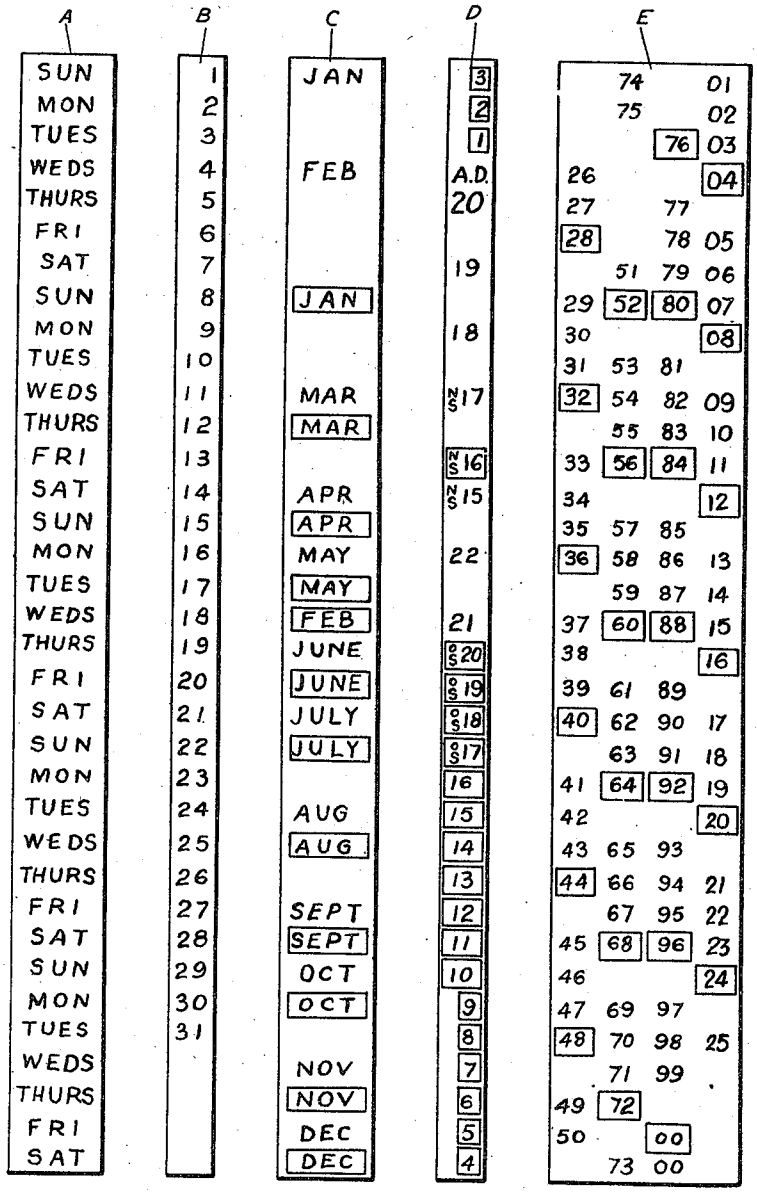
Jan. 27, 1948. J. F. BOTHAM 2,435,069

PERPETUAL CALENDAR WITH AUTOMATIC DAY INDICATION

Filed Dec. 7, 1943 4 Sheets-Sheet 1

FIG. 1.



Inventor
Jack Frederick Botham
By
Michael Stott & Sons
Agents

Jan. 27, 1948. J. F. BOTHAM 2,435,069

PERPETUAL CALENDAR WITH AUTOMATIC DAY INDICATION

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FIG. 2.

