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Meitinger et al.

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[45] **Aug. 14, 1973**

[54] **TIMEPIECE CALENDAR INFORMATION CHANGING APPARATUS**

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Nov. 26, 1971 Germany ..... P 21 58 728.0

[52] **U.S. Cl.** **58/58**

[51] **Int. Cl.** **G04b 19/24**

[58] **Field of Search** ..... 58/4 R, 4 A, 58

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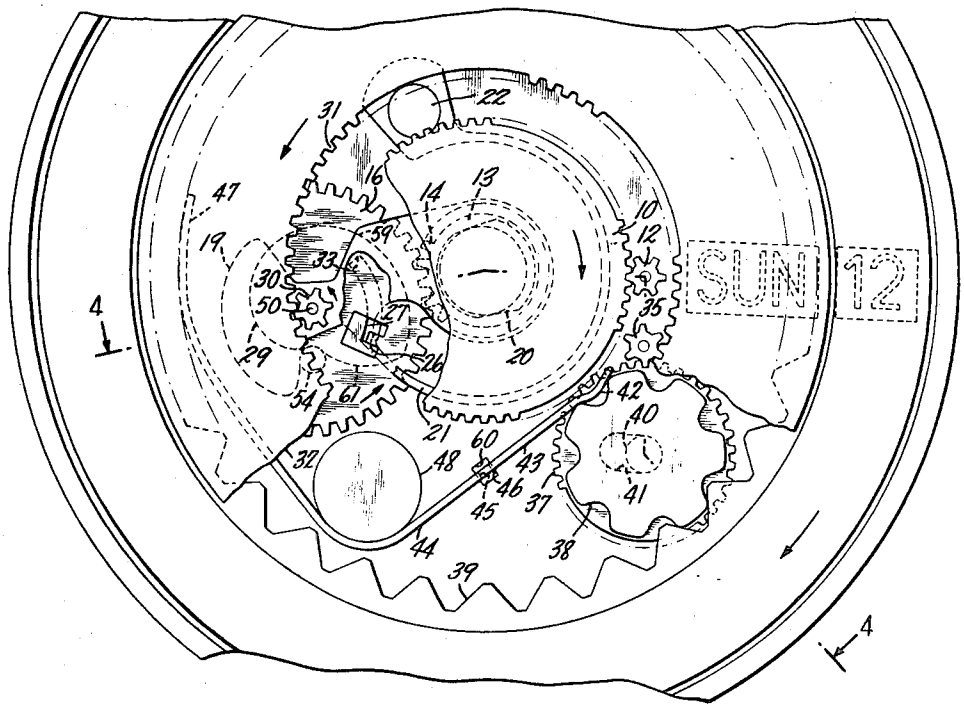
[57] **ABSTRACT**

Apparatus for periodically changing calendar information displayed in a timepiece while holding the information-carrying elements motionless between successive changes to insure that the current day and date are properly displayed. A cam mechanism connects the element or elements to the time measuring components of the timepiece so as to allow relative movement therebetween during the interval between successive day and date changes but to impart a quick advancing motion to the elements at the end of the interval to display the next succeeding day and date. A positive drive connection is thus always maintained with the information-carrying elements, notwithstanding that they are moved only intermittently. The cam mechanism also permits turning back of the day element for resetting purposes and provision is made for adjustment of the date element independently of the day element.

