclosing said cylinder formed with a plurality of vertical slots corresponding to the columns of numerals, an indicator engaging the helical groove in the date cylinder and sliding in one of the vertical slots in the casing, a ring or cylinder adapted to be rotated either independently of the date cylinder or in unison therewith, said ring or cylinder having represented thereon the days of the month which are adapted to be brought into coincidence with the columns of numerals on the date cylinder, a timepiece or clockwork mechanism adapted to rotate the cylinder to cause the indicator to traverse the groove and slot in the cylinder and casing respectively to pass successively from date to date, a cylinder or drum on the circumference of which are represented the names of the months, and means for controlling the mechanism to reverse the direction of motion of the date cylinder to return the indicator on the last date of each month, substantially as described.

3. In a calendar and automatic date indicator, the combination of the date cylinder formed with a circumferential helical groove, between the convolutions of which are numerals arranged in seven columns representing the dates of the month, a ring mounted on the date cylinder on the circumference of which are the days of the week adapted to be brought into coincidence with the columns of numerals on the date cylinder, a casing surrounding said cylinders formed with slots and apertures through which the numerals and days may be read, an indicator arranged in one of the date slots in the casing and engaging the helical groove in the date cylinder, a timepiece or clockwork mechanism operating mechanism for rotating the cylinders, a drum or cylinder on which are represented the names of the months, means for rotating said months' cylinder a twelfth of a revolution when the indicator of the date cylinder is returned to the numeral 1, and means operated from the date cylinder for reversing the mechanism to return the indicator at the end of each month, substantially as described.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

ARMAND GALOIS RAYMOND.

Witnesses:

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F. A. OVENDALE.