Nov. 30, 1926. **1,608,906**

F. NEDBALEK

CLOCK OPERATED CALENDAR

Filed August 12, 1925 4 Sheets-Sheet 1

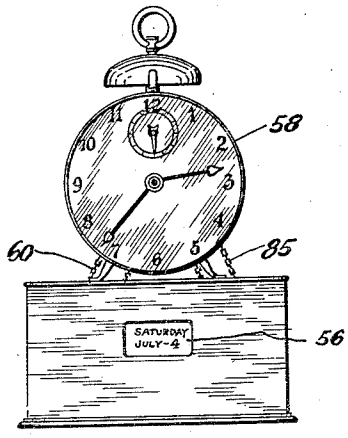


Fig. 1

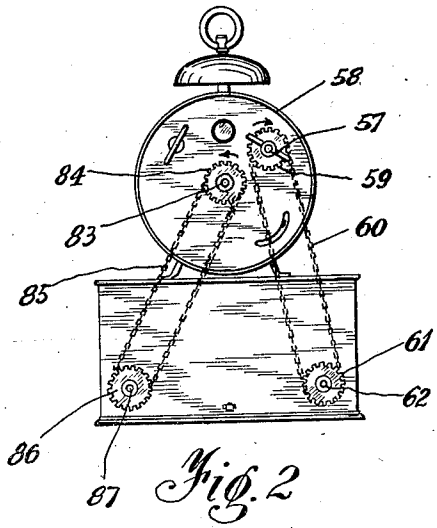


Fig. 2

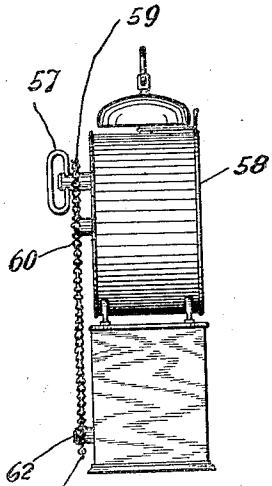


Fig. 3

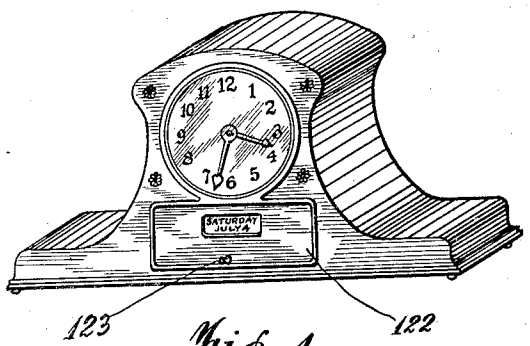


Fig. 4

INVENTOR:

Frank Nedbalek

by Ralph L. Smith et al

Paul Prichard.