24 Claims, 4 Drawing Figures



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4 Sheets-Sheet 1

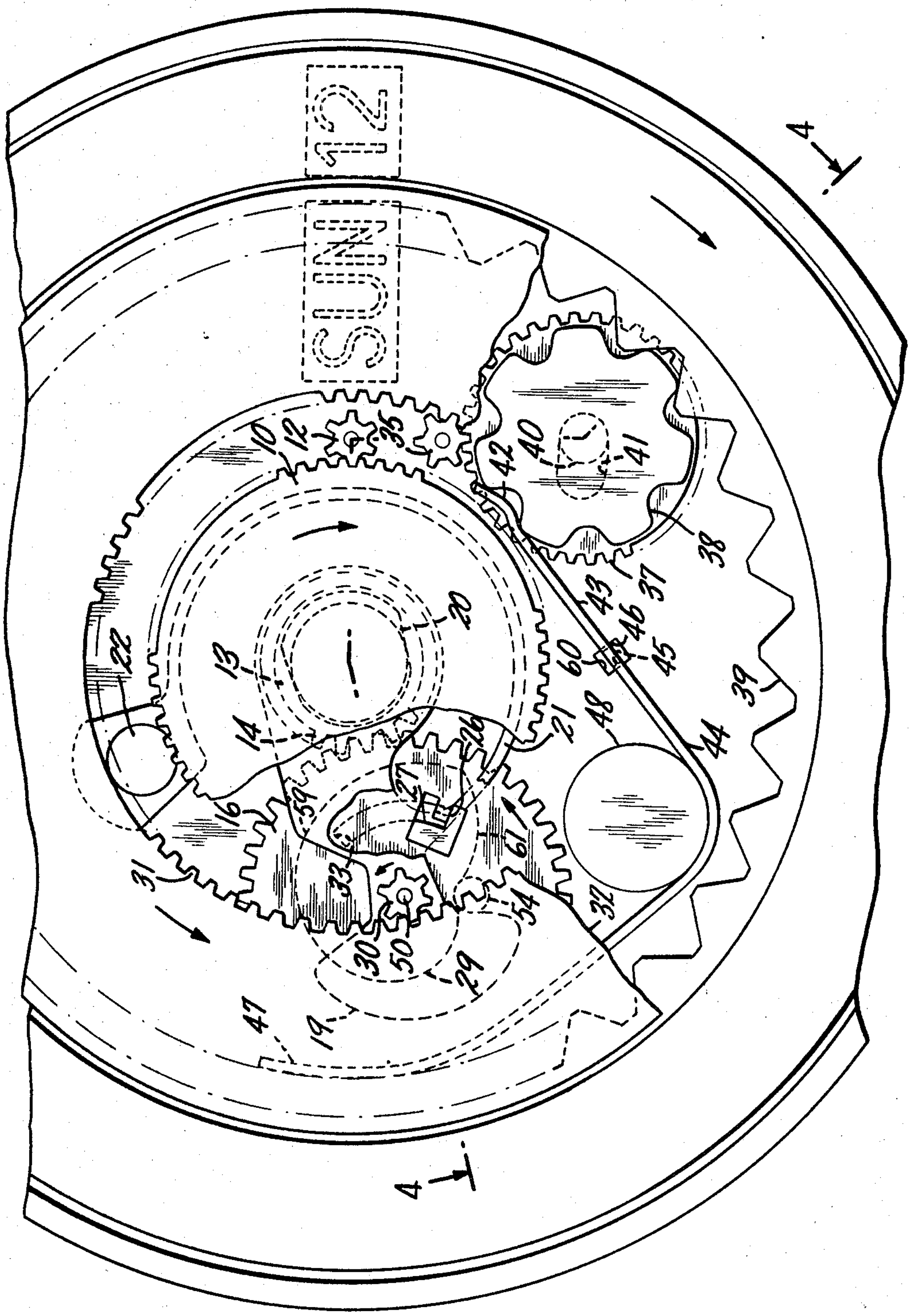

FIG. 1

