United States Patent [19]

Kurita

[11] **3,846,973**

[45] **Nov. 12, 1974**

[54] **AUTOMATIC WINDING WATCH WITH BRIDGE PLATE OFFSET TO RECEIVE AUTOMATIC WINDING MECHANISM**

[75] Inventor: **Hirohisa Kurita,** Shimosuwa-machi, Japan

[73] Assignee: **Kabushiki Kaisha Suwa Seikosha,** Tokyo, Japan

[22] Filed: **Oct. 15, 1973**

[21] Appl. No.: **406,320**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 212,456, Nov. 27, 1971, abandoned.

[30] **Foreign Application Priority Data**

Dec. 28, 1970 Japan 45-132723

[52] **U.S. Cl.** ..... **58/82 R,** 58/82 A

[51] **Int. Cl.** **G04b 5/02,** G04b 7/00

[58] **Field of Search** ..... 58/82 R, 82 A

[56] **References Cited**

UNITED STATES PATENTS

2,765,679	10/1956	Godat	58/82 A X
2,942,486	6/1960	Beguin	58/82 A X

Primary Examiner—George H. Miller, Jr.
Attorney, Agent, or Firm—Robert E. Burns; Emmanuel J. Lobato; Bruce L. Adams

[57] **ABSTRACT**

An automatic winding watch has a bridge plate with a transversely extending offset to provide a higher portion and a lower portion. Automatic winding mechanism for transforming the movement of an oscillating weight into movement for winding the main spring of the watch movement is superposed on the lower portion of the bridge plate. By reason of the offset in the bridge plate and the arrangement of the automatic winding mechanism, the overall thickness of the watch is reduced without increasing manufacturing cost.

6 Claims, 5 Drawing Figures

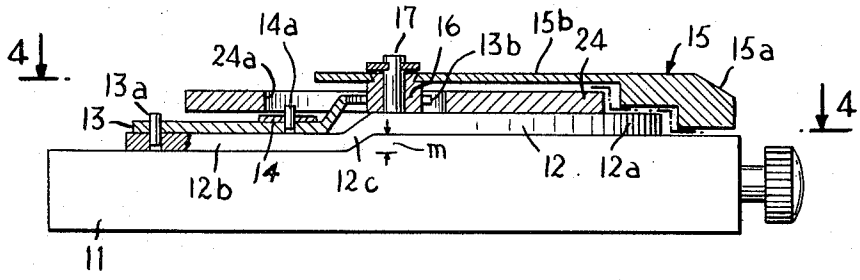


FIG. 1

(PRIOR ART)

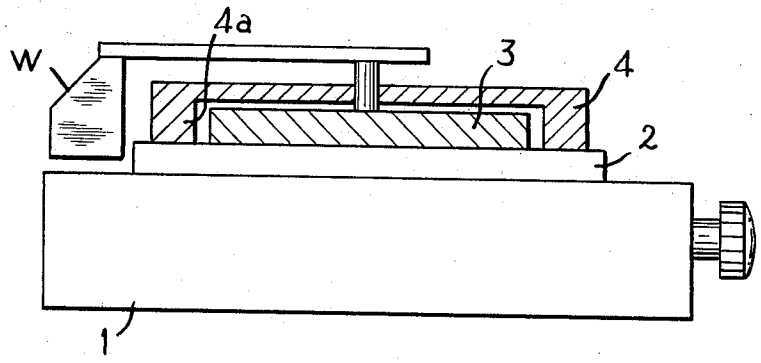


FIG. 2

(PRIOR ART)