Attorneys

Nov. 30, 1926. 1,608,906

F. NEDBALEK

CLOCK OPERATED CALENDAR

Filed August 12, 1925 4 Sheets-Sheet 2

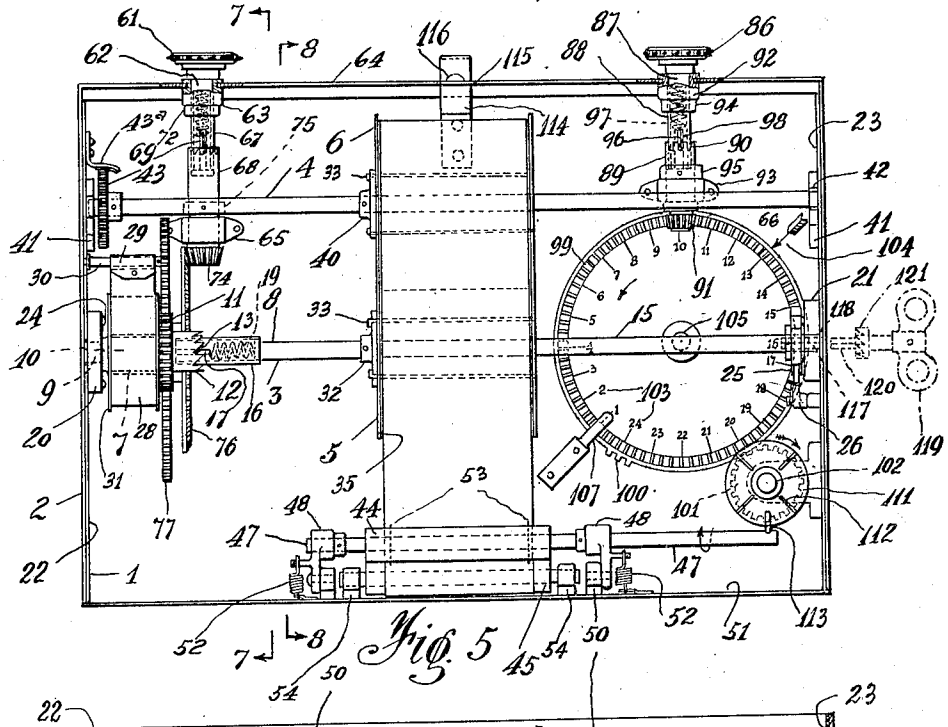


Fig. 5

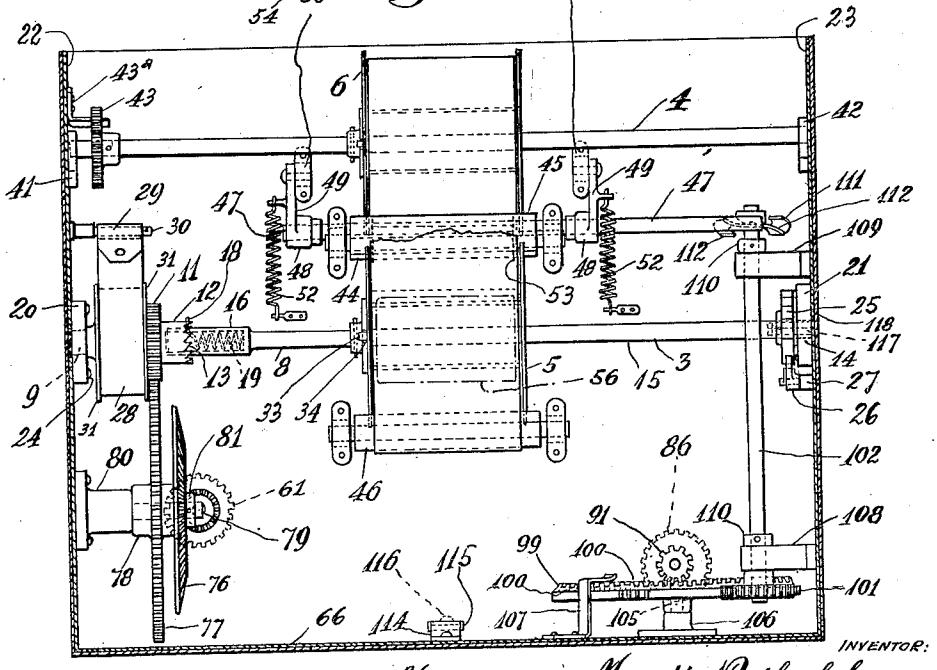


Fig. 6

INVENTOR:
Frank Nedbalek
by Ralph Orwatt et al
Paul Purchard
Attorneys

Nov. 30, 1926. 1,608,906

F. NEDBALEK