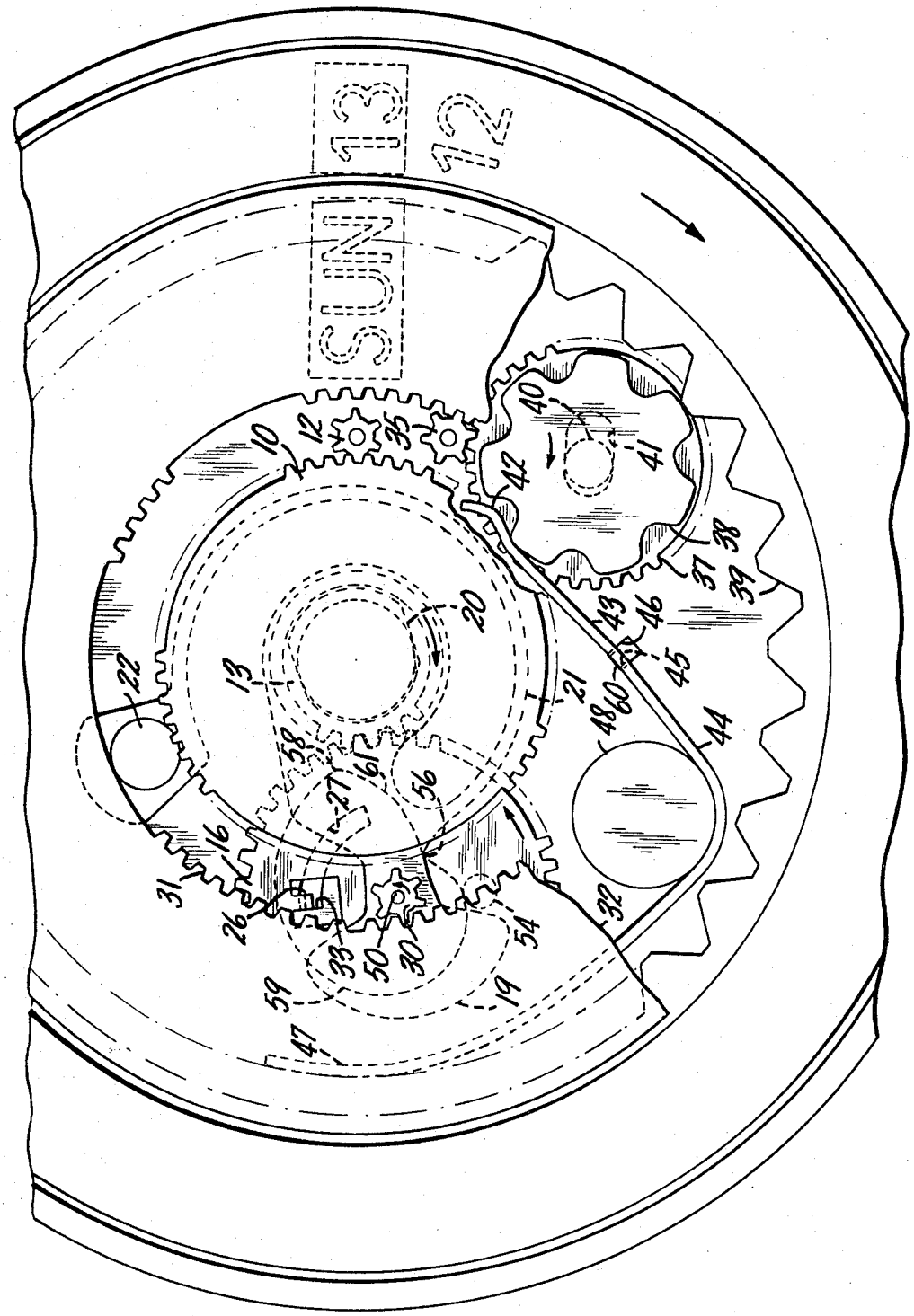
FIG. 2
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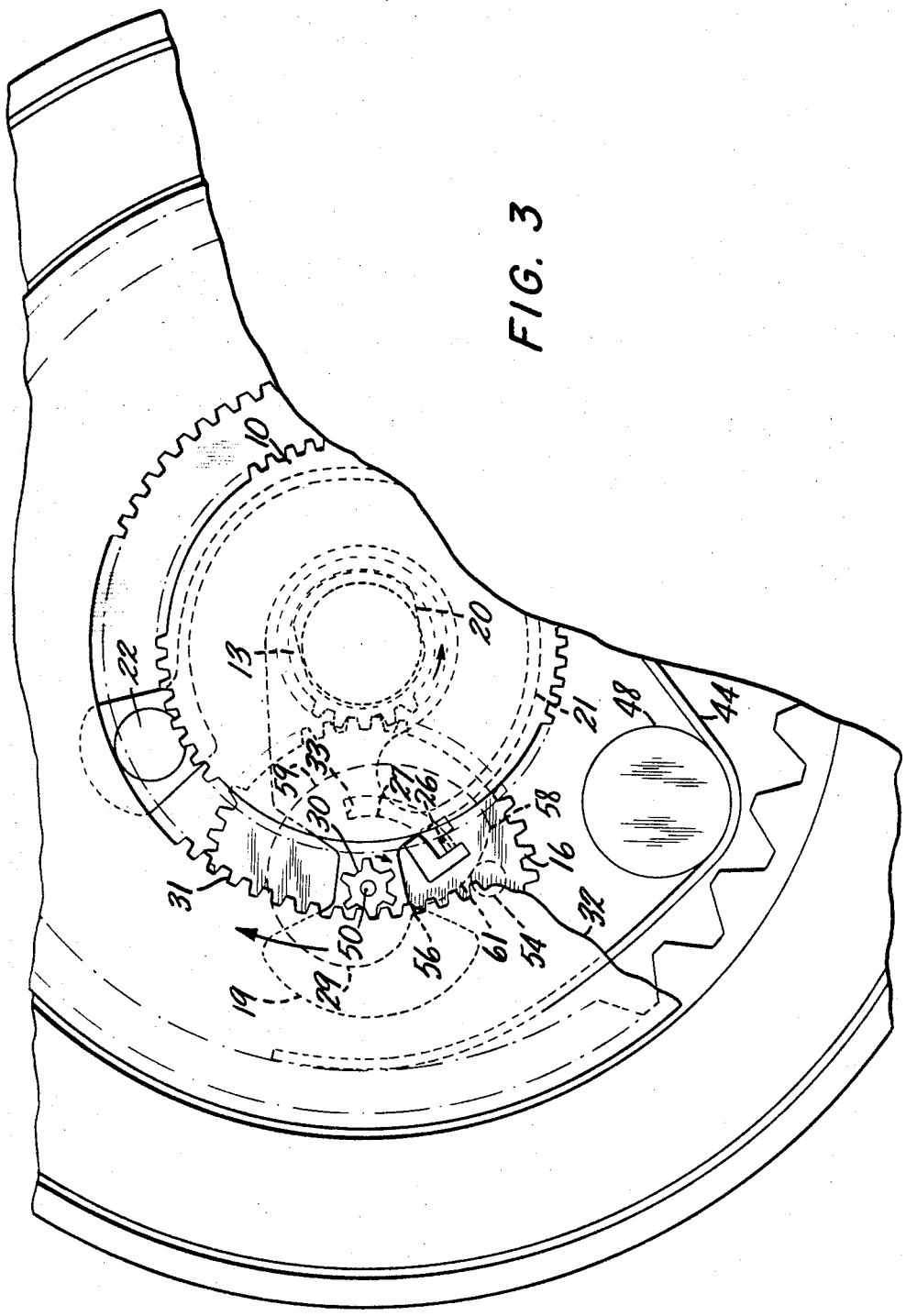
FIG. 3



