

PATENT SPECIFICATION (11)

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DRAWINGS ATTACHED



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(54) A TIMEPIECE CALENDAR MECHANISM

(71) We, KABUSHIKI KAISHA SUWA SEIKOSHA, a Japanese company of 3-4, 4-chome, Ginza, Chuo-ku, Tokyo, Japan, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention concerns a timepiece calendar mechanism.

In a conventional timepiece calendar mechanism a jumper, which is used to prevent unintentional movement of an intermittently rotatable toothed day or date wheel, usually comprises a contact portion which engages the teeth of the toothed wheel and a weak spring which lightly presses the contact portion against the said teeth. In the case of one such jumper, the contact portion and the spring portion form different parts of a one-piece member, while in another case the jumper comprises a resilient part of the date wheel at the extreme end of which there is a contact portion.

However, if the jumper is provided with a separate spring there is the risk of the spring flying out, so that the parts cannot be automatically assembled. Moreover, when the spring is formed from wire, it is liable to have varying dimensions.

On the other hand, if the contact portion and the spring portion are parts of a one-piece member, all of the latter has to be punched out simultaneously from plate material, and therefore the width of the spring portion cannot be made such as to give it a very small spring force. However, in the case of timepiece calendar mechanisms, it is desirable that the torque required to effect operation of the mechanism is as small as possible, since if it is not, the overall torque available in the timepiece as a whole, especially in the case of a battery watch, may be insufficient, with the result that the watch will stop.

According, therefore, to the present invention there is provided a timepiece calendar mechanism comprising a jumper having a mounting portion which is pivotally mounted in fixed structure, the jumper having

two spring portions which extend from and diverge from the mounting portion, each of said spring portions having a contact portion which engages with teeth of a calendar wheel.

The jumper is preferably a one-piece substantially V-shaped member. Such a jumper is easy to assemble and minimises the torque required to effect driving of the said calendar wheel or wheels.

Each contact portion is preferably a bulbous portion at the end of the respective spring portion remote from the mounting portion.

In its preferred form, the present invention comprises a timepiece calendar mechanism comprising an intermittently rotatable toothed day wheel, an intermittently rotatable toothed date wheel, and a jumper having a mounting portion pivotally mounted in fixed structure, the jumper having two spring portions which extend from and diverge from the mounting portion, the spring portions respectively having contact portions which engage with the teeth of the respective toothed wheels.

Means may be provided such that each intermittent angular movement of one of the said toothed wheels is effected prior to the corresponding intermittent angular movement of the other toothed wheel.

Each of the toothed wheels may be driven from a common driving wheel.

The invention also comprises a timepiece provided with a calendar mechanism as set forth above.

The invention is illustrated, merely by way of example, in the accompanying drawing, which shows a timepiece calendar mechanism according to the present invention.

Referring to the drawing, a timepiece, such as a wristwatch, is provided with a calendar mechanism which comprises an annular, intermittently rotatable, toothed date wheel or date dial 1 having internal teeth 1a. The mechanism also comprises an intermittently rotatable toothed day star wheel 2 which has external teeth 2a and which is secured to a day disc 3. The date dial 1 is provided with indicia indi-

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cating the day of the month, such as the numbers 5, 6 shown thereon, while the day disc 3 is provided with indicia represented by abbreviations of the names of the days of the week, as indicated by the abbreviations "Mon" and "Sun" shown thereon. As will be appreciated, the timepiece comprises a plate or plates having windows through which these indicia are viewable.

The date dial 1 and the day star wheel 2 are driven from a common driving wheel 4. For this purpose, a date driving finger 5 and a day driving finger 6 are mounted on driving wheel 4. The date driving finger 5 is engageable with the internal teeth 1a of the date dial 1, while the day driving finger 6 is engageable with the external teeth of an intermediate day wheel 7 which is in mesh with the day star wheel 2. Thus, counterclockwise rotation of the driving wheel 4 produces counterclockwise rotation of the date dial 1 so as to move the indicia on the day disc 3 successively into view through the respective window. Similarly, the counterclockwise rotation of the driving wheel 4 effects clockwise rotation of the intermediate day wheel 7 and hence counterclockwise rotation of the day star wheel 2 whereby to move the indicia on the day disc 3 intermittently into view through the respective window.

