July 17, 1928. 1,677,872

R. N. REID

CALENDAR CLOCK

Filed Oct. 17, 1927 2 Sheets-Sheet 1

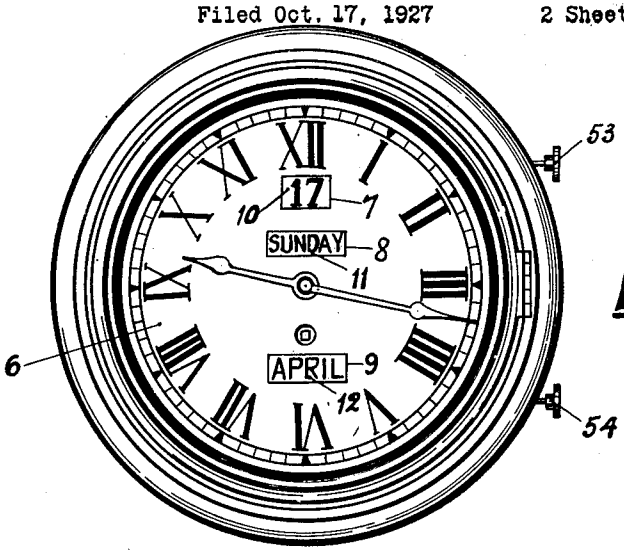


FIG. 1.

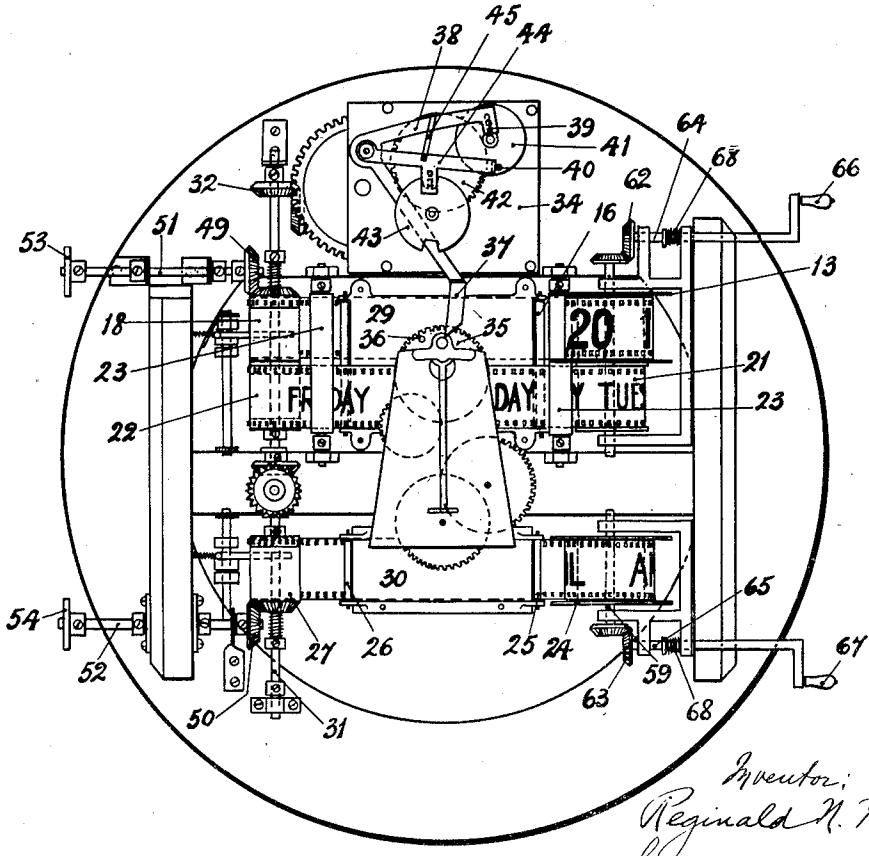


FIG. 2.

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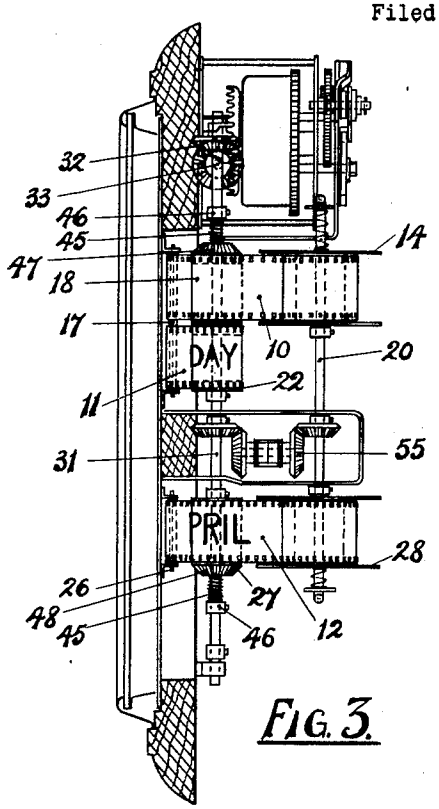


FIG. 3.

