

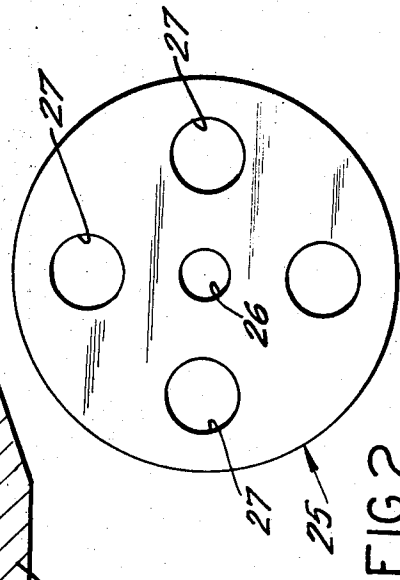