If desired it may be arranged that the driving wheel 4 produces simultaneous rotation of the date dial 1 and of the day star wheel 2. However, as will be seen from the drawing, in the particular timepiece calendar mechanism shown, the date driving finger 5 will effect counterclockwise rotation of the date dial 1 before the day driving finger 6 engages the intermediate day wheel 7 to effect, through the intermediary of the latter, counterclockwise rotation of the day star wheel 2.

After each intermittent angular movement of the date dial 1, and the day star wheel 2, it is necessary to hold the latter in that position until the next intermittent movement. This is achieved by the use of a one-piece, substantially V-shaped jumper 8 having a mounting portion which is provided with a spindle 10 by means of which the jumper 8 is pivotally mounted in a plate 9 constituting part of the fixed structure of the timepiece. The jumper 8 has two spring portions 8b, 8d which respectively extend from and diverge from said mounting portion, each of these spring portions having at its end remote from the mounting portion a bulbous portion 8a, 8c. The contact portion 8a is engageable with the teeth 1a of the date dial 1, while the contact portion 8c is engageable with the teeth 2a of the day star wheel 2.

Accordingly, in operation, when the driving wheel 4 is given an intermittent angular

movement by means of a wheel train (not shown), it will first adjust the angular position of the date dial 1 and will shortly thereafter adjust the angular position of the day disc 3. The angular movement of the date dial 1 will cause one of the teeth 1a to ride over the contact portion 8a thus forcing the latter radially inwardly until it springs back into the next position. This movement of the contact portion 8a will be resiliently resisted by the spring portion 8b, but by reason of the fact that the portion 8b can pivot about the spindle 10 as a fulcrum and by reason of the provision of the spring portion 8d it is possible to make the spring force of the spring portion 8b fairly small. Similarly, when the day star wheel 2 is moved through one pitch, this will cause one of its teeth 2a to force the contact portion 8c radially outwardly until the contact portion 8c enters the space between the two next teeth. In the course of this movement, there will be flexure of the spring portion 8d accompanied by rotation about the fulcrum provided by the spindle 10 and accompanied also by resilient resistance exercised by the spring portion 8b. Consequently, the spring force of the spring portion 8d can also be made fairly small.

Consequently, it will be appreciated that the spring strength of the portions 8b, 8d does not require to be as great as would be the case in a conventional construction. The width of the spring can therefore be widened so that the contact portions and the spring portions can be formed from a single sheet without the disadvantages mentioned above. Manufacture and assembly are therefore simplified, while the torque required to rotate the toothed wheels is small, with the result that the jumper 8 will not decrease the balance wheel amplitude or stop the calendar mechanism from being driven.

The jumper may be such as not to permit rotation of the day star wheel 2 during rotation of the date dial 1 nor to permit rotation of the date dial 1 during rotation of the day star wheel 2.

WHAT WE CLAIM IS:—

1. A timepiece calendar mechanism comprising a jumper having a mounting portion which is pivotally mounted in fixed structure, the jumper having two spring portions which extend from and diverge from the mounting portion, each of said spring portions having a contact portion which engages with teeth of a calendar wheel.

2. A timepiece calendar mechanism as claimed in claim 1 in which the jumper is a one-piece substantially V-shaped member.

3. A timepiece calendar mechanism as claimed in claim 1 or 2 in which each



cating the day of the month, such as the numbers 5, 6 shown thereon, while the day disc 3 is provided with indicia represented by abbreviations of the names of the days of the week, as indicated by the abbreviations "Mon" and "Sun" shown thereon. As will be appreciated, the timepiece comprises a plate or plates having windows through which these indicia are viewable.

10 The date dial 1 and the day star wheel 2 are driven from a common driving wheel 4. For this purpose, a date driving finger 5 and a day driving finger 6 are mounted on driving wheel 4. The date driving finger 15 5 is engageable with the internal teeth 1a of the date dial 1, while the day driving finger 6 is engageable with the external teeth of an intermediate day wheel 7 which is in mesh with the day star wheel 2. Thus, counterclockwise rotation of the driving wheel 4 produces counterclockwise rotation of the date dial 1 so as to move the indicia on the day disc 3 successively into view through the respective window. Similarly, the 25 counterclockwise rotation of the driving wheel 4 effects clockwise rotation of the intermediate day wheel 7 and hence counterclockwise rotation of the day star wheel 2 whereby to move the indicia on the day disc 3 intermittently into view through the respective window.