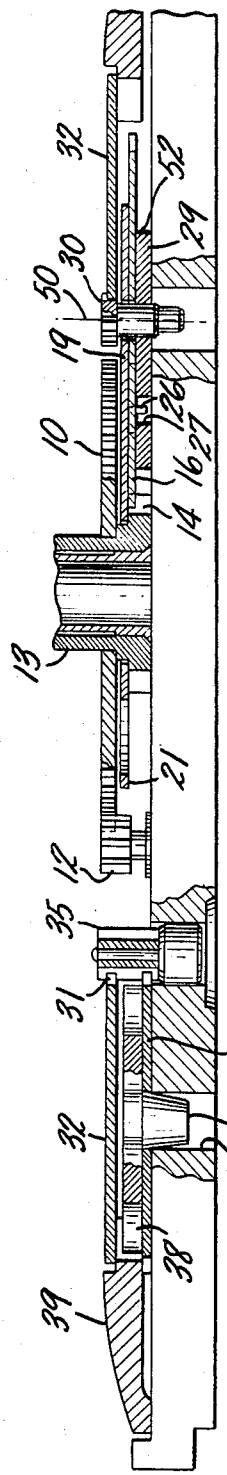


FIG. 4

TIMEPIECE CALENDAR INFORMATION CHANGING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention pertains generally to the periodic changing of the calendar information displayed in a timepiece and, more particularly, to apparatus that intermittently and rapidly changes the calendar information while maintaining the information-carrying elements substantially motionless during the intervening time interval to assure proper display of the current calendar information.

2. Prior Art

Commonly, devices for changing calendar information in timepieces, such as disclosed for use in watches by the published German Patent Application No. 1,523,770, provide an arrangement in which the date information carrying component has gear teeth which at all times mesh with a pinion that is part of the hour-hand mechanism. The date wheel and associated gear mechanism is thus continuously moved. In order to periodically change the calendar information displayed in this device, a movable shutter is mounted between the dial face and the watch component carrying the date calendar information. The shutter is equipped with a cut-out through which only one figure printed on the date wheel may be observed, and periodic changing of the calendar information displayed is accomplished by intermittent shifting of the shutter, not the information-bearing component itself.

The use of a movable shutter of this nature between the dial and the date wheel is disadvantageous. In operation, the shutter is easily blocked by uneveness in the dial face and in any event results in an increase in the thickness of the watch. Moreover, parts of the shutter are visible from the dial side of the watch and must be surface treated to conform to the dial. In addition, the continuous running of the date wheel results in the information not being positioned in a constant relationship with the other indicators on the watch face. This construction also necessitates a comparatively wide, oblong cut-out in the watch face.

Other methods for the periodic changing of calendar information include those in which the date wheel is advanced by an intermittently operating pawl and ratchet wheel arrangement. The operation of these devices requires, however, that the friction between the pawl and the ratchet wheel be overcome before changing of the calendar information can be effected. Since only comparatively small forces are available in a timepiece for this purpose, the date wheel frequently is either weakly mounted, leading to erroneous changes in the calendar information displayed, or the frictional forces become so great that the gear mechanism of the timepiece is overloaded. The latter circumstance may result in a pronounced modification of the frequency of the time standard.

SUMMARY OF THE INVENTION

The novel calendar information changing apparatus of the present invention overcomes the foregoing and other disadvantages of the prior art by providing for periodic movement of the information - carrying elements of a timepiece, through a continuous, positive connection with the time measuring mechanism of the timepiece which maintains the elements in substantially

fixed position during the interval between successive information changes but which advances the elements, by application of a relatively slight force, to change the information displayed at the end of the intervening interval.

More specifically, apparatus constructed in accordance with the invention includes a timepiece element bearing calendar information at spaced intervals along its length, a rotatable member in continuous engagement with the element, supporting structure for the rotatable member that permits rotation of the member and movement of its rotational axis lengthwise of the information - carrying element, the supporting structure resiliently resisting such movement in the direction opposite to that in which the element is normally advanced, and a cam mechanism which drivably couples the rotatable member to the time measuring mechanism of the timepiece in a manner to control the rotational and lengthwise movements of the rotatable member such that substantially no movement is transmitted to the information - bearing element during the interval between successive calendar information changes, but at the end of the interval the element is advanced under the impetus of the resisting force of the supporting structure by a distance sufficient to bring the next successive calendar information into proper position for display. Suitably the information - bearing element may be formed with gear teeth along a periphery thereof, and the rotatable member may constitute a pinion gear for meshing engagement with the element gear teeth. Meshing of the pinion and element teeth is maintained at all times, thus affording a positive connection between the pinion and the element which prevents unintentional displacment of the element.

As a further feature, the cam mechanism is constructed to allow turning back of the information - bearing element without jamming between the cam surface and the pinion. Resetting of the calendar information is thereby facilitated.

In a preferred embodiment both a day element and a date element are provided, with the day element being engaged by the pinion. The date element is driven by the day element through a gear train which, though normally establishing meshing engagement with gear teeth on the date element, admits of disengagement with the date element to permit independent adjustment of the date information displayed. Engagement of the gear train with the date element is spring loaded to prevent inadvertent displacement of the element both when its movement is controlled by the day element and when it is adjusted independently of that element. According to the invention, the spring force resisting movement of the date element by the day element is relatively small, placing no undue load on the timepiece gear mechanism. On the other hand, independent movement of the date element, which typically would be done manually, is resisted by a relatively large spring force, thereby tending to prevent over-adjustment.