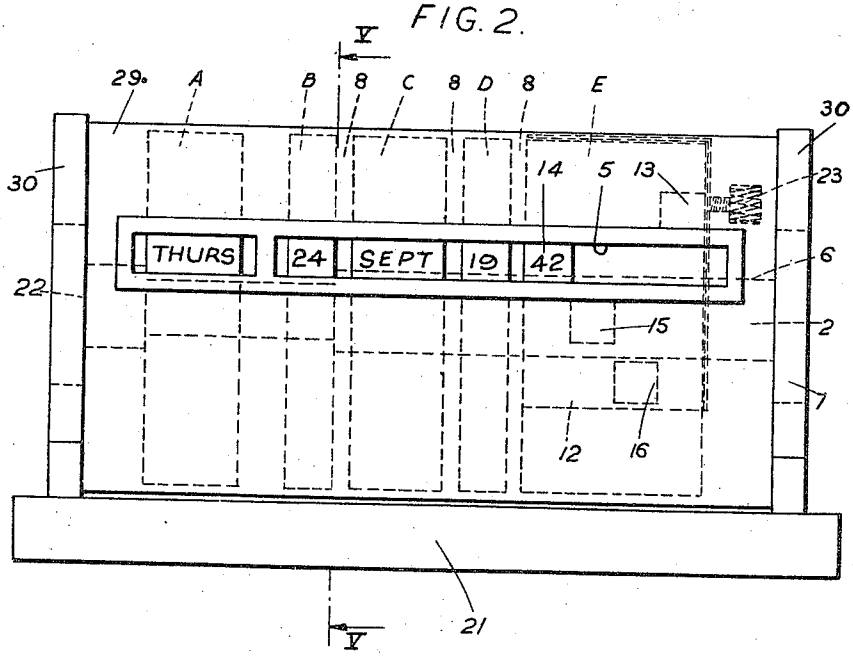
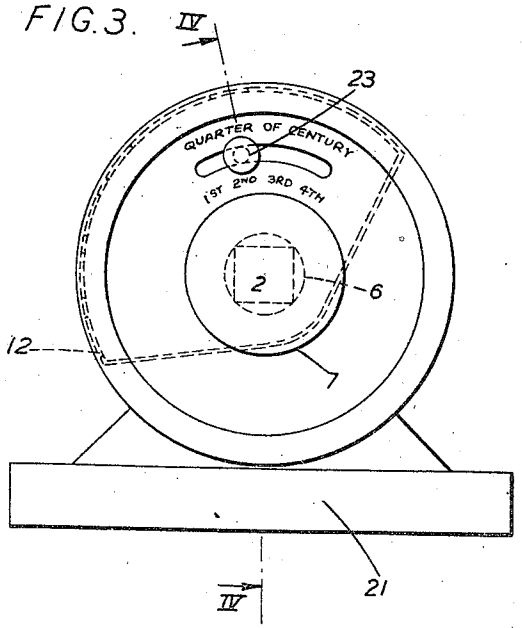


FIG. 3.



Jack Frederick Botham Inventor

By Michael & Botham

Agent

Jan. 27, 1948. J. F. BOTHAM 2,435,069

PERPETUAL CALENDAR WITH AUTOMATIC DAY INDICATION

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FIG. 4.

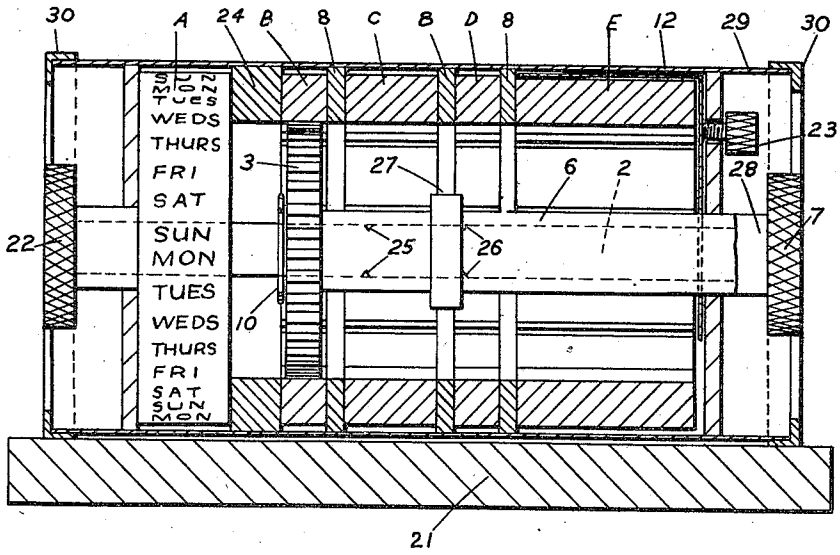
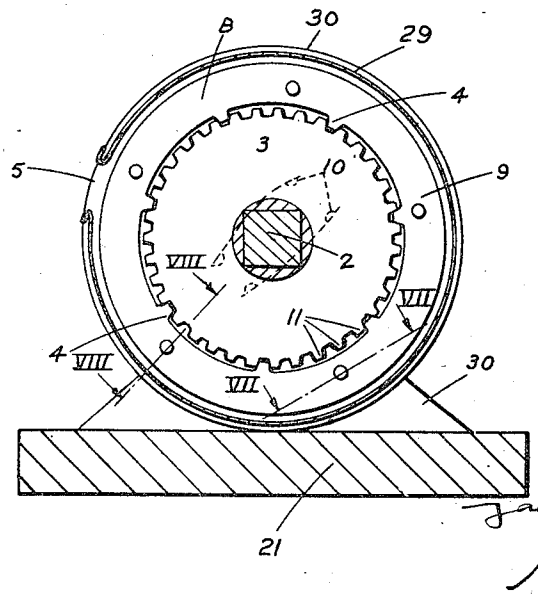