CLOCK OPERATED CALENDAR

Filed August 12, 1925 4 Sheets-Sheet 3

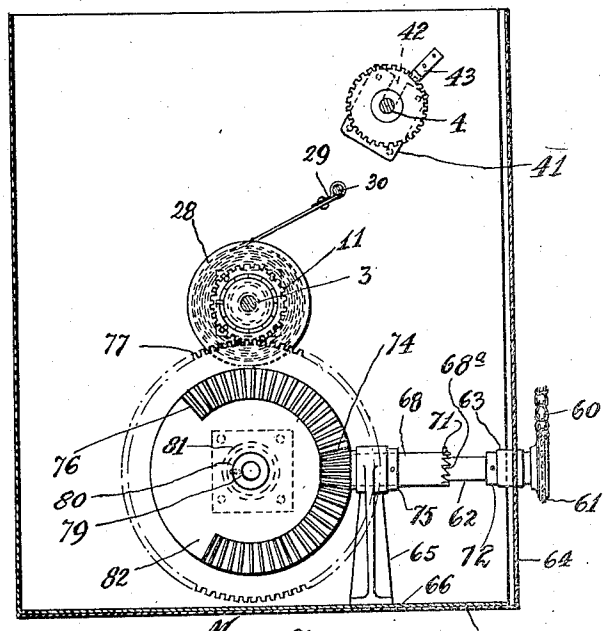
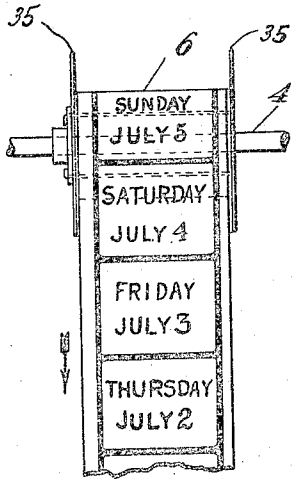


Fig. 7



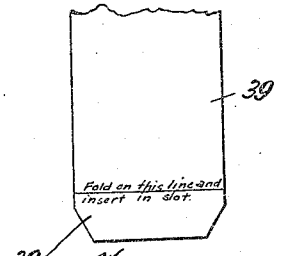


Fig. 9

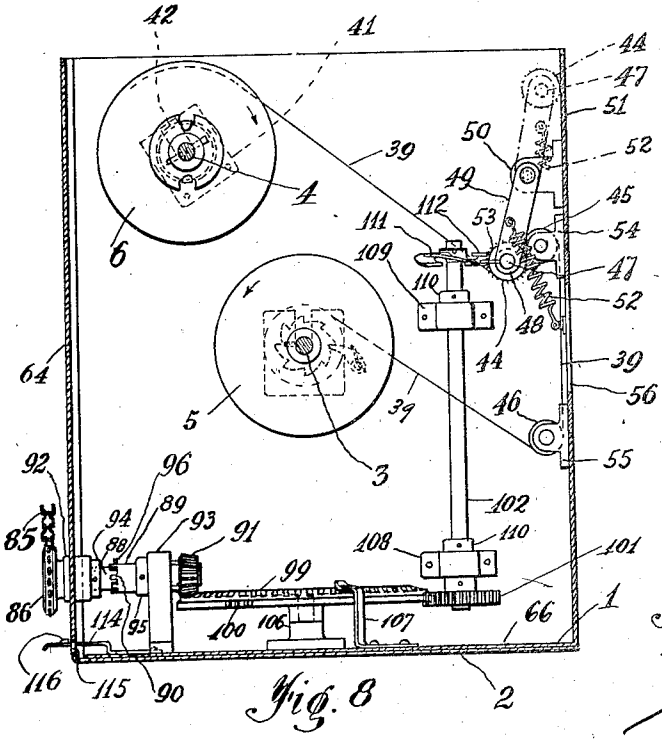


Fig. 8

INVENTOR.

Frank Nedbalek

by Ralph Doueatt and

Paul Punchard

Attorneys.