By the foregoing features, and other features which will become apparent hereinafter, the invention not only provides apparatus which overcomes the disadvantages of the prior art devices but requires comparatively few component parts.

It therefore also affords significant advantages in respect of reduced manufacturing costs and reduction in overall size of the timepiece. This particularly facili-

tates application of the apparatus to samll timepieces, such as, for example, ladies watches.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the invention, reference may be made to the following description of preferred embodiments, taken in conjunction with the figures of the accompanying drawings, in which:

FIG. 1 is a dial side view of an illustrative embodiment of the calendar information changing mechanism of the invention immediately after an advancement of the calendar information;

FIG. 2 is a dial side view of the calendar mechanism of FIG. 1 illustrating manual advancement of the date information relative to the day information;

FIG. 3 is a dial side view of the calendar mechanism of FIG. 1 on manual turning back of the calendar information; and

FIG. 4 is a partial cross-sectional view of the calendar mechanism of FIG. 1, taken along the line 4—4 of FIG. 1 and looking in the direction of the arrows.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring first to FIG. 1 of the drawings, a preferred embodiment of a timepiece having calendar information changing apparatus, according to the invention, comprises an hour wheel **10** engaged and advanced by a main drive pinion **12** and on which is ordinarily mounted an hour hand which, for purposes of clarity is not shown. Joined to and turning with the hour wheel **10** is a pinion **13** having teeth **14** which engage a day wheel **16.** Through this engagement with the hour wheel **10** by way of pinion **13,** the day wheel **16** always turns with the hour wheel **10.** The day wheel **16** is rotatably supported on a rocker **19.** Bearing surface **20** of rocker **19** is larger than pinion **13** and the rocker is therefore free to move radially in a counterclockwise or clockwise direction around the center of rotation of the pinion **13.** The rocker **19** includes a spring **21** attached to the time piece at position **22** and prestressed in a manner whereby the rocker **19** is continuously subjected to a counterclockwise torque. The day wheel **16** is provided with a projection **26** bent downwardly, as may best be seen in FIG. **4.** The projection **26** is received in a cut-out **27** of a disc cam **29.** In addition to the day wheel **16,** the rocker **19** supports the disc cam **29** and a rotatable member or pinion **20.** The pinion **30** and the disc cam **29** are rigidly connected so that rotation of the disc cam results in rotation of the pinion. As may best be seen in FIG. **4,** the day wheel **16** is supported by the rocker **19** between the rocker and the disc cam **29.** The pinion **30** engages the teeth **31** of a day element **32** which has imprinted thereon the days of the week in sequence to appear in an aperature in the dial face in the proper order as the element is rotated in a counterclockwise direction.

In addition, as may be seen in FIGS. **1** and **4,** the teeth **31** of the day element **32** engage a pinion **35** which meshes with a wheel **37.** The wheel **37** is fastened to a second wheel **38** which in turn meshes with the date element **39.** The date element **39** carries the numbers one (**1**) to thirty one (**31**) to appear in ascending sequential order in an aperature in the dial face as the element is rotated in a clockwise direction. The wheels **37** and **38** are connected to a pin **40** which is positioned in a cut-out **41.**

As may best be seen in FIG. **1,** wheel **38** is positioned by the curvature **42** of the end **43** of the spring **44.** The spring **44** is provided with a lug **45** that extends downwardly and is received within a cut-out **46** of the timepiece frame. A second end **47** of the spring **44** maintains pressure against the teeth of the date element **39** to keep the teeth of the wheel **38** engaged in the date element **39** without clearance and to provide resistance to the free revolution of the date element **39.** The spring **44** is installed by being bent around the projection **48** integral with the timepiece frame and inserting the lug **45** in the cut-out **46** to properly position the spring **44.**

During normal operation of the timepiece, as is shown in FIG. **1,** the hour wheel **10** is driven by the main drive pinion **12** thereby turning the day wheel **16** in the direction shown. The pinion **30,** the day wheel **16,** and the disc cam **29** all rotate about a common axis **50.** Since the day wheel **16** is not rigidly connected to the rocker **19,** the pinion **30** or the disc cam **29,** it is free to rotate in the position shown in FIG. **1,** until the projection **26** extending into the cut-out **27** of the disc cam **29** reaches the end **33** of the cut-out **27.** As shown in FIG. **2,** the continued rotation of the day wheel **16** after the projection **26** has reached the end **33** of the cut-out **27,** results in a rotation of the disc cam **29** and the pinion **30** attached thereto. The cam surface **52** of the disc cam **29,** shown in FIG. **4,** is urged into continual contact with a stop **54** by the counterclockwise torque applied to the rocker **19** by the spring **21.** The disc cam **29** has a rise displacement sector **59** and return displacement sector **61** bounded by a bottom dead center **56** and a top dead center **58,** as shown in FIG. **2.** As the revolution of the day wheel **16** causes the projection **26** to strike the end **33** of the cut-out **27,** thereby causing the disc cam **29** and the pinion **30** to turn, the rocker **19** is displaced by the action of the rise sector **59** of the disc cam **29** against the stop **54.** The rise sector **59** of the disc cam **29** is designed to shift the rocker **19** in a clockwise direction at a rate equal to the rate at which the teeth of the pinion **30** engage the teeth of the day element **32.** Thereby the pinion **30,** while remaining continuously engaged with the day element **32,** moves clockwise, and the day element **32** remains stationary. Additionally, the teeth of the pinion **30** are held into contact with the teeth of the day element **32** by the torque of the spring **21.**