30 If desired it may be arranged that the driving wheel 4 produces simultaneous rotation of the date dial 1 and of the day star wheel 2. However, as will be seen from the drawing, in the particular timepiece calendar mechanism shown, the date driving 35 finger 5 will effect counterclockwise rotation of the date dial 1 before the day driving finger 6 engages the intermediate day wheel 7 to effect, through the intermediary of the latter, counterclockwise rotation of the day star wheel 2.

45 After each intermittent angular movement of the date dial 1, and the day star wheel 2, it is necessary to hold the latter in that position until the next intermittent movement. This is achieved by the use of a one-piece, substantially V-shaped jumper 8 50 having a mounting portion which is provided with a spindle 10 by means of which the jumper 8 is pivotally mounted in a plate 9 constituting part of the fixed structure of the timepiece. The jumper 8 has two 55 spring portions 8b, 8d which respectively extend from and diverge from said mounting portion, each of these spring portions having at its end remote from the mounting portion a bulbous portion 8a, 8c. The contact portion 8a is engageable with the teeth 1a of the date dial 1, while the contact portion 8c is engageable with the teeth 2a of the day star wheel 2.

65 Accordingly, in operation, when the driving wheel 4 is given an intermittent angular

movement by means of a wheel train (not shown), it will first adjust the angular position of the date dial 1 and will shortly thereafter adjust the angular position of the day disc 3. The angular movement of the date dial 1 will cause one of the teeth 1a to ride over the contact portion 8a thus forcing the latter radially inwardly until it springs back into the next position. This movement of the contact portion 8a will be resiliently resisted by the spring portion 8b, but by reason of the fact that the portion 8b can pivot about the spindle 10 as a fulcrum and by reason of the provision of the spring portion 8d it is possible to make the spring force of the spring portion 8b fairly small. Similarly, when the day star wheel 2 is moved through one pitch, this will cause one of its teeth 2a to force the contact portion 8c radially outwardly until the contact portion 8c enters the space between the two next teeth. In the course of this movement, there will be flexure of the spring portion 8d accompanied by rotation about the fulcrum provided by the spindle 10 and accompanied also by resilient resistance exercised by the spring portion 8b. Consequently, the spring force of the spring portion 8d can also be made fairly small.

Consequently, it will be appreciated that the spring strength of the portions 8b, 8d does not require to be as great as would be the case in a conventional construction. The width of the spring can therefore be widened so that the contact portions and the spring portions can be formed from a single sheet without the disadvantages mentioned above. Manufacture and assembly are therefore simplified, while the torque required to rotate the toothed wheels is small, with the result that the jumper 8 will not decrease the balance wheel amplitude or stop the calendar mechanism from being driven.

The jumper may be such as not to permit rotation of the day star wheel 2 during rotation of the date dial 1 nor to permit rotation of the date dial 1 during rotation of the day star wheel 2.

WHAT WE CLAIM IS:—

1. A timepiece calendar mechanism comprising a jumper having a mounting portion which is pivotally mounted in fixed structure, the jumper having two spring portions which extend from and diverge from the mounting portion, each of said spring portions having a contact portion which engages with teeth of a calendar wheel.

2. A timepiece calendar mechanism as claimed in claim 1 in which the jumper is a one-piece substantially V-shaped member.

3. A timepiece calendar mechanism as claimed in claim 1 or 2 in which each



contact portion is a bulbous portion at the end of the respective spring portion remote from the mounting portion.

5 4. A timepiece calendar mechanism comprising an intermittently rotatable toothed day wheel, an intermittently rotatable toothed date wheel, and a jumper having a mounting portion pivotally mounted in fixed structure, the jumper having two spring portions which extend from and diverge from the mounting portion, the spring portions respectively having contact portions which engage with the teeth of the respective toothed wheels.

15 5. A timepiece calendar mechanism as claimed in claim 4 in which means are provided such that each intermittent angular movement of one of the said toothed wheels is effected prior to the correspond-

ing intermittent angular movement of the other toothed wheel. 20

6. A timepiece calendar mechanism as claimed in claim 4 or 5 in which each of the toothed wheels is driven from a common driving wheel. 25

7. A timepiece calendar mechanism substantially as hereinbefore described with reference to and as shown in the accompanying drawing.

8. A timepiece provided with a timepiece calendar mechanism as claimed in any preceding claim. 30

J. MILLER & CO.,
Agents for the Applicants,
Chartered Patent Agents,
262 High Holborn,
London, WC1V 7EF.