Nov. 30, 1926. 1,608,906

F. NEDBALEK

CLOCK OPERATED CALENDAR

Filed August 12, 1925 4 Sheets-Sheet 4

Fig. 10

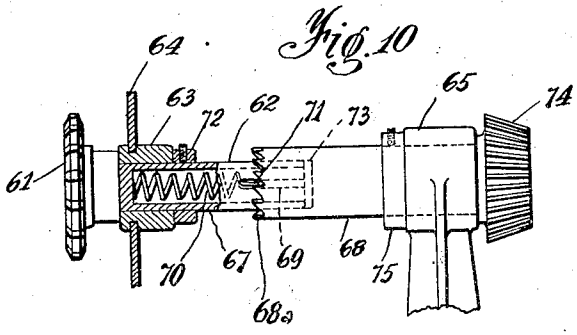


Fig. 11

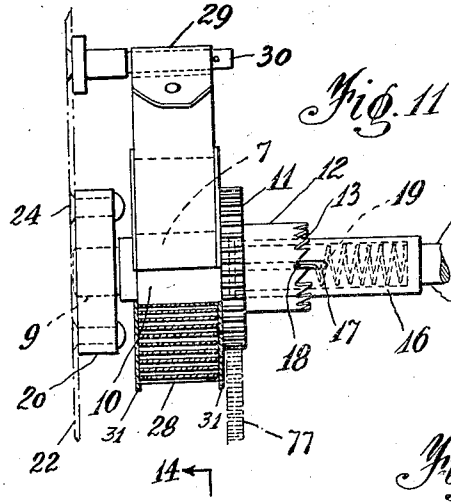
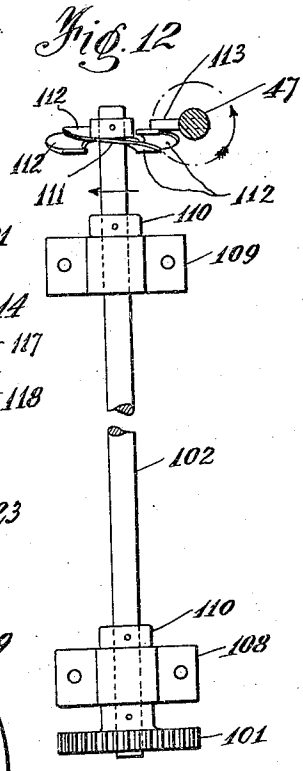


Fig. 12



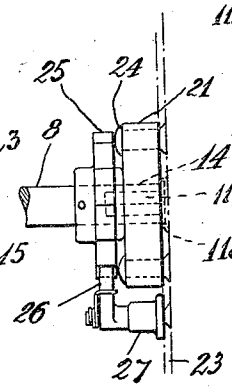
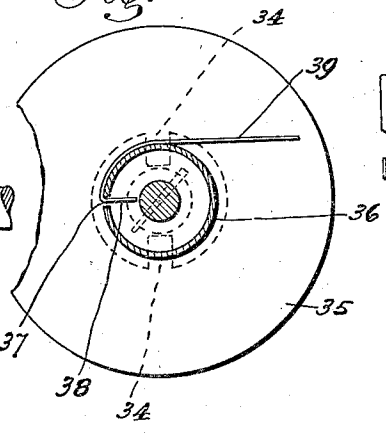


Fig. 14



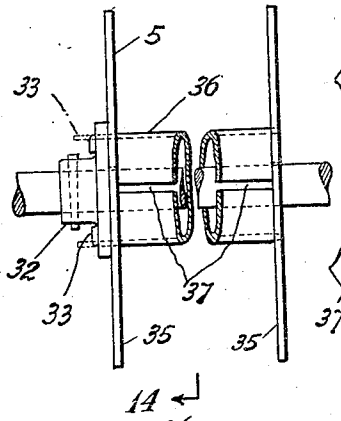


Fig. 13

INVENTOR:
Frank Nedbalek
by Ralph Donath and
Paul Prichard
Attorneys

Patented Nov. 30, 1926. 1,608,906

UNITED STATES PATENT OFFICE.

FRANK NEDBALEK, OF DUQUESNE, PENNSYLVANIA.

CLOCK-OPERATED CALENDAR.

Application filed August 12, 1925. Serial No. 49,716.

This invention relates to calendars and more in particular to automatic clock operated calendars.

The primary object of this invention is to provide a mechanical calendar device which is adapted to be used in connection with alarm clocks, or other spring operated clocks of similar design. Another object of this invention is to provide a calendar in which a renewable strip, or ribbon, of paper containing the days of the year is automatically changed by the clock to which said calendar is connected. A further object is to provide such a calendar which is provided with all the adjustable features required to take care of the various exigencies occurring in the year-round operation of a clock. Additional features and advantages of this invention will appear from the following description considered in connection with the accompanying drawings forming part of this application and in which:

Fig. 1 represents a front elevation of an alarm-clock mounted upon and operating my mechanical calendar.

