

Singapore

PATENT SPECIFICATION

DRAWINGS ATTACHED

1,146,340



1,146,340

Date of Application and filing Complete
Specification: 11 March, 1968.

No. 11838/68

Application made in United States of America (No. 632040) on
19 April, 1967.

Complete Specification Published: 26 March, 1969.

© Crown Copyright, 1969.

Index at Acceptance:—G3 T (A7A1, A7B).

Int. Cl.:—G 04 b 1/16.

COMPLETE SPECIFICATION

Watch Mainspring Barrel

WE, THE UNITED STATES TIME CORPORATION, a Corporation organized under the laws of the State of Connecticut, United States of America, of Waterbury 20, Connecticut, United States of America, 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:—

The present invention relates to horological instruments and more particularly to a mainspring-barrel assembly such as that of a watch.

Watches having a coil spring as their power source have been known for many years. In most such watches, the inner end of the spring is attached to the winding arbor. The spring's outer end is connected, by friction or by attachment, to the inner wall of a barrel. The barrel usually consists of a round cylindrical structure having top and bottom covers and shaped like a closed can. The spring, within the barrel, is wound up by rotating the arbor. The arbor is rotated by a gear, attached to the arbor, being turned by the winding stem through one or more intermediate gears. The barrel has external teeth which mesh, through intermediate gears, with the shaft of the escape wheel of the watch movement. This type of construction of the barrel is relatively expensive as it involves the machining or stamping of a number of parts and the cost of their assembly. For example, the cover may be snap-fitted on a shoulder of the body portion, requiring precision parts and the assembly of the small parts. If the construction is improper, there may be friction, which is a waste of power, due to the rubbing of the bottom or top of the barrel on a frame member.

It is necessary in conventional watches to

[Price 4s. 6d.]

remove the barrel from the watch movement in order to clean the watch. This is time consuming. If the barrel is not removed, and sometimes in a cheap cleaning job it is left in place, detergents or soaps may be left in the barrel and may harm the operation of the spring.

It is the objective of the present invention to provide a relatively inexpensive mainspring-barrel construction the rotation of which is also opposed by relatively low frictional forces.

It is a further objective of the present invention to provide a mainspring-barrel construction which permits the watch to be cleaned without removal of the barrel from the movement.

In accordance with the present invention, a mainspring-barrel assembly comprises a rotatable arbor connectable to a winding mechanism, a coiled spring connected near its inner end to said arbor, a barrel having a top and a cylindrical side wall at least partly covering said spring, said side wall having a free lower edge, the outer end of said spring being connectable to said barrel, said barrel having gear teeth for driving an escapement, and a barrel plate positionable against said lower edge of the barrel to enable said lower edge to rotatably bear on said plate. In a watch incorporating a preferred form of the invention the barrel is constructed in the form of a round cylinder having a top member, so that it is similar in shape to a short cylindrical can having only one end. A coiled mainspring is attached at one of its ends to an arbor and at its other end is connected with the inside wall of the barrel. The lower edge of the barrel turns on a round flat plate, preferably blanked from steel in the form of a disc. The disc rests on a frame plate of the watch.

The present invention, and preferred

features thereof will be more readily understood from the following description by way of example of a preferred embodiment, given with reference to the accompanying

5 drawings, in which:

Fig. 1 is a side cross-sectional view of the portion of a watch containing the mainspring-barrel assembly of the present invention; and

10 Fig. 2 is a top plan view of the barrel plate.

The watch includes a bottom train bridge 1, which is itself a frame member of the watch or is connected to a frame member.

15 An upper frame member 4 is spaced, for example by pillar posts (not shown) from the train bridge 1. The train bridge 1 and frame member 4 are of a relatively soft metal, for example, brass which is plated

20 with nickel. The bridge 1 contains a pivot jewel 2 within which a seconds shaft 3 rotates. The frame member 4 carries a jewel 5 which supports a tubular member 6 around which a minutes tube 7 rotates. The

25 seconds shaft 3 rotates within the tubular member 6. A seconds hand 8 is attached at the top of the seconds shaft 3 and a minute hand 9 is attached at the top of minutes tube 7.

