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(54) INSTRUMENT RESETTING MECHANISM E.G. FOR USE IN A TIMEPIECE MOVEMENT

(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 an instrument resetting mechanism and, although the invention is not so restricted, it is more particularly concerned with an instrument resetting mechanism for use in the movement of a timepiece such, for example, as a chronograph or a stop-watch.

In the case of a chronograph or stop-watch it is known to provide an operating button to return simultaneously a number of parts, such as a minute hand and a second hand, to a zero position. Thus the minute hand and second hand may be respectively provided with heart-shaped cams which make contact with engagement surfaces on a common resetting lever, the latter being movable about its fulcrum by the operating button. However, when the operating button is pressed in, if there are any manufacturing errors in the component parts of the timepiece, there may be a gap between one of the said heart-shaped cams and the respective engagement surface, and if this is so, the respective second or minute hand will not be adjusted to the zero position. In the past, this has been corrected by filing down the engagement surface which did not have such a gap until both engagement surfaces appropriately engaged the two heart-shaped cams.

Such an operation, however, although it corrected the error, had the result of increasing the coefficient of friction of the engagement surface concerned and so made it difficult to operate the mechanism satisfactorily. Such filing, moreover, tended to alter the shape of the engagement surface concerned so that it no longer made point contact with the cam, while it also involved much use of skilled labour.

According to the present invention, there is provided an instrument resetting mechanism comprising a plurality of resettable members each of which may be reset in datum position after having been moved therefrom, a pin having first and second cylindrical portions which are eccentric to each other, the said first portion being mounted so as to be rotatably adjustable in a fixed structure; a resetting device having engagement surfaces which may respectively engage the resettable members, at least a part of the resetting device being rotatable about the said second portion of the pin; and an operating member for rotating the said part of the resetting device about the said second portion of the pin; the pin being rotatable about the axis of the said first portion to a position in which operation of the operating member causes each engagement surface to engage the respective resettable member and move the latter correctly to its datum position.

Each of the engagement surfaces is preferably disposed on the same side of the said axis. Moreover, the engagement surfaces are preferably inclined to each other. The resettable members may be heart-shaped cams.

A return spring may be provided which acts on the resetting device to urge the latter to move in a direction opposite to the direction in which the resetting device is moved by the operating member.

The resetting device may if desired have two inter-engaging parts which are respectively provided with the said engagement surfaces, one of said parts being rotatable about the said second portion of the pin, the other of said parts being engaged by

[*Price 25p*]

the said return spring and being rotatable about another pin.

The resetting device preferably comprises at least one flat lever.

The invention also comprises a timepiece movement provided with a mechanism as set forth above, the resettable members actuating time-indicating members of the movement.

The invention is illustrated, merely by way of example, in the accompanying drawing, in which:—

Figure 1 is a broken-away plan view of a timepiece provided with a resetting mechanism according to the present invention,

Figure 2 is a cross-sectional view taken on the line 2-2 of Figure 1, and

Figure 3 is a plan view corresponding to that of Figure 1 but showing a modified construction.

Referring first to Figures 1 and 2, a chronograph or stop-watch 10 has a timepiece movement which includes a fixed base plate 11. A pin 12 has cylindrical portions 13, 14 which are eccentric to each other, the portion 13 being mounted so as to be rotatably adjustable in the base plate 11. A flat resetting lever 15 has a cylindrical aperture 16 within which the cylindrical portion 14 is disposed so as to permit the lever 15 to be rotated about the cylindrical portion 14. The cylindrical aperture 16 is disposed adjacent one end 17 of the lever 15, the lever 15 being provided with engagement surfaces 20, 21 which are inclined to each other and each of which is disposed on the same side of the axis 22 of the cylindrical portion 13. The engagement surfaces 20, 21 respectively engage heart-shaped cams 23, 24 which are themselves connected to a seconds hand (not shown) and to a minute hand (not shown) of the movement.

The movement is provided with an operating button 25 which engages the radially outer surface of an arm 26 of the lever 15, radial inward movement of the operating button 25 causing the lever 15 to be rotated counter-clockwise about the cylindrical portion 14 to the position shown. The radially inner surface of the arm 26 is engaged by a return spring 27 which thus acts on the lever 15 to urge the latter to rotate in a clockwise direction about the cylindrical portion 14. Movement of the lever 15 by the operating button 25 moves the engagement surfaces 20, 21 substantially at right angles to themselves.

In operation, when the operating button 25 is pressed inwardly, the cams 23, 24 are rotated counter-clockwise by rotation of the lever 15 and, if all the parts are appropriately adjusted, the second and minute hands are then returned satisfactorily to the datum, i.e. the zero, position. However, if when the operating button 25 is pressed fully inwardly, there should be a gap between one of the engagement surfaces 20, 21 and the respective cam 23, 24, it will not be possible to return the relevant hand to the zero position. If this gap should occur between the cam 24 and the engagement surface 21, it can be readily corrected merely by rotating the pin 12 in a clockwise direction about the axis 22 to an extent sufficient to bring the engagement surface 21 into appropriate contact with the cam 24, while leaving the engagement surface 20 in contact with the cam 23. Equally, if the said gap should be between the cam 23 and the engagement surface 20, then this may be corrected by appropriate rotation of the pin 12 in a counterclockwise direction about the axis 22.

Thus whatever may have been the initial position of the pin 12, it is possible to rotate the latter to a position in which there is no gap affecting either of the cams 23, 24, merely by rotating the pin 12 in the appropriate direction and to an appropriate extent.