Fig. 2 is a rear elevation of Fig. 1.

Fig. 3 is a side elevation of Fig. 1.

Fig. 4 is a perspective view showing a more artistic application of my invention.

Fig. 5 is a top plan view of the mechanical calendar operating mechanism.

Fig. 6 is a front elevation of the calendar operating mechanism with the front wall removed, or assumed transparent, to better illustrate the mechanism.

Fig. 7 is a cross section taken on line 7—7 in Fig. 5.

Fig. 8 is a cross section taken on line 8—8 in Fig. 5.

Fig. 9 is a detail view showing the printed ribbon of the mechanical calendar.

Fig. 10 is a detail view, partly in section, of the winding shaft and connected parts.

Fig. 11 is an enlarged view, partly in section, of the power-spring and shaft mechanism therefor.

Fig. 12 is an enlarged view of the escapement-shaft and associated parts.

Fig. 13 is a front elevation, broken off, of the reels for the calendar ribbons.

Fig. 14 shows a section taken on line 14—14 in Fig. 13.

Referring to the drawings, the calendar mechanism is enclosed in an inner casing 1 open at the front and top, which slidably engages an outer casing 2 which is open at the rear and top. Positioned within said casings is the drive-shaft 3 and the idler-shaft 4 upon which are respectively mounted the wind-up reel 5 and the supply-reel 6.

The drive shaft 3 is composed of two coaxially disposed portions, namely the short spring hub 7 and the long portion 8. The former comprises a journal 9, the hub 10, the integral spur-gear 11 and the clutch portion 12 having at its outer end the triangular clutch-teeth 13.

The long portion 8 of the drive-shaft includes the journal 14, the solid section 15 and the hollowed portion 16 which is provided at the end with a slot 17 of suitable width and depth to accommodate the outwardly bent end 18 of the coil-spring 19 which is inserted in said hollow portion. The hollow shaft 16 fits snugly within the clutch portion 12, whereby both parts of the drive-shaft are maintained in proper alignment. Suitable bearings 20 and 21 for the drive-shaft are secured to the side-walls 22 and 23 of the inner casing, by means of rivets 24. Secured to the shaft section 15 and adjacent the bearing 21 is a ratchet-wheel 25 which is engaged by a spring pressed pawl 26 rockably mounted on a support 27 secured to the inner wall 23.

The power required to automatically operate the calendar-ribbon is derived from a power-spring 28 having its inner end secured to the hub 10 and its outer end 29 attached to a post support 30 fastened in any desired manner to the wall 22 of the inner casing. To properly guide the many convolutions of the power-spring, the latter is preferably placed between the guide-disks 31 securely held on the hub 10.

Suitably located and secured on the solid shaft 15 is a flanged hub 32 to which is permanently fastened the wind-up reel 5 by means of short bendable lugs 33 which engage slots 34 cut in the periphery of said hub. This reel is composed of two lateral disks 35 centrally apertured to fit snugly on the shaft 15, and of a drum 36 in which is provided a longitudinal slot 37 wherein may be inserted the starting end 38 of the calendar-ribbon 39, shown especially in Fig. 9.

In proper alignment with the wind-up reel is positioned on the idler-shaft 4 the supply reel 6 which is removably securable thereon by means of a flanged hub 40 fastened on the shaft. The construction of

said reel is identical to that of the wind-up reel above mentioned and, therefore, need not be described here. Suffice it to say that the supply-reel is preferably sold to the trade with the calendar-ribbon wound thereon and that the former must be removed from the idler-shaft whenever the ribbon is run out. For this reason, the lugs 33 of the reel are made sufficiently pliable to permit their bending over the flanged hub 40 by hand, and without using any special tool.

The idler shaft rests in bearings 41, secured to the inner casing, which are preferably open to facilitate the removal of the shaft and reel when required. As shown in Figs. 7 and 8, the open slots 42 wherein the shaft lies are inclined in opposite direction to the pull on the calendar-ribbon, to prevent said shaft from being forced out of its bearings. To maintain a certain tension in the calendar-ribbon 39, a friction disk 43, preferably knurled at the periphery, is securely mounted on the idler-shaft to be engaged by a spring-feather 43ª, thereby causing enough friction on the shaft to maintain the calendar-ribbon fairly taut.