FIG. 5.



Inventor
Jack Frederick Botham
By
Michael G. Stricker
his Agent

Jan. 27, 1948. J. F. BOTHAM 2,435,069

PERPETUAL CALENDAR WITH AUTOMATIC DAY INDICATION

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FIG. 6.

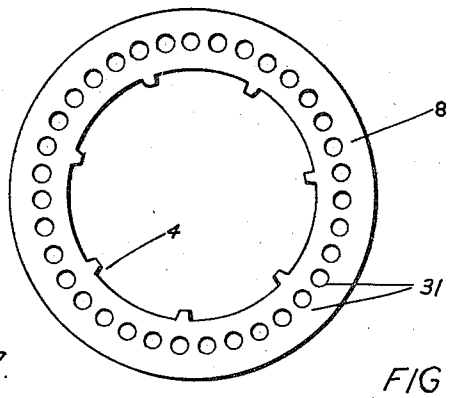


FIG. 7.

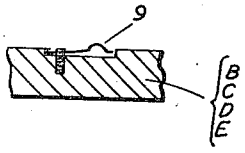


FIG. 8.

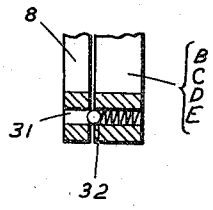
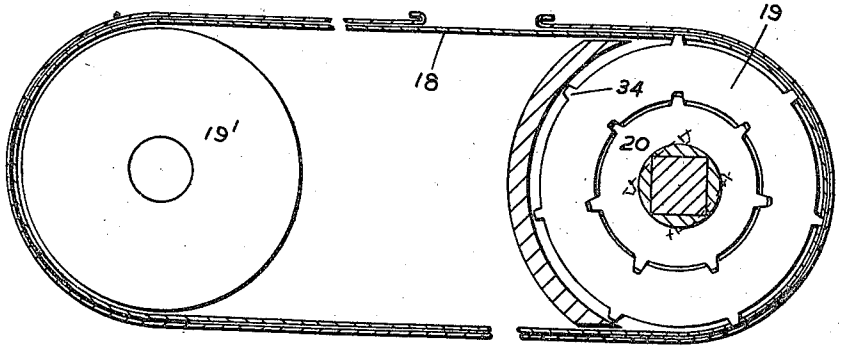


FIG. 9.



Jack Frederick Botham Inventor

By Michael E. Botham
his Agent

Patented Jan. 27, 1948

2,435,069

UNITED STATES PATENT OFFICE

2,435,069

PERPETUAL CALENDAR WITH AUTOMATIC DAY INDICATION

Jack Frederick Botham, Colchester, England

Application December 7, 1943, Serial No. 513,243
In Great Britain December 22, 1942

2 Claims. (Cl. 40—112)

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This invention is concerned with a perpetual calendar in which, when it has been set to a certain date (i. e., the day of the month, the month, and the year), the name of the day of the week is indicated. As viewed from one aspect the invention provides a perpetual calendar having movable indicators including a day-name indicator for the names of the days of the week, a day-number indicator for the numbers of the days of the month, a month-name indicator for the names of the months, and a year indicator for the numbers of the years, operating means for setting the day-number, month-name, and year indicators, and means whereby such setting automatically sets the day-name indicator.

As viewed from another aspect the invention provides a perpetual calendar, having movable indicators including a day-name indicator, a day-number indicator, a month-name indicator, and a year indicator, means for shifting each of the three last-mentioned indicators individually to show the required date, and means whereby the arithmetic sum of these movements is communicated to the day-name indicator and the latter is thereby shifted to show the name of the day.