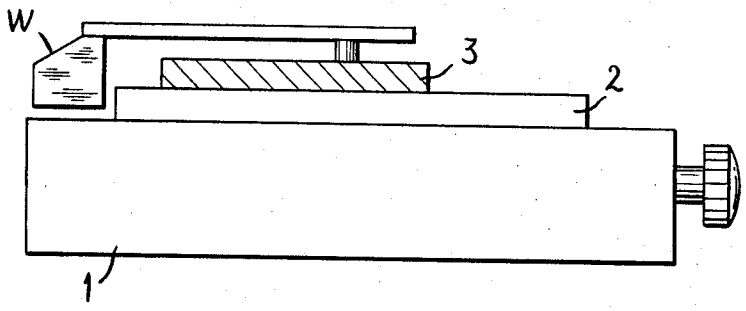


FIG. 3

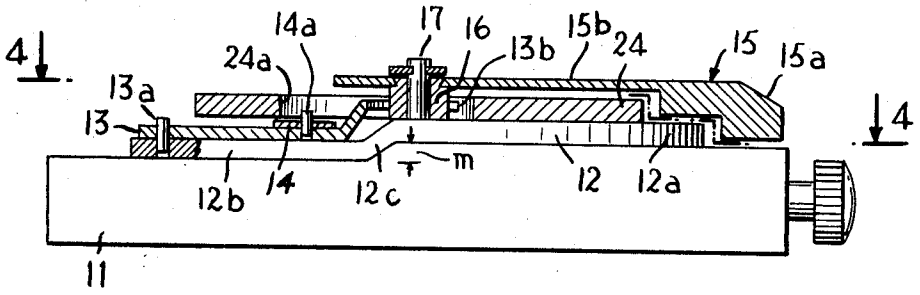


FIG. 4

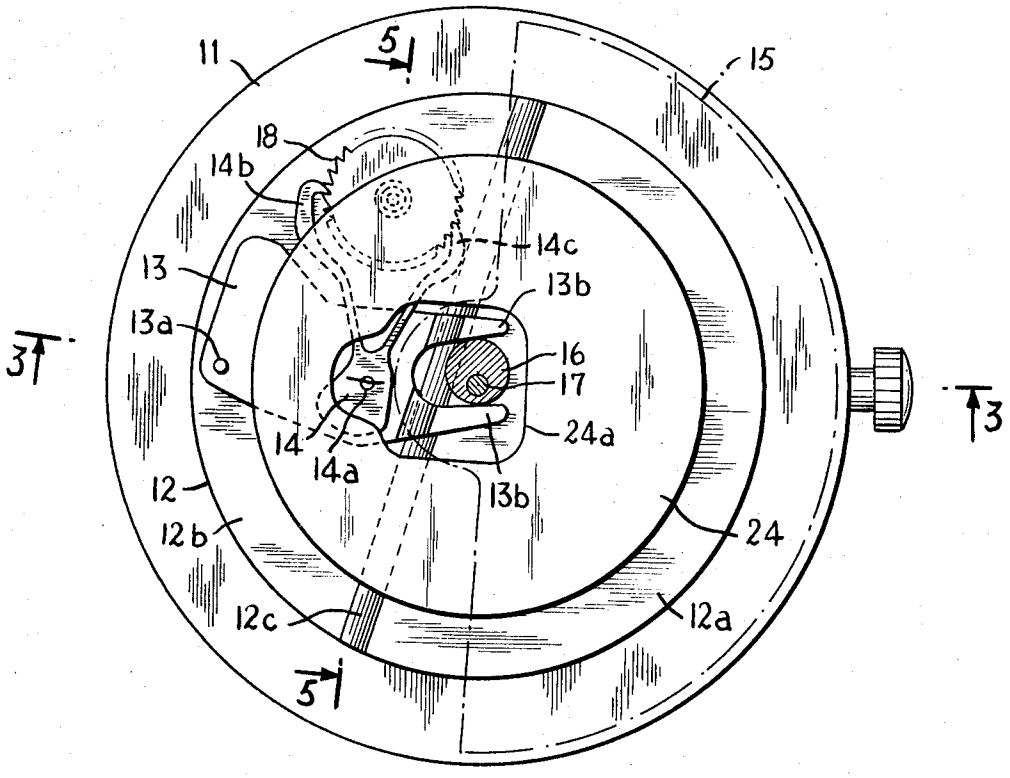
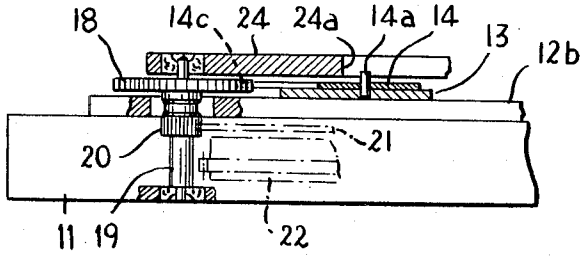

11
5
15
18
14b
14c
13
13b
13a
3
16
17
24a
3
14
14a
13b
12
12b
24
12c
12a
5

FIG. 5


18
14c
24
24a
14a
14
13
12b
21
20
11
19
22

AUTOMATIC WINDING WATCH WITH BRIDGE PLATE OFFSET TO RECEIVE AUTOMATIC WINDING MECHANISM

This application is a continuation-in-part of my application Ser. No. 212,456 filed Dec. 27, 1971.

The present invention relates to an automatic winding watch and in particular to a wristwatch in which automatic winding mechanism is superposed on the watch movement.

An automatic winding watch generally comprises a basic timepiece movement herein referred to as a watch movement and an automatic winding device. The automatic winding device consists of an oscillating weight, bearings for the oscillating weight and mechanism for transforming the movement of the oscillating weight into movement suitable for winding a main spring of the watch movement. Such mechanism is herein referred to as the automatic winding mechanism. As the oscillating weight is generally placed over the watch movement, the overall thickness of the timepiece depends on the thickness required for the automatic winding mechanism of the watch.