Referring to FIG. **2,** the rotating pinion **30** continues to move counterclockwise relative to the stationary day element **32** until the day wheel **16** has turned the disc cam **29** until top dead center **58** passes stop **54.** At this instant, which corresponds to a time of mid-night, the rocker **19** is moved counterclockwise by the torque of the spring **21,** as the stop **54** slides along the cam surface from top dead center **58** to bottom dead center **56.** As the rocker **19** is pulled counterclockwise by the spring **21,** the pinion **30** is prevented from rotating clockwise by the action of the day wheel projection **26** against cut-out end **33** although, for reasons described below, the pinion does experience a small counterclockwise rotation. Since the pinion **30** cannot rotate in a clockwise direction, the inertia of the day element **32** is overcome by the torque of the spring **21** and the day element is shifted along with the counterclockwise movement of the rocker **19,** thereby changing the day indication which is viewed through an aperture in the dial face.

As may be seen in FIG. 1, the teeth of the day element 32 positively engage and thereby drive pinion 35 and in so doing positions the date element 39 by way of the wheels 37 and 38. When the day calendar information is changed by counterclockwise movement of the day element 32, pinion 35 is turned in a counterclockwise manner thereby resulting in a clockwise rotation of the wheels 37 and 38. The date element 39 is therefore shifted, against the tension of the spring 44 by the clockwise rotation of the wheel 38 and the day and date information displayed through the dial face are changed in unison.

In addition to assisting the normal changing of the components carrying the calendar information, the ability of the day wheel 16 to move independently of the disc cam 29 mades manual turning back of the indicator apparatus possible. As shown in FIG. 3, the rocker 19, the pinion 30 and the day element 32 all move clockwise on being manually turned back by a mechanism the details of which are not shown. As the pinion 30 and thereby the disc cam 29 are turned clockwise it is necessary for the rate of change of the cam surface over the return sector 61 to be gradual enough to prevent jamming of the stop 54 against that portion of the cam surface 52. The gradual rate of change of the return sector 61 required for manual turning back of the calendar information components, means that the disc cam 29 must be free to rotate in a counterclockwise direction during normal advancement of the calendar components, through an arc sufficient to permit the stop 54 to slide over the return sector 61 to bottom dead center 56 if the calendar information change is to be rapidly made. As the day wheel 16 is not capable of free turning due to its engagement with the hour wheel 10 by means of pinion 13, it is necessary to provide for free rotation of the disc cam 29 with respect to the day wheel 16. The provision of the cut-out 27 in the disc cam 29 and the projection 26 of the day wheel 16 solves the problem of providing an inter-connection between the day wheel and the disc cam while permitting limited free rotation therebetween.

In a preferred embodiment of the invention, the timepiece is provided with a cut-out 41, which, by sliding contact with the pin 40 therein, swings the wheels 37 and 38 through a curve concentric with the axis of rotation of the pinion 35 and disengages the teeth of the wheel 38 from the teeth of the date element 39. This means for disengaging the wheel 38 and the date element 39 is provided in order to facilitate the changing of the date element on manual compensation for the differences in the number of days in the various months of the year. In connection with the date changing apparatus the spring 44 fulfills two functions: it eliminates the gear play between the wheel 38 and the date element 39, which could result in unsymmetrical positioning of the date information with respect to the day information on the day element 32; and the spring provides increased pressure during manual advancing of the date element to prevent unintentional advancement of the element beyond the point desired.

During normal operation of the calendar information changing apparatus the frictional and inertial forces required to be overcome to change the calendar information must be kept to a minimum since they must be overcome by the gear mechanism of the watch. A different situation is presentd however during manual changing of the date information, when the force available is so large as to cause an unintentional advancement beyond the point desired unless additional resistance to the changing mechanism is provided. In order to realize such varying forces, the lug 45 of the spring 44 is placed at a point between the curvature 42 and the projection 48, as shown in FIG. 2. Upon slight deviation of spring 44, occurring when the wheels 37 and 38 are rotated during normal operation of the calendar apparatus, projection 45 does not touch the edge 60 of the cut-out 46. Due to the length of the spring from projection 48 to curvature 42, the force applied by the spring to wheel 38 is relatively small. When it is desired to manually change the date element 39 however, the wheels 37 and 38 are shifted in the cut-out 41, as shown in FIG. 2. For purposes of clarity the mechanism for shifting wheels 37 and 38 is not shown. As the wheels 37 and 38 are shifted the leg 43 of the spring 44 is further displaced and the projection 45 reaches the edge 60 of the cut-out 46 thereby greatly reducing the effective length of the spring leg 43 and resulting in a considerable increase in the pressure applied against the teeth of the wheel 38 by the leg 43. As a result of the increased pressure, the probability of advancing the date element 39 beyond the point desired is considerably lessened.