On its way from the supply-reel to the wind-up reel, the calendar-ribbon engages the friction rollers 44 and 45 and the lower guide roller 46. These rollers are preferably lined with rubber to insure a better frictional contact with the calendar-ribbon. The shaft 47, of roller 44, is rotatably mounted in bearings 48 provided in the links 49 which are hingedly mounted on brackets 50 fastened to the front wall 51 of the inner casing. Tension-springs 52 are also used on each side of the roller 44 to increase the pressure thereof on the calendar-ribbon. The point of attachment of these springs on said links is such that the latter will be held in their lifted position, shown in dot and dash lines in Fig. 8, by the tension in said springs.

To prevent any slipping of the ribbon on the roller 44, the latter is preferably provided adjacent both ends with peripherally disposed short and sharp pins or protuberances 53 which slightly penetrate the edges of the ribbon and insure a substantially positive engagement between the latter and the roller 44.

The rollers 45 and 46 are rotatably mounted in bearings 54 and 55 respectively, secured to the front wall 51. An aperture 56 of suitable size is cut in the latter intermediate said rollers to expose part of the face of the calendar-ribbon upon which the dates are printed.

The clock-spring 28 is wound directly from the usual spring-winder 57 provided on the alarm-clock 58 by means of the following mechanism: A chain-sprocket 59 is secured on the exterior projection of the spring-winder 57 and is connected by a suitable chain 60 to another sprocket 61 securely fastened at the outer end of the winder-shaft 62 which is suitably supported by means of the bushing 63, secured in the rear wall 64 of the outer casing, and the bearing support 65 fastened on the bottom 66 of the inner casing.

The winder-shaft 62 is composed of two telescoping parts 67 and 68. The first, and smaller one, extends through the wall 64 and carries the sprocket 61. This part is centrally bored to a desired depth and is provided at its inner end with a slot 69. Within the bore of part 67 is placed a coiled spring 70, the outer end of which has an outwardly directed extension 71 which engages the slot 69 and protrudes a certain amount out of the part 67. A collar 72 is also shown to hold this part of the shaft in position.

Part 68 is provided with a central bore 73 to be engaged by part 67 and has cut at its outer end triangular clutch-teeth 68ª which are engaged by the spring extension 71. At the inner end of part 68 is securely positioned the bevel gear 74. A collar 75 is used to prevent any axial displacement of part 68 in its bearing support.

The power imparted to the shaft 62 is transmitted to the power-spring 28 through the agency of a segmental bevel-gear 76 and the spur-gear 77 which are keyed on a common hub 78 mounted for rotation on the stationary pin 79 secured in the bracket 80 fastened to the wall 22. A collar 81 holds these gears in proper position. A spur-gear 77 meshes with the spur-gear 11 by means of which the power-spring 28 is wound. The reason for using a segmental bevel-gear 76 in connection with the pinion 74 is that the power-spring 28 need not be wound as many turns as the main-spring of the alarm-clock, since the former works only a short time, once a day. It will be seen from Fig. 7 that when the pinion has rotated a few times, say from 4 to 6 times, it will leave its engagement with the teeth of the segmental-gear and enter the blank space 82, so that the former will not be affected by any further rotation of the pinion.

The daily automatic shifting of the calendar-ribbon is operated from the center-shaft 83 of the alarm-clock, which shaft, as is well known, rotates but once every hour. Upon this shaft is secured the chain-sprocket 84 which transmit its roation, by means of the drive-chain 85, to a sprocket-wheel 86 mounted on the calendar operating shaft 87.

The construction of this shaft is substantially identical to that of the winder-shaft 62 and comprises the male portion 88 which engages the female portion 89 having at its outer end clutch-teeth 90 which are made rectangular in shape to permit rotation of the pinion 91 in either direction. This shaft is supported in the bushing 92 and the bearing-support 93 and is properly held in place

by the collars 94 and 95. Power is transmitted from the sprocket 86 to the pinion 91 by the outward extension 96 of the spring 97, which extension engages the slot 98 and the teeth 90.