In automatic winding watches in which the automatic winding mechanism is superposed on the watch movement the thickness of the automatic winding mechanism added to the thickness of the watch movement has resulted in an objectionably large overall thickness which detracts from the attractiveness and salability of the watch. If, on the other hand the automatic winding mechanism is incorporated in the watch movement, the timepiece is thinner but considerably more expensive.

It is an object of the present invention to retain the advantages of the respective prior art constructions while avoiding their disadvantages by providing an automatic winding watch which is thin and yet can be manufactured at an economical price.

In accordance with the present invention one of the bridge plates which are provided with bearings for the pivots of the gears and other elements of the watch movement is provided with a transversely extending offset so that one portion of the plate is higher and another portion is lower. The automatic winding mechanism is superposed on the lower portion of the bridge plate and has an upper surface lying approximately in the same plane as the upper surface of the higher portion of the bridge plate so that the combined thickness of the thinner portion of the movement and the automatic winding mechanism is only approximately the same as the thickness of the thicker portion of the movement. Hence, a guide member secured to the higher portion of the bridge plate and overlying the winding mechanism can be a thin, flat plate which is inexpensive to make and assemble and does not objectionably increase the overall thickness of the watch.

The nature and advantages of the invention will be more fully understood from the following description of a preferred embodiment shown by way of example in the accompanying drawings in comparison with representative prior art constructions:

IN THE DRAWINGS:

FIGS. 1 and 2 are explanatory schematic views of automatic winding watches with winding mechanisms superposed on the watch movements in accordance with the prior art;

FIG. 3 is a schematic view of an automatic winding watch in accordance with the present invention with portions shown in cross section taken approximately on the line 3-3 in FIG. 4;

FIG. 4 is a schematic plan view of the embodiment of the invention illustrated in FIG. 3 and;

FIG. 5 is a partial section taken approximately on the line 5—5 in FIG. 4.

In FIG. 1 there is shown schematically a prior art construction of an automatic winding watch in which the automatic winding mechanism 3 for transforming the oscillatory movement of a weight W into a movement suitable for winding the main spring of the watch movement is superposed on the bridge plate 2 of the watch movement 1. A bridge 4 for guiding the elements of the automatic winding mechanism 3 is made thick enough and provided with a recess 4a on its underside to accommodate the automatic winding mechanism. Because of the thickness of the automatic winding mechanism 3 and of the bridge 4 superposed on the bridge plate 2 of the watch movement, the overall thickness of the watch is undesirably increased. Moreover, because of the bridge plate 4 being thick and having to be recessed to receive the automatic winding mechanism, the cost of manufacture of the watch is increased.

In FIG. 2 there is shown schematically another prior art construction which is similar to that of FIG. 1 except that the bridge 4 is omitted and hence the overall thickness of the watch is somewhat less. However, it has the disadvantage that the elements of the automatic winding mechanism cannot be disassembled from the bridge plate 2 because the automatic winding mechanism must be fixed to the bridge plate 2 of the watch movement 1 by pins and other elements having flanges because of the omission of the bridge 4 shown in FIG. 1. Hence, service and repair of the watch are difficult.

In the construction according to the present invention as illustrated by way of example in FIGS. 3 to 5 one face of the watch movement 11 is formed by a bridge plate 12 having bearings for the pivots of gears and other elements of the watch movement. The bridge plate 12 is made with a transversely extending offset 12*c* so that one portion 12*a* of the bridge plate 12 is higher and another portion 12*b* is lower. The terms "higher" and "lower" are herein used with reference to the watch in the position in which it is shown in FIG. 3. The bridge plate 12 is formed of a single piece of plate or sheet stock with the offset portion 12*c* formed by bending so as to be inclined with respect to the portions 12*a* and 12*b* which are disposed in parallel planes and are offset from one another by a distance m which in the example illustrated in FIG. 3 is approximately equal to the thickness of the bridge plate.

As seen in FIGS. 3 and 4, an oscillating weight 15 comprises an arcuate rim portion 15*a* and a web portion 15*b* which is fixed to an eccentric 16 rotatable about a pillar 17 provided at the center of the timepiece. The oscillating weight 15 and the eccentric member 16 are thus freely oscillable about the pillar 17.