During normal operation therefore, the calendar changing apparatus is required to overcome only those forces necessary to shift the date element 39 and the day element 32. During changing of the calendar information elements they are able to move in a limited area until positively restrained by the gear elements and at the end of each change both calendar elements are again returned to their proper position by springs 21 and 44.

The arrangement of the date element 39 and the day element 32, as shown in FIG. 3, for manual turning back of the calendar information, permits the calendar information to be adjusted as the timepiece hand mechanism is turned back. In this manner the day wheel may be set, and should subsequent adjustment to the date element 39 be necessary, a rapid correction device, which is not shown in the figures, is provided with the timepiece.

The partial cross-sectional view of FIG. 4 shows the simple construction of the calendar information changing apparatus. The difference between the outer diameter of the hour wheel 10 and the inner diameter of the day element 32 makes possible the positioning in this area of a support for the dial face so that the dial becomes more economical to produce, and operational reliability of the timepiece improves. Further, it is advantageous to continuously drive the day element and to change the date element therefrom, in that the day element ordinarily need never be reset if the timepiece is used continuously. Due to the varying length of the months of the year however, the date element will have to be reset periodically and is therefore suitably placed at the end of the gear chain.

In order to minimize the displacement of the rocker 19 required to change the day calendar information, the day element 32 carries calendar information for two weeks. Thereby, an angular rotation of one-fourteenth of the circumference of the day element 32 is required to change the day calendar information. In order to accomplish this change the following gear tooth ratios are provided; the pinion 30, revolving once per day, has six teeth; the day wheel 32 therefore re-

quires 84 teeth. It is further required that the number of teeth in the wheel 37 be six times larger than the number of teeth in the wheel 38.

Many other variations and modifications of the invention will be apparent to those skilled in the art without departing from the spirit and scope of the invention. Accordingly all such variations and modifications are intended to be included within the scope of the invention as defined in the appended claims.

We claim:

1. Apparatus for periodically changing calendar information displayed in a timepiece, comprising:
- a timepiece element carrying the calendar information at spaced intervals along the length thereof, the element being movably mounted on the timepiece to permit changing of the calendar information displayed;
- a rotatable member in continuous engagement with the information-carrying element for effecting movement of the element;
- means supporting the rotatable member for permitting (1) rotation thereof relative to the information-carrying element and (2) movement of the axis of rotation of the member lengthwise of the information-carrying element, the supporting means including means for resiliently resisting such movement of the rotational axis of the member in the direction opposite to that in which the rotational movement of the member normally tends to move the element;
- means for determining the time period between successive changes of the calendar information;
- cam means responsive to the time period-determining means having (1) a rise sector for imparting to the rotatable member during the time period between successive information changes a predetermined rotational movement and a predetermined movement of the rotational axis thereof lengthwise of the information-carrying element in said opposite direction, said predetermined movements being related such that substantially no movement is imparted to the information-carrying element, and (2) a return sector for allowing return of the rotatable member in said normal direction under the impetus of the resilient resisting means at the end of the time period between successive information changes thereby to move the information-carrying element lengthwise by a distance to change the calendar information displayed.

2. Apparatus as set forth in claim 1 wherein:
- the time period determining means includes timepiece drive means and a driven member in continuous engagement with the drive means; and
- the cam means and the driven member are supported coaxially with the rotatable member by the supporting means.

3. Apparatus as set forth in claim 2 wherein:
- the information-carrying element is mounted for movement about an axis of rotation; and
- the supporting means is mounted for movement coaxially therewith, thereby to permit said movement of the rotatable member lengthwise of the element.

4. Apparatus as set forth in claim 3 wherein the information-carrying element is dimensioned such that, upon each return of the rotatable member in the normal direction, the element is moved one-fourteenth of a revolution.

5. Apparatus as set forth in claim 3 wherein:
- the information-carrying element has a generally circular periphery coaxial with its axis of rotation and a multiplicity of gear teeth around the periphery; and
- the rotatable member comprises a pinion having a plurality of gear teeth of complementary size to the element teeth.

6. Apparatus as set forth in claim 5 wherein the information-carrying element is annular in plan; and
- the circular tooth-bearing periphery is the internal periphery.

7. Apparatus as set forth in claim 5 wherein:
- the resilient resisting means urges the gear teeth of the information-carrying element and the pinion into meshing engagement to minimize gear play therebetween.

8. Apparatus as set forth in claim 7 wherein the resilient resisting means comprises an elongate spiral spring attached at one end to the member supporting means and at the other end to the timepiece.

9. Apparatus as set forth in claim 3 wherein the rotatable member is rigidly coupled to the cam means for movement therewith.

10. Apparatus as set forth in claim 9 further comprising means coupling the driven member and the cam means for (1) rotating the cam means therewith over the rise sector and (2) permitting rotation of the driven member relative to the cam means over the return sector.