The reason for making the shafts 62 and 87 in two telescoping parts is to permit the extraction of the inner casing and mechanism therein without disturbing the chain-drives connecting the alarm-clock with the calendar mechanism.

The pinion 91 meshes with a horizontal crown-gear 99, the diameter of which is 24 times that of the pinion, so that said gear will rotate only once a day. On the outer periphery of said gear are also provided a few teeth 100 which come into meshing engagement every 24 hours with a gear 101 secured at the lower end of the vertical escapement-shaft 102. To facilitate the proper adjustment of the teeth 100 in relation with the gear 101, the crown-gear 99 is preferably marked with graduations 103 running from 1 to 24, and a pointer 104 is provided on the bottom 66 of the inner casing. The crown-gear is rotatably mounted on a vertical pin 105 secured on a pedestal 106 fastened in any desired manner to the bottom 66. A friction device, such as the spring-feather 107, bearing on top of the crown-gear-teeth is also shown to prevent undesired rotation of the crown-gear due to jars or other accidental causes.

The escapement-shaft 102 is mounted for rotation in the bearings 108 and 109 secured to the side-wall 23. Collars 110 insure proper location of this shaft. At the upper end of the latter, at substantially the same level as the roller-shaft 47, is securely mounted the escapement disk 111, which in the present case is shown as having four vanes, as shown especially in Fig. 12; the high point of each vane being positioned directly above the low point of the adjacent vane. At the right end of the roller shaft 47 is secured a pin 113 which normally presses on the top side of any one of the vanes, due to the action of the pull of the calendar-ribbon 39 on the roller 44.

The inner and outer casings 1 and 2 are locked into proper relation by means of any suitable and desired locking device. In the drawings I have shown the use of a simple catch-spring 114 which is riveted to the bottom 66 and which engages an aperture 115 provided in the rear wall 64 of the outer casing. A lug 116 is struck up in the catch-spring to engage the upper side of this aperture and prevent the accidental extraction of the inner casing.

Having described the principal elements of my invention, its operation may be succinctly explained, as follows:

When the main spring of the alarm-clock is wound up, say in the direction of the arrow over the sprocket-wheel 59 in Fig. 2, the power-spring 28 will also be wound up as many turns as the segmental gear 76 will permit, as has already been explained. During the winding up process of the spring 28, the end 18 of the coil-spring 19 will simply snap over the clutch-teeth 13, and the long portion 8 of the drive-shaft upon which the wind-up reel 5 is mounted will remain stationary, it being further prevented from rotating by the ratchet-pawl arrangement 25 and 26. However, the reaction created by the tension in the power-spring will tend to rotate the clutch-teeth 13 in the opposite direction and this tendency to rotate will also be imparted, on account of the shape of the clutch-teeth 13, to the long shaft portion 8 and the wind-up reel 5, which latter would tend to roll up the calendar-ribbon 39. The tension in the latter causes the pin 113 to bear on the top of the escapement-disk 11 and, therefore, actual rotation is prevented, for the time being.

The change of date on the calendar-ribbon is preferably done at or about midnight, which hour is indicated by the graduation "24" on the crown-gear 99. When this time has arrived, the teeth 100 on said gear impart to the gear 101, the escapement-shaft 102 and the escapement-disk 111 a quarter turn, in the present design, which causes the pin 113 to glide along the top of one of the vanes until it reaches the lower end thereof, at which instant the roller-shaft 47 will be free to rotate practically a full turn, that is, until the pin strikes the top of the next following vane, owing to the tension existing in the calendar-ribbon. The size of the rollers 44, 45 and the spacing of the dates on the ribbon are so proportioned that each turn of the roller-shaft will shift the calendar-ribbon to the next following date. This same process is repeated for every day of the year, at the end of which a new calendar-ribbon must be inserted, unless a longer ribbon be used. The renewal is done by pulling the inner casing out, unrolling the calendar-ribbon which has now gathered on the reel 5 and replacing the used up supply-reel by a new one in a manner that will be readily understood by those versed in the art.