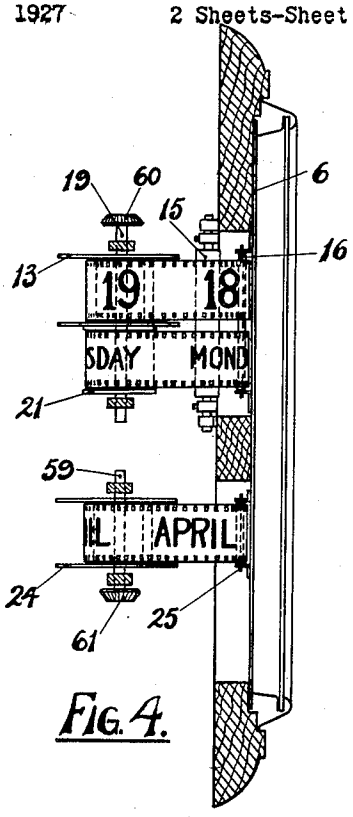


FIG. 4.

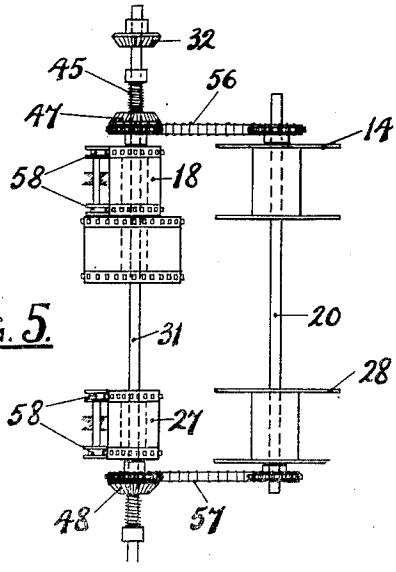


FIG. 5.

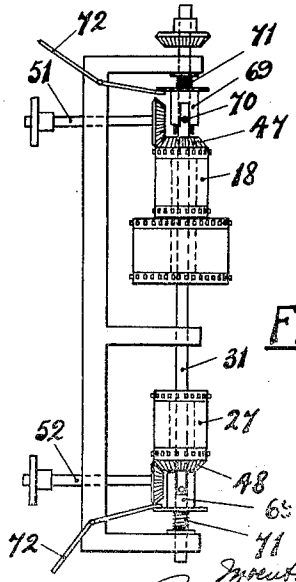


FIG. 6.

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Patented July 17, 1928. 1,677,872

UNITED STATES PATENT OFFICE.

REGINALD NORMAN REID, OF EDINBURGH, SCOTLAND.

CALENDAR CLOCK.

Application filed October 17, 1927, Serial No. 226,794, and in Great Britain September 1, 1926.

This invention relates to improvements in calendar clocks of the kind wherein a calendar strip is intermittently moved by clockwork mechanism released periodically by a tripping device.

It has heretofore been proposed to accommodate such a calendar strip within the casing of a clock or time-piece, but a characteristic feature of the present invention consists in so positioning the calendar strip that the date is exhibited through an aperture or apertures in the dial of the clock.

To effect the move of the calendar strip, I adopt the known method of providing the strip with perforations engaged by the teeth of a sprocket wheel over which the strip passes, but according to my invention this sprocket wheel is directly driven by a spring motor released periodically by the tripping device, so that the sprocket wheel draws the strip from a let-off spool and delivers it to a take-up spool.

A further characteristic feature of the present invention consists in that the date may be exhibited on separate strips, one for the months, another for the days of the month and another for the days of the week, each strip being visible through an aperture in the clock dial. Heretofore it has been necessary either to use a single strip bearing the whole date or to exhibit the days of the week, or both the days of the week and the days of the month, upon the faces of polygonal drums.

In carrying out my invention, a spindle is arranged to receive a spool upon which the strip is wound, and a number of small rollers or guides are employed in order that the strip may run over them and by so doing expose part of the strip through the aperture or apertures in the dial of the clock. The strip also runs over a toothed wheel or sprocket wheel periodically driven by an independent spring motor so as to regulate the timing action of the strip. A second spindle is arranged to receive an empty spool for taking up the strip as it unwinds, and this spindle is driven so as to exert a slight tension on the strip.

After a predetermined period, a pin or other element controlled by the clock coacts with an arm or other member to release the spring motor and allow the sprocket wheel to move the strip until a certain number of revolutions of the sprocket wheel have caused a notch wheel to rotate until a pin coacts with a notch in the wheel and stops the spring motor, whereupon another part of the strip is exposed through the aperture or apertures in the clock dial.