In the preferred construction the indicators are located side by side and there is an operating device which is permanently coupled to the day-name indicator but which is displaceable into connected relationship with any selected one of the other indicators so that when the selected indicator is shifted by it the day-name indicator is simultaneously shifted.

These, and other features of the invention set out in the appended claims, are incorporated in the constructions which will now be described in detail with reference to the accompanying drawings in which—

Figure 1 is a development of the inscribed surfaces of the indicators;

Figure 2 is a front elevation of the calendar;

Figure 3 is an end elevation thereof;

Figure 4 is a longitudinal section taken on the line IV—IV in Figure 3;

Figure 5 is a cross section taken on the line V—V in Figure 2;

Figure 6 is an elevation of one of the spacing members hereinafter referred to.

Figures 7 and 8 are fragmentary sections taken respectively on the lines VII—VII and VIII—VIII in Figure 5, while

Figure 9 illustrates a modification.

The calendar shown in Figures 2, 4 and 5 comprises a drum-like casing consisting of a cylinder 29 located between end walls 30 arising from a

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base 21. This cylinder 29 has an aperture or window 5 whereat the inscribed peripheries of five indicators are presented. In Figures 2 and 4 these indicators are shown as rotatable drums A, B, C, D, and E. A is the day-name indicator intended for indicating the names of the days of the week. As shown in Figure 1 its periphery is in effect divided into 35 sections in which the names of the days of the week are inscribed serially five times. B is the day-number indicator for indicating the numbers of the days of the months: as shown in Figure 1 its periphery is in effect divided into 35 sections, 31 of which are inscribed with the numbers 1 to 31 and the remaining four sections are blank. C is the month-name indicator for indicating the names of the months; as shown in Figure 1 it is in effect divided into 35 sections in some of which the names of the months are inscribed in the order shown; some of the sections are blank and the names of the months are in duplicate. D is a century-indicator for indicating the centuries. It is in effect divided into 35 sections in which the numbers of the centuries are inscribed in the order shown in Figure 1; certain sections are blank. E is a year-number indicator. Its periphery is in effect divided into four parallel columns of 35 sections in which the numbers 00 to 99 are inscribed in the order shown in Figure 1. The four columns are appropriated to the four quarters of the century and reading from left to right in Figure 1 the first column is concerned with the second quarter-century, the second column with the third quarter-century, the third column with the fourth quarter-century, and the fourth column with the first quarter-century.

It will be seen that on the indicators C, D, and E certain of the inscriptions are duplicated and those that are enclosed with a rectangle are intended to be rendered in a visually-distinctive manner (e. g., in red) and appertain to leap years. In indicators D and E in all cases excepting when the year ends in double zero (00) the year number on indicator E indicates whether or not the year is a leap year according to whether the inscription is in red for a leap year or black for an ordinary year, and this is irrespective of the colour in which the century number appears on indicator D. Where, however, the year ends in double zero the century number indicates whether or not the year is a leap year. If it is a leap year the red double zero must be used, and if an ordinary year the black double zero. In all cases the red month names must be used for leap years and the black names for ordinary years.

In order to provide for the changes made when the Gregorian calendar takes the place of the Julian calendar two inscriptions are required on indicator D for century numbers of the 16th and following centuries. Before the change the calendar is referred to as Old style (O. S.) and after as New style (N. S.). In Great Britain the change was effected by the Calendar (New style) Act 1750, and two inscriptions are therefore needed for dates in the eighteenth century. For dates up to and including September 2, 1752, the inscription "O. S. 17" must be used and for those including and from September 14, 1752, "N. S. 17" must be used. Unless otherwise stated inscriptions before the 18th century are Old style and those after New style. Different parts of the world adopted the change at different times so that it is necessary to know which style is in force when referring to the calendar. Some Roman Catholic countries on the continent of Europe were the first to adopt the New style when it was originally introduced. For these countries the inscription "15" must be used for dates up to and including October 4, 1582, and "N. S. 15" for dates including and from October 15, 1582. Russia did not adopt the New style until the 20th century. Old style numbers must therefore be used for dates up to and including January 31, 1918, and New style for dates including and from February 14, 1918. From the 16th to the 20th centuries inclusive the calendar can be used for Old style and/or New style dates. Before that period only Old style are shown and after only New style. The Old style inscriptions are "15," "16," "O. S. 17," "O. S. 18," "O. S. 19" and "O. S. 20" and the corresponding New style inscriptions "N. S. 15," "N. S. 16," "N. S. 17," "18," "19" and "20."