Should it occur that, for any reason, the alarm-clock has stopped running, the calendar is readily set to the proper date upon resumption of operation in the following manner, after the inner casing has been extracted and the roller-shaft 47 raised in the position shown in dot and dash lines in Fig. 8:—At the end of the shaft portion 15 there is provided a polygonal aperture 117, and an opening 118 is cut opposite this end in the inner wall 23. A special set-key 119, having a suitably shaped shank 120 is supplied with every apparatus and by

means of this key the shaft section 15 is rotated until the proper date appears in the sight-aperture 56.

However, this rotation causes the unwinding of the power-spring 28, and the latter must be wound up again by inserting the same set-key 119 in the hollow portion 68 of the winder-shaft 62. For this purpose, the set-key is also provided with a crown 121 upon which are cut suitable teeth to fit those on the shaft portion 69.

The time required for making the above changes or adjustments amounts to only a few minutes, generally. But, in the meanwhile, the center-shaft 83 and its sprocket 84 of the alarm-clock keep on turning slowing, so that when the inner casing is again inserted in place, the spring extension 96 may not readily engage one of the spaces between the rectangular clutch-teeth 90. When the lapse of time is short, no further adjustment need be made, as this extension will soon engage one of said spaces and it is of no great importance whether or not the change of date be made a few minutes before or after midnight.

If the calendar mechanism has been disconnected too long from the alarm clock, it becomes necessary to make adjustments to the calendar-shifting mechanism also. This may be done by using the same set-key 119 on the clutch-teeth 90 or, preferably, by rotating the crown-gear 99 by hand until the actual hour of the day at which this regulating is being done, as read on the graduations 103, appears in line with the pointer 104. When so adjusted, the change of date will occur at midnight.

The arrangement shown in Figs. 1 to 3 enables the application of my invention in connection with old alarm-clocks or other similar clocks. More pretentious effects are obtained in the embodiment illustrated in Fig. 4 wherein a complete calendar mechanism would be assembled in a drawer-like container 122 provided with a pull knob 123, and which would correspond to the inner casing mentioned hereinbefore. The construction of the interior mechanism would be the same as above described, except for minor changes required by the shape of the outer casing.

Also, if desired, the calendar ribbon may have printed thereon, in addition to the dates, supplementary matter such as historical or religious holidays, etc., corresponding to the various dates.

As will be understood, as suggested herein, there may be slight changes made in the construction and arrangement of the details of my invention without departing from the field and scope of the same, and I intend to include all such variations, as fall within the scope of the appended claims, in this application in which the preferred form only of my invention has been illustrated and described.

I claim:—

1. In a clock operated calendar, a supply-reel; a calendar-ribbon wound thereon; a wind-up reel and a spring operated mechanism adapted for winding said ribbon from said supply-reel onto said wind-up reel; a plurality of guide-rolls and a pressure-roll positioned intermediate said reels and engaged by said ribbon, and a release mechanism adapted to periodically release a definite portion of said ribbon onto said wind-up reel, said release mechanism comprising a stop-pin positioned on the shaft of said pressure-roll, an escapement-disc and clock operated means for periodically rotating said escapement-disc.

2. In a clock operated calendar, a supply reel; a calendar-ribbon wound thereon; a wind-up reel and a spring operated mechanism adapted for winding said ribbon from said supply-reel onto said wind-up reel; a plurality of guide-rolls for said ribbon; a pressure roll adapted to exert a yielding pressure upon one of said guide-rolls and to be rotated by said ribbon; a shaft for said pressure-roll; a stop-pin positioned on said shaft and adapted to prevent the rotation thereof; an escapement-disc comprising a plurality of inclined sectoral vanes adapted to be engaged by said stop-pin, and clock operated means for periodically releasing the engagement between said stop-pin and escapement-disc to permit the rotation of said friction-roll for the purpose of winding a definite portion of said ribbon on said wind-up reel.

In testimony whereof I affix my signature.

FRANK NEDBALEK.