The winding mechanism of the clock may also be arranged to wind-up the spring motor.

The accompanying drawings illustrate a preferred construction of combined calendar and clock according to my invention in which the months and days of the month are marked on separate strips, while the days of the week are marked on an endless strip.

Fig. 1 is a face view of the apparatus and Fig. 2 is a rear view with the case removed and showing only such parts as are necessary to illustrate the invention. Figs. 3 and 4 are edge views looking on the mechanism from opposite sides. Fig. 5 is a detail view illustrating a modification.

Fig. 6 is a detail view illustrating a further modification.

In the apparatus illustrated, the clock dial 6 has three apertures 7, 8 and 9 through which the strips 10, 11 and 12 respectively are exhibited. The strip 10 has the numbers of the days of the months printed consecutively thereon, preferably for a whole year, viz 1–31 for January, 1–28 for February, and so on up to 1–31 for December. The strip 12 has marked thereon the respective months, repeated according to the number of days in the month, i. e. the strip bears the inscription "January" 31 times, followed by the word "February" 28 times and so on. The reason for this is that the strips 10 and 12 are moved together and thus disclose a fresh portion of the strip through the dial of the clock at the end of each day. It will of course be understood that when the month of February has 29 days, strips correspondingly printed or otherwise marked must be used. The strip 11 is an endless strip bearing the days of the week marked consecutively thereon. The mechanism is so arranged that the periodic travel of the strips is equal to the pitch of the markings thereon, and the strips are moved simultaneously at the end of each day.

The strip 10 is carried on a let-off spool 13 and after passing under guide rollers 15 and 16, and across the aperture 7, it passes under a guide roller 17 to and partially around a sprocket wheel or roller 18 and from thence to a take-up spool 14. The

spools 13 and 14 are mounted on spindles 19 and 20 respectively. The endless strip 11 passes around an end roller 21, under the guide rollers 15, 16 and 17, around a sprocket wheel or roller 22 and back again to the roller 21 under guide rollers 23. The spool 13 is fixed on the spindle 19 and the spool 21 is freely mounted on the spindle 19. The strip 12 is taken from a let-off spool 24, a securely mounted on a spindle 59, under a guide roller 25, across the aperture 9, under a guide roller 26, and around a sprocket wheel or roller 27 to a take-up spool 28 on the spindle 20. The take-up spools 14 and 28 are frictionally held on the spindle 20. The apertures 7, 8 and 9 are covered in at the back by sheet-metal channeled covers 29 and 30.

The travel of the strips is effected by teeth on the sprocket rollers 18, 22 and 27 engaging perforations in one or both edges of their respective strips, which are preferably made of non-inflammable celluloid, after the manner of kinematographic films, with the dates printed or otherwise marked either directly upon the film or upon adhesive paper attached to the film. The number of teeth on the sprockets 18, 22 and 27 is suited to the length of strip to be moved. In the construction illustrated, each strip travels through the same distance at the end of each day and therefore the sprockets 18, 22 and 27 are alike, but will be different in diameter if the markings are wider apart on one strip than another, e. g. if the word representing the day of the week is to be more prominently displayed, so that it is of greater width than the width taken up by the words indicating the day and month on the other strips.

To effect rotation of the sprockets 18, 22 and 27, they are mounted upon a spindle 31 driven at its upper end by bevel gearing 32 from a motor-driven shaft 33. The shaft 33 derives motion from a spring motor 34 which is set in motion at the end of each day. For this purpose I have shown a 24 hour pinion 35 driven from the hour spindle of the clock, said pinion having a pin 36 which coacts with the end of a cranked lever 37 forming one arm of a bell-crank 38 having a stop 39 at its end which coacts with a pin 40 on a fly-wheel 41. The latter is driven from the spring motor through a gear wheel 42. The spring motor also drives a notched disc 43 with which cooperates a drop lever 44.

Normally a projection on the lever 44 engages one of the notches in the disc 43 and thus arrests the motor. The end of the lever 44 also acts as a stop for the pin 40. When the pin 36 on the 24 hour pinion strikes the cranked lever 37, the bell-crank 38 is turned and lifts the lever 44 by means of a link or yoke 45 which is secured to lever 44 and preferably extends around bell-crank 38, whereby upward movement of bell-crank 38 lifts lever 44, but bell-crank 38 may drop independently of lever 44, as hereinafter explained. This raises the end of lever 44 clear of pin 40 and allows the spring motor to turn the flywheel 41 until the pin 40 thereon is arrested by the stop 39 on the end of bell-crank 38. At the same time, the projection on lever 44 is raised out of the notch in disc 43. The pin 36 is now free to move the cranked lever 37 still further, until it clears the latter, when the lever 37 and bell-crank 38 drop back again. The bell-crank 38 thus releases the flywheel 41 and spring motor 34, which then drives the sprockets 18, 22 and 27. The spring motor also rotates the notched disc 43, whose periphery holds the lever 44 raised until the requisite length of strip has been wound up by the sprockets. A projection on the lever 44 then drops into a notch in the disc 43 and as soon as the pin 40 comes into contact with the end of lever 44, the spring motor is again arrested.