30 A set of gear teeth 31, integral with the minute tube 7, meshes with a gear wheel 32 which is attached to a pinion 33. The pinion 33 meshes with an hour wheel 34, which is integral with an hour wheel shaft 35. An

35 hour hand 36 is attached to the hour wheel shaft 35.

The train bridge 1 has a hole 10 within which the bottom shaft portion 11 of a winding arbor 12 rotates. The arbor 12 has an elongated round top shaft portion 13 which rotates in a hole 14 of the frame member 4.

A barrel 15 is rotatably positioned on the arbor 12. The barrel consists of a flat top 16, an integral round cylindrical side wall 17 at a right angle to the top 16 at its external periphery, a plurality of external

45 gear teeth 28 integral with the barrel, a central hole in top 16, and an elongated cylindrical flange 19 on the inside periphery of the top 16. The flange 19, at its inside, rides on a bearing surface 18 formed by the bottom of the elongated top portion 14 of the arbor 12. The barrel is preferably

50 machined out of brass.

The teeth 28 of the barrel mesh with teeth 29 which are integral with the tubular member 6. The rotation of the tubular member 6 turns a centre gear wheel 30 which

60 is fastened to the tubular member 6, which in turn drives an escapement (not shown) and the watch train.

A bump (protrusion) 20 on the bottom side of frame member 4 acts to keep the top 65 16 of the barrel 15 from rubbing on the

frame member 4, if the barrel should wobble slightly on its arbor.

A coiled spring 21, of spring steel, is coiled inside the barrel 15. The spring 21 is the mainspring of the watch, and the number 70 of turns of the spring is usually from 6 to 9. The inside end of the spring 21 has a hole 22 which fits over a protrusion 23 on the arbor 12 to secure the spring to the arbor. The outer end of the spring 21 is 75 attached to the cylindrical wall 17 of the barrel by means of a latch 24 protruding from the inside surface of the barrel wall.

A barrel cover plate (disc) 25 is positioned on the bridge 1. The barrel plate is preferably 80 not fastened or attached to the bridge 1 and is of a relatively hard metal, such as steel, compared with the metal of the bridge 1. A central hole 26 in the centre of the plate 25 is large enough to fit around the 85 bottom portion 11 of the arbor 12. A bottom flange 37 of the arbor 12 bears on the top of the barrel plate 25 and rotates on that plate. The barrel plate 25 is preferably formed in the shape of a flat circular disc 90 having a number, preferably four, of evenly spaced holes 27 around its central hole 26, see Fig. 2. The purposes of these holes 27 are, first, to permit a visual inspection, when 95 the back of the case is removed, into the barrel to obtain an indication of the condition and tensioning of the spring; secondly, to permit the spring to be lubricated, for example, by dropping oil into the barrel; and thirdly, to permit the ready 100 flow of cleaning fluids into, and out of, the barrel.

In watches using a conventional closed barrel, it is necessary for the manufacturer or watch repairer to remove the barrel prior 105 to cleaning the watch. If he does not, the cleaning fluid, which usually includes soap or a detergent, may enter the barrel and become trapped. In the construction of the present invention the watch may be cleaned, 110 for example in an ultrasonic bath, without removal of the barrel. This is a saving in time. In the case of those repairers who do not remove the barrel from watches, the use of an easily flushed barrel may preserve 115 the correct operation of the spring.

If the barrel, during the course of its rotation, becomes slightly askew, i.e., non-perpendicular in regard to its arbor, it may 120 tend to rub against protrusion 20. Normally the bottom edge surface of the barrel wall 17 bears on the barrel plate 25.

The construction of the present invention is less costly than the conventional construction employing a barrel which is closed 125 on its top and bottom by joined members. The barrel cover plate 25 ensures that the spring does not rub against the frame, if the spring should protrude beyond the wall of the barrel, which it might do if the bottom 130

barrel cover is simply omitted. The barrel cover plate 25 also lessens the friction and the wear due to rotation of the bottom edge of the barrel, compared to friction and wear in a construction which omits the bottom barrel cover and has the bottom edge of the barrel side wall directly bearing against the frame.