In accordance with the invention the automatic winding mechanism for transforming the oscillatory movement of the weight 15 into movement for winding the main spring of the timepiece is disposed eccentrically of the watch movement so as to overlie the lower por-

tion of the bridge plate 12 of the watch movement 11. As illustrated in FIGS. 3 and 4 the winding mechanism comprises an oscillating lever 13 which overlies the lower portion 12*b* of the bridge plate 12 and pivots about a pin 13*a* projecting up from the bridge plate. An upwardly offset portion 13*b* of the oscillating lever 13 is bifurcated as seen in FIG. 4 so as to embrace the eccentric member 16 of the oscillating weight 15. Thus, as the weight 15 rotates or oscillates about the pillar 17 the lever 13 is oscillated by the eccentric 16. A pawl member 14 pivotally connected to the oscillating lever 13 by a pivot pin 14*a* has spring pawl arms 14*b* and 14*c* engaging opposite sides of a ratchet wheel 18. The pawl arms have oppositely directed nose portions so that when the pawl member 14 is reciprocated by oscillatory movement of the lever 13, the ratchet wheel 18 is rotated in a counterclockwise direction as indicated by the arrow.

As seen in FIG. 5 the ratchet wheel 18 is fixed on a rotatable shaft 19 which extends up through an opening in the lower portion 12*b* of the bridge plate 12. The shaft 19 also carries a pinion 20 meshing with a winding gear 21 for winding the main spring in the barrel 22 of the watch movement. It will thus be seen that the automatic winding mechanism comprising the oscillating lever 13, the pawl member 14 and the ratchet wheel 18 overlie the lower portion 12*b* of the bridge plate 12 and do not extend upwardly above the upper surface of the higher portion 12*a* of the bridge plate. Thus with the construction as shown in FIG. 3, it is possible to make the watch thinner than with the construction shown in FIGS. 1 and 2.

A guiding member 24 overlies the higher portion 12*a* of the bridge plate 12 to which it is secured, for example by screws and extends over the automatic winding mechanism so that the automatic winding mechanism is received between the guiding plate 24 and the lower portion 12*b* of the bridge plate 12 of the watch movement 11. Since the upper surface of the automatic winding mechanism lies in approximately the same plate as the upper surface of the higher portion 12*a* of the bridge plate, the guiding member 24 can be in the form of a thin, flat plate. It is hence thinner and less expensive to manufacture than the thick recessed bridge 4 of the prior art construction shown in FIG. 1.

As illustrated by way of example in FIGS. 3 and 4 the guide plate 24 is provided with an approximately central opening 24*a* which receives the upwardly extending portion 13*b* of the oscillating lever 13 of the automatic winding mechanism. The opening 24*a* in the guide plate 24 permits the oscillatory movement of the oscillating lever 13. The upper surface of the extension 13*b* of the oscillating lever 13 of the automatic winding mechanism does not extend above the upper surface of the guide plate 24 and hence does not increase the overall thickness of the watch. The opening 24*a* in the guide plate 24 is conveniently formed in the same stamping operation by which the plate 24 is formed from sheet or strip stock and hence does not increase the cost of manufacture.

It will thus be seen that in accordance with the present invention an automatic winding watch can be made thinner and the manufacturing of the watch is simplified so that the cost of manufacture is reduced. Moreover, since the guide plate 24 is easily removed to provide access to the automatic winding mechanism, service and repair of the watch is made easier. By reason of the correlation between essential parts of the watch such as the bridge plate, automatic winding mechanism and guide plate the manufacturing and assembly of parts are simplfied making it possible to obtain high quality at a low cost.

While a preferred embodiment in accordance with the invention has been shown by way of example in the drawings it will be understood that the invention is in no way limited to the illustrated embodiment.

What I claim and desire to secure by letters patent is:

1. In an automatic winding watch comprising a basic watch movement having a main spring, an oscillating weight, and an automatic winding mechanism for transforming the movement of the oscillating weight into movement for winding the main spring of the watch movement, the improvement that the watch movement comprises a bridge plate with two parallel portions of said bridge plate offset from one another so that one of said portions is lower and the other of said portions is higher, and the automatic winding mechanism is superposed on the lower portion of the bridge plate so that the total height of the watch movement and the automatic winding mechanism is reduced, said bridge plate comprising a single piece of metal plate of uniform thickness bent to form said offset between said higher and lower portions of said bridge plate.

2. An automatic winding watch according to claim **1**, in which said offset extends chordwise of said bridge plate, the higher portion of said bridge plate being larger than said lower portion.

3. An automatic winding watch according to claim **1**, in which a portion of said metal plate forming said offset between said higher and lower portions of said bridge plate is inclined with respect to said upper and lower portions.

4. An automatic winding watch according to claim **1**, in which the automatic winding mechanism has an upper surface lying in approximately the same plane as the upper surface of the higher portion of said bridge plate.

5. An automatic winding watch according to claim **4**, in which a flat guide plate has a portion overlying and secured to the higher portion of said bridge plate and a portion extending over and spaced from said lower portion of said bridge plate and overlying said automatic winding mechanism.

6. An automatic winding watch according to claim **5**, in which said guide plate has an opening into which an upward extension of said automatic winding mechanism extends.

* * * * *