11. Apparatus as set forth in claim 10 wherein:
- the cam means includes (1) a rotatable disc cam with a cam surface having a top dead center and a bottom dead center and (2) a stop coacting with the cam surface;
- the resilient resisting means urges the cam surface into contact with the stop; and
- the coupling means for permitting said relative rotation includes (1) a cut-out in the disc cam extending over an arc through which the driven member is permitted to rotate relative to the disc cam and (2) a projection extending from the driven member into the cut-out, the projection engaging an edge of the cut-out to rotate the disc cam therewith over the rise sector.

12. Apparatus as set forth in claim 11 wherein:
- the cam disc top dead center and bottom dead center are so spaced on the cam surface that, as the cam disc rotates and the top dead center passes the stop, the resilient resisting means forces the cam disc and rotatable member in said normal direction until the stop reaches bottom dead center of the cam surface, the arc of the cut-out in the cam disc being such that the driven member and the cam disc rotate relative to each other during said normal direction movement of the cam disc and rotatable member.

13. Apparatus as set forth in claim 11 wherein the rate of change of the cam surface over the return sector is sufficiently gradual to permit relative movement without jamming between the disc cam and the stop over the return sector in the direction from bottom dead center to top dead center, whereby the information-carrying element may be freely turned back to display earlier calendar information.

14. Apparatus according to claim 1 further comprising:

a second element carrying calendar information at spaced intervals along the length thereof, the second element being movably mounted on the timepiece to permit changing of the information displayed;

one of the first and second elements carrying day calendar information and the other carrying date calendar information; and

means for moving the second element to change the information displayed thereby in response to movement of the first element.

15. Apparatus according to claim **14** wherein the first element carries day calendar information and the second element carries date calendar information.

16. Apparatus as set forth in claim **15** further comprising means for permitting movement of the second element independently of movement of the first element, whereby the date information displayed may be changed independently of a change in the day information displayed.

17. Apparatus as set forth in claim **15** wherein:

the first element has a generally circular periphery coaxial with its axis of rotation and a multiplicity of gear teeth around the periphery;

the second element has a generally circular periphery concentric with the first element periphery, the second element having a multiplicity of gear teeth around the periphery; and

the second element moving means includes rotatable gear means for meshing engagement with the first element gear teeth and the second element gear teeth to rotate the Second element in response to rotation of the first element.

18. Apparatus as set forth in claim **17** wherein:

the first and second elements are generally annular; and

the tooth-bearing periphery of each element is the internal periphery.

19. Apparatus as set forth in claim **17** further comprising means for disengaging the gear means from meshing engagement with the second element gear teeth, thereby permitting the second element to be rotated independently of rotation of the first element.

20. Apparatus as set forth in claim **19** wherein the disengaging means comprises:

means for shifting the gear means between a first position where the gear means meshes with the gear teeth of the second element and a second position where the gear means is out of meshing engagement but is in nonmeshing contact with the gear teeth of the second element; and

spring means for urging the gear means toward the first position, whereby when the gear means is in the first position it is resiliently urged into meshing engagement with the second element gear teeth to minimize gear play therebetween and when the gear means is in the second position independent rotation of the second element may take place in opposition to the nonmeshing contact between the gear means and the second element gear teeth.

21. Apparatus as set forth in claim **20** wherein:

the gear means comprises a first gear element in continuous meshing engagement with the gear teeth of the first information-carrying element and a second gear element in continuous meshing engagement with the first gear element for rotation therewith;

the second gear element being in meshing engagement with the gear teeth of the second information-carrying element when the gear teeth means is in the first position; and

the means for shifting the gear means comprises means for moving the axis of rotation of the second gear element away from the second information-carrying element along a curved path coaxial with the rotational axis of the first gear element.

22. Apparatus as set forth in claim **20** wherein:

the spring means comprises an elongate spring member having one end bearing against the gear means; and

means mounting the elongate spring member on the timepiece such that when the gear means is in the first position the spring member has a relatively long effective length providing a relatively small force against the gear means and when the gear means is in the second position the spring member has a relatively short effective length providing a relatively large force against the gear means, whereby rotation of the second element in response to rotation of the first element is opposed by only a relatively small spring force but independent rotation of the second element is opposed by a relatively large spring force.

23. Apparatus as set forth in claim **22** wherein the other end of the spring member bears against the second element so as to urge it toward the gear means, whereby nonmeshing contact is maintained between the gear means and the second element gear teeth when the gear means is at the second position.

24. Apparatus as set forth in claim **22** wherein the spring mounting means comprises:

a projection integral with the timepiece and around which the spring member is biased at a point intermediate to its ends;

a lug carried by the spring member at a point intermediate to the projection and the end thereof bearing against the gear means; and

a cut-out in the timepiece opposite the location of the lug, the lug extending into the cut-out, the cut-out being dimensioned such that when the gear means is in the first position the lug is freely received therein and when the gear means is in the second position the lug engages an edge of the cut-out so as to cause the end of the spring member bearing against the gear means to be pivoted about the lug, thereby shortening the effective length of the spring member.

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