The day-name indicator A is fixed on a rotatable shaft 2 extending axially within the casing of the calendar, the said shaft being provided with a knob 22 at one end by which it may be turned. Slidable along said shaft 2 there is a sleeve 6 the said sleeve and shaft being keyed together (as for example by the shaft and the interior of the sleeve being polygonal) and if necessary an end bearing 28 can be provided on the shaft inside the sleeve and this sleeve carries a gear 3 provided with 35 teeth 11. Each of the indicators B, C, D and E is a hollow cylinder the inner surface of which is provided with teeth 4 adapted to mesh with the teeth of the gear 3. Therefore by sliding the sleeve 6 by means of a knob 7 provided on it, the gear 3 may be meshed with any selected one of the indicators B to E (the gear tooth arrangement constituting a clutch) and the selected indicator is thereby coupled to the day-name indicator A. By rotating either of the knobs 7 or 22, the selected indicators B to E may be rotated to present the required date at the aperture or window 5 and simultaneously the day-name indicator A is rotated to an equal extent. It will be understood that if the indicators B to E are rotated one after another to present the required date (i. e., the day of the month, the name of the month and the year) at the window 5, the arithmetic sum of the movements of these four indicators is communicated to the day-name indicator A and the latter is shifted so that it presents at the window 5 the name of the day of that particular date.

It is, however, desirable to provide means whereby only the number from the appropriate quarter-century on indicator E is presented at the window 5, the numbers of the other three quarter centuries being covered up. This is effected by means of a quarter-century screen 12 which has apertures 13, 14, 15 and 16 as shown in Figure 2, one for each column on the indicator E. This screen 12 may be rotated to bring the required aperture to the window 5 and locked in that position by means of the screwed knob 23.

The principle on which the calendar operates is as follows: Numbers ranging from 1 to 7 can be assigned to each date of the month, each month, century and year of the century, so that a different day of the week can be represented respectively by each one of the seven remainders (0 to 6) left after the total (of four figures) representing a given date has been divided by seven.

If each band of 35 sections is assumed to be numbered from 1 to 35, each section can be represented by one of the seven remainders of a division by seven. In turning the indicators B, C, D and E to set the date the turn of each is communicated to indicator A, the turn of which is therefore the total of the turns of B, C, D and E. The turn of any indicator through a fifth part of a circle does not affect the day of the week indicia showing through window 5, i. e., when indicator A is turned through one-fifth part of a circle, the same day of the week indicia will reappear. The effective part of any turn then is the amount by which it exceeds a multiple of a fifth of a turn and the effective turn of A is only that part by which the total turn exceeds a multiple of a fifth of a turn. This excess can only be one of seven parts of a fifth.

The various indicators are spaced apart by partitions 8 and 24 and in order to prevent the clutch member 3 from engaging and turning two of the indicators when passing from one to the other certain or all of these spacing members may be provided with teeth similar to the teeth 4. Thus in Figure 6 the spacing members 8 are shown as being provided with such teeth 4. Rotation of the indicators B to E under the effect of vibration or the like is prevented by a spring-loaded detent such as that shown in Figure 7 or Figure 8. Each spacing member 8 is provided with 35 holes or recesses 31 and according to Figure 7 the adjacent indicator is provided with a spring 9 adapted to engage these recesses. In Figure 8 this spring 9 is replaced by a spring-loaded ball 32. The correct position of the clutch member 3 lengthwise of shaft 2 in relation to the indicators B to E is determined by springs 10 movable with said clutch member and adapted to engage recesses such as 25, 26 spaced lengthwise of shaft 2. The outward movement of sleeve 6 is limited by a stop 27 secured to said sleeve.

In the alternative form shown in Figure 9 each indicator comprises an endless band 18 running over a sprocket 19 provided with teeth 34 for engaging perforations in said band and over a drum 19'. Here the clutch member (the equivalent of member 3 in Figure 4) is shown at 20 and in order to illustrate the fact that the number of teeth need not be equal to the number of sections, this clutch member is shown as having seven teeth. The number of teeth on each sprocket 19 must be the same and a whole number of teeth must be contained in the angle through which the sprocket 19 must be turned in order to move the inscription band forward or backward by one section.