In the construction illustrated in Figs. 1-4, in order to allow the strips to be set at any time, the sprockets are driven from the spindle 31 by the friction of compression springs 45 inserted between the sprockets and collars 46 fixed on the spindle. The sprockets 18 and 27 have bevel wheels 47 and 48 which gear with bevel wheels 49 and 50 on adjusting shafts 51 and 52 respectively. These shafts are fitted with hand wheels or knobs 53 and 54 to enable them to be rotated. The springs 45 allow the sprockets to be turned on their spindle and thus enable the setting of the strips to be adjusted. In this construction, the sprocket 22 is driven by frictional contact with the sprocket 18 and to effect relative resetting of the strips 10 and 11, it is necessary to hold the sprocket 22 while turning the knob 53 which drives the sprocket 18.

The take-up spindle 20 is normally driven from spindle 31 through bevel gearing 55, but when setting the strips by hand, the take-up rollers 14 and 28 must be turned on the spindle 20 to take up the slack strip.

In order to re-wind the strips on to the let-off spools 13 and 24 at the end of the year, the spindles 19 and 59 are each fitted with bevel gears 60 and 61 respectively which mesh with bevel gears 62 and 63 on shafts 64 and 65 which carry crank handles 66 and 67. Any type of clutch or ratchet device, such as the spring clutch 68 is provided between the crank handles and shafts 64 and 65 so that the crank handles do not normally rotate. By engaging the crank handles 66 and 67 with their respective shafts, the spools 13 and 24 may be rotated to re-wind the strips from the take-up spools 14 and 28 on the let-off spools 13 and 24.

As above explained, the arrangement shown in Figs. 1 to 4 does not provide for

driving the take-up spindle when setting the strips. Fig. 5 shows an alternative construction in which the sprockets 18 and 27 have their bevel gears 47 and 48 connected to chain wheels around which pass chains 56 and 57 which drive similar chain wheels on the take-up spindle 20. The intermediate sprocket 22 is frictionally driven in both cases by the sprocket 18.

In Fig. 5 I have shown pressure rollers 58 for holding the perforated strips in engagement with the sprockets.

In the arrangement shown in Fig. 6, the sprockets 18 and 27 have their bevel gears 47 and 48 fixed to the sprockets, which are free to turn on the spindle 31. A double-pin clutch member 69 in slotted engagement with a cross pin 70 on the spindle 31 is normally pressed by a spring 71 into engagement with the gear 47 or 48, so that the two pins on clutch member 69 engage two holes in the bevel-gear. In this position, (shown in the lower part of Fig. 6), the spindle 31 drives the sprockets. The clutch member 69 may be withdrawn from engagement with the bevel gear against the pressure of spring 71 by a control lever 72 (as shown in the upper part of Fig. 6), whereupon the sprocket is free to be adjusted by rotation of the setting spindle 51 or 52.

It will of course be apparent that the construction is capable of varied modification without departing from the scope of the invention set forth in the appended claims.

Claims:

1. In combination, a clock having three apertures in the dial thereof, a movable strip positioned behind each aperture, a let-off spool, a driving spool, and a take-up spool for two of said strips, rollers around which the other strip forms an endless band, the driving spool for one of said strips operatively engaging one of said rollers, and mechanism controlled by said clock for simultaneously rotating said spools, whereby said strips and band move at predetermined intervals of time.

2. In combination, a clock having three apertures in the dial thereof, a movable strip positioned behind each aperture, a let-off spool, a driving spool, and a take-up spool for two of said strips, rollers around which the other strip forms an endless band, the driving spool for one of said strips frictionally engaging one of said rollers, and mechanism controlled by said clock for simultaneously rotating said spools, whereby said strips and band move at predetermined intervals of time.

3. In combination, a clock having three apertures in the dial thereof, a movable strip positioned behind each aperture, a let-off spool, a driving spool, and a take-up spool for two of said strips, rollers around which the other strip forms an endless band, said band being positioned intermediate said strips, the driving spool for one of said strips operatively engaging one of said rollers, and mechanism controlled by said clock for simultaneously rotating said spools, whereby said strips and band move at predetermined intervals of time.

In testimony whereof I affix my signature.

REGINALD N. REID.