Modifications may be made in the present invention within the scope of the appended claims. For example, the barrel cover plate 25 need not be round but may be made square or rectangular shaped and may be glued or otherwise adhered to the frame.

15 WHAT WE CLAIM IS:—

1. A mainspring-barrel assembly for a horological instrument, the mainspring-barrel assembly comprising a rotatable arbor connectable to a winding mechanism, a 20 coiled spring connected near its inner end to said arbor, a barrel having a top and a cylindrical side wall at least partly covering said spring, said side wall having a free lower edge, the outer end of said spring being connectable to said barrel, said barrel 25 having gear teeth for driving an escapement, and a barrel plate positionable against said lower edge of the barrel to enable said lower edge to rotatably bear on said plate.
- 30 2. An assembly as claimed in claim 1, wherein said plate is in the form of a flat disc.

3. An assembly as claimed in claim 1 or claim 2, wherein said plate has a central hole within which the arbor rotates, and a 35 plurality of other holes.

4. An assembly as claimed in any one of the preceding claims, wherein said plate is of steel.

5. A horological instrument including a 40 top frame member, a bottom frame member, a winding mechanism, an escapement and the mainspring-barrel assembly as claimed in anyone of the preceding claims, wherein said barrel plate is positioned between said 45 lower edge of the barrel and said bottom frame member.

6. An instrument as claimed in claim 5, wherein said plate is of relatively hard metal compared to the hardness of the bottom 50 frame member.

7. An instrument as claimed in claim 6, wherein said plate is of steel and said frame members are of brass.

8. A mainspring-barrel assembly substantially as hereinbefore described with reference to the accompanying drawings, 55

9. A watch incorporating the mainspring-barrel assembly as claimed in claim 8.

STEVENS, LANGNER, PARRY &
ROLLINSON,
Chartered Patent Agents,
Agents for the Applicants.

barrel cover is simply omitted. The barrel cover plate 25 also lessens the friction and the wear due to rotation of the bottom edge of the barrel, compared to friction and wear in a construction which omits the bottom barrel cover and has the bottom edge of the barrel side wall directly bearing against the frame.

Modifications may be made in the present invention within the scope of the appended claims. For example, the barrel cover plate 25 need not be round but may be made square or rectangular shaped and may be glued or otherwise adhered to the frame.

15 WHAT WE CLAIM IS:—

1. A mainspring-barrel assembly for a horological instrument, the mainspring-barrel assembly comprising a rotatable arbor connectable to a winding mechanism, a 20 coiled spring connected near its inner end to said arbor, a barrel having a top and a cylindrical side wall at least partly covering said spring, said side wall having a free lower edge, the outer end of said spring 25 being connectable to said barrel, said barrel having gear teeth for driving an escapement, and a barrel plate positionable against said lower edge of the barrel to enable said lower edge to rotatably bear on said plate.
- 30 2. An assembly as claimed in claim 1, wherein said plate is in the form of a flat disc.

3. An assembly as claimed in claim 1 or claim 2, wherein said plate has a central hole within which the arbor rotates, and a 35 plurality of other holes.

4. An assembly as claimed in any one of the preceding claims, wherein said plate is of steel.

5. A horological instrument including a 40 top frame member, a bottom frame member, a winding mechanism, an escapement and the mainspring-barrel assembly as claimed in anyone of the preceding claims, wherein said barrel plate is positioned between said 45 lower edge of the barrel and said bottom frame member.

6. An instrument as claimed in claim 5, wherein said plate is of relatively hard metal compared to the hardness of the bottom 50 frame member.

7. An instrument as claimed in claim 6, wherein said plate is of steel and said frame members are of brass.

8. A mainspring-barrel assembly substantially as hereinbefore described with 55 reference to the accompanying drawings.

9. A watch incorporating the mainspring-barrel assembly as claimed in claim 8.

STEVENS, LANGNER, PARRY &
ROLLINSON,
Chartered Patent Agents,
Agents for the Applicants.