The following is a simple sequence of operations in using the calendar:

(i) Draw out the knob 7 and move the selector

12 to expose the quarter of the century in which the date occurs.

(ii) Turn the indicator D bearing the century numbers into position. The inscription will appear in red or black, indicating the following, (*a*) If red, that when followed by double zero the year is a leap year and the red double zero on the indicator E bearing the year numbers must be used. (*b*) If black, that when followed by double zero the year is an ordinary year and the black double zero must be used. (*c*) That if the century numbers are not followed by double zero the colour of the inscription gives no indication as to whether or not the year is a leap year. This is correspondingly indicated by the year numbers.

(iii) Turn the year-number indicator E into position.

(iv) After the year is set turn the month-name indicator C into position. If the year is a leap year the red inscriptions must be used.

(v) Turn the day-number indicator B into position and the day-name indicated on indicator A is that for the date shown.

The number of hollow cylinders need not be four but any number according to the number of portions into which the date is divided for the purposes of the calendar.

Cylinder A need not be on the left. It can be placed to the right or in any position where mechanical arrangements will allow, and it need not be solid.

The keyed shaft 2 may be of any section which allows the gear or clutch 3 to traverse it without rotation relative to the shaft.

The number of teeth on the gear wheel 3 need not be 35—the number depends on the number of sections into which the inscribed surface of the indicators is divided. Where the surface is divided into 35 sections the number of teeth may be of any multiple of 35. The number of internal teeth may be any number which will engage with the gear. For example one tooth is sufficient to lock the gear within the cylinder. Alternatively the internal teeth could number 35 with only one tooth on the gear.

The inscriptions need not be in black for ordinary years. Any suitable method of representation may be employed. The inscriptions for leap years need not be in red and any suitable method of distinguishing them from the inscriptions for ordinary years may be employed.

The method of distinguishing Old style Century numbers from the corresponding New style numbers may be any one suitable.

The quarter-century selector will only be necessary where it is desired to cover inscriptions which would otherwise show were it not for the selector. The number of openings need not necessarily be four nor need each band of inscriptions contain a quarter of a century.

The accompanying drawing, showing developments of the inscribed surfaces of the indicators, gives only one selection of inscriptions. This may be modified in one or more of the following or similar ways. The number of bands may be different. The sequence of the bands may be changed and likewise the sequence of the sections. The inscriptions may be designed to cover a greater or lesser period of years.

The tube or casing 29 containing the indicators may be of any suitable shape, size or design and the opening, window or other means of distinguishing a particular date may be arranged in any suitable position. In some cases it may be arranged so that the opening can be moved if desired so that it is perpendicular to the line of sight, or at any other angle. The base 21 may be designed to be utilitarian as well as functional. For example the base might contain a drawer to hold papers, instructions for using the calendar, or printed calendars to serve the 14 different calendar years—that is one for each of the ordinary years commencing with a different day of the week and one for each of the bissextile years commencing with a different day of the week. Provision could be made in the casing and/or base so that any chosen calendar could be held in view by notches, clips or other means. Tables could also be included for the finding of Easter Day or other information regarding the calendar.

The operating knob 7 of the calendar described in the specific description is on the right although it need not necessarily be in that position. Partly to secure symmetry a similar knob 22 may be placed on the left. This will be constantly coupled to the operating knob 7 and rotate with it although it will not follow the longitudinal movement of the operating knob. Both knobs may be turned together with different hands in setting the date and the calendar thus kept more steady.

I claim:

1. A perpetual calendar, having a series of internally-toothed indicator drums side by side and including a day-name indicator for the names of the days of the week, a day-number indicator for the numbers of the days of the month, a month-name indicator for the names of the months, and a year indicator for the numbers of the years, and a common operating device comprising a gear permanently meshing with the teeth of the day-name indicator, an axially movable gear displaceable to engage the teeth of any one of the other indicators, means coupling the gears together, and means for rotating them.

2. A calendar according to claim 1, having a non-rotatable toothed member interposed between successive indicators for engaging the movable gear as the latter passes from one indicator to the next and for preventing rotation of the gear in its passage.

JACK FREDERICK BOTHAM.

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