In Figure 3 there is shown a timepiece 30 which is generally similar to that of Figures 1 and 2, and which for this reason will not be described in detail, like parts being given the same reference numerals.

In the case of the timepiece movement 30, a one-piece lever 15 is not used and, instead, a resetting device is employed which comprises flat resetting levers 31, 32 which are respectively provided with the engagement surfaces 21, 20. The lever 31 is rotatable about the cylindrical portion 14 of the pin 12, while the lever 32 is rotatable about a pin 33. The lever 31 has a projection 34 which engages the lever 32, the latter having a projection 35 which is engageable by a return spring 36. Thus the return spring 36 urges the levers 31, 32 to rotate in a clockwise direction, while radial inward movement of the operating button 25 will rotate the levers 31, 32 in a counterclockwise direction.

If the timepiece is provided with three or more parts which are to be returned to a datum position, the constructions shown above may be used to effect the return of two of these parts.

As will be appreciated, the construction shown in the drawing enables resetting to be effected without a construction involving considerable space. The construction shown also enables adjustments of the resetting mechanism to be effected whenever required by appropriate rotation of the pin 12.

In British Patent No. 1,180,366 there is disclosed and claimed a stopwatch including a base plate, a heart-shaped minute

cam and a heart-shaped seconds cam, a hammer having acting surfaces adapted to co-operate with said cams to re-set the minute and second hands of the stopwatch to their respective zero positions, an adjusting member which is secured to said base plate and to which said hammer is pivotally connected and means for adjusting the relative positions of said base plate and said adjusting member so as to ensure that the said minute and second hands are re-set to their respective true zero positions by compensating for any possible errors in the spacing between the said acting surfaces and the said cams.

WHAT WE CLAIM IS:—

1. An instrument resetting mechanism comprising a plurality of resettable members each of which may be reset in datum position after having been moved therefrom; a pin having first and second cylindrical portions which are eccentric to each other, the said first portion being mounted so as to be rotatably adjustable in a fixed structure; a resetting device having engagement surfaces which may respectively engage the resettable members, at least a part of the resetting device being rotatable about the said second portion of the pin; and an operating member for rotating the said part of the resetting device about the said second portion of the pin; the pin being rotatable about the axis of the said first portion to a position in which operation of the operating member causes each engagement surface to engage the respective resettable member and move the latter correctly to its datum position.

2. A mechanism as claimed in claim 1 in which each of the engagement surfaces is disposed on the same side of the said axis.

3. A mechanism as claimed in claim 1 or 2 in which the engagement surfaces are inclined to each other.

4. A mechanism as claimed in any preceding claim in which the resettable members are heart-shaped cams.

5. A mechanism as claimed in any preceding claim comprising a return spring which acts on the resetting device to urge the latter to move in a direction opposite to the direction in which the resetting device is moved by the operating member.

6. A mechanism as claimed in claim 5 in which the resetting device has two interengaging parts which are respectively provided with the said engagement surfaces, one of said parts being rotatable about the said second portion of the pin, the other of said parts being engaged by the said return spring and being rotatable about another pin.

7. A mechanism as claimed in any preceding claim in which the resetting device comprises at least one flat lever.

8. An instrument resetting mechanism substantially as hereinbefore described with reference to and as shown in the accompanying drawing.

9. A timepiece movement provided with a mechanism as claimed in any preceding claim, the resettable members actuating time indicating members of the movement.

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cam and a heart-shaped seconds cam, a hammer having acting surfaces adapted to co-operate with said cams to re-set the minute and second hands of the stopwatch to their respective zero positions, an adjusting member which is secured to said base plate and to which said hammer is pivotally connected and means for adjusting the relative positions of said base plate and said adjusting member so as to ensure that the said minute and second hands are re-set to their respective true zero positions by compensating for any possible errors in the spacing between the said acting surfaces and the said cams.

WHAT WE CLAIM IS:—

1. An instrument resetting mechanism comprising a plurality of resettable members each of which may be reset in datum position after having been moved therefrom; a pin having first and second cylindrical portions which are eccentric to each other, the said first portion being mounted so as to be rotatably adjustable in a fixed structure; a resetting device having engagement surfaces which may respectively engage the resettable members, at least a part of the resetting device being rotatable about the said second portion of the pin; and an operating member for rotating the said part of the resetting device about the said second portion of the pin; the pin being rotatable about the axis of the said first portion to a position in which operation of the operating member causes each engagement surface to engage the respective resettable member and move the latter correctly to its datum position.

2. A mechanism as claimed in claim 1 in which each of the engagement surfaces is disposed on the same side of the said axis.

3. A mechanism as claimed in claim 1 or 2 in which the engagement surfaces are inclined to each other.

4. A mechanism as claimed in any preceding claim in which the resettable members are heart-shaped cams.

5. A mechanism as claimed in any preceding claim comprising a return spring which acts on the resetting device to urge the latter to move in a direction opposite to the direction in which the resetting device is moved by the operating member.

6. A mechanism as claimed in claim 5 in which the resetting device has two interengaging parts which are respectively provided with the said engagement surfaces, one of said parts being rotatable about the said second portion of the pin, the other of said parts being engaged by the said return spring and being rotatable about another pin.

7. A mechanism as claimed in any preceding claim in which the resetting device comprises at least one flat lever.

8. An instrument resetting mechanism substantially as hereinbefore described with reference to and as shown in the accompanying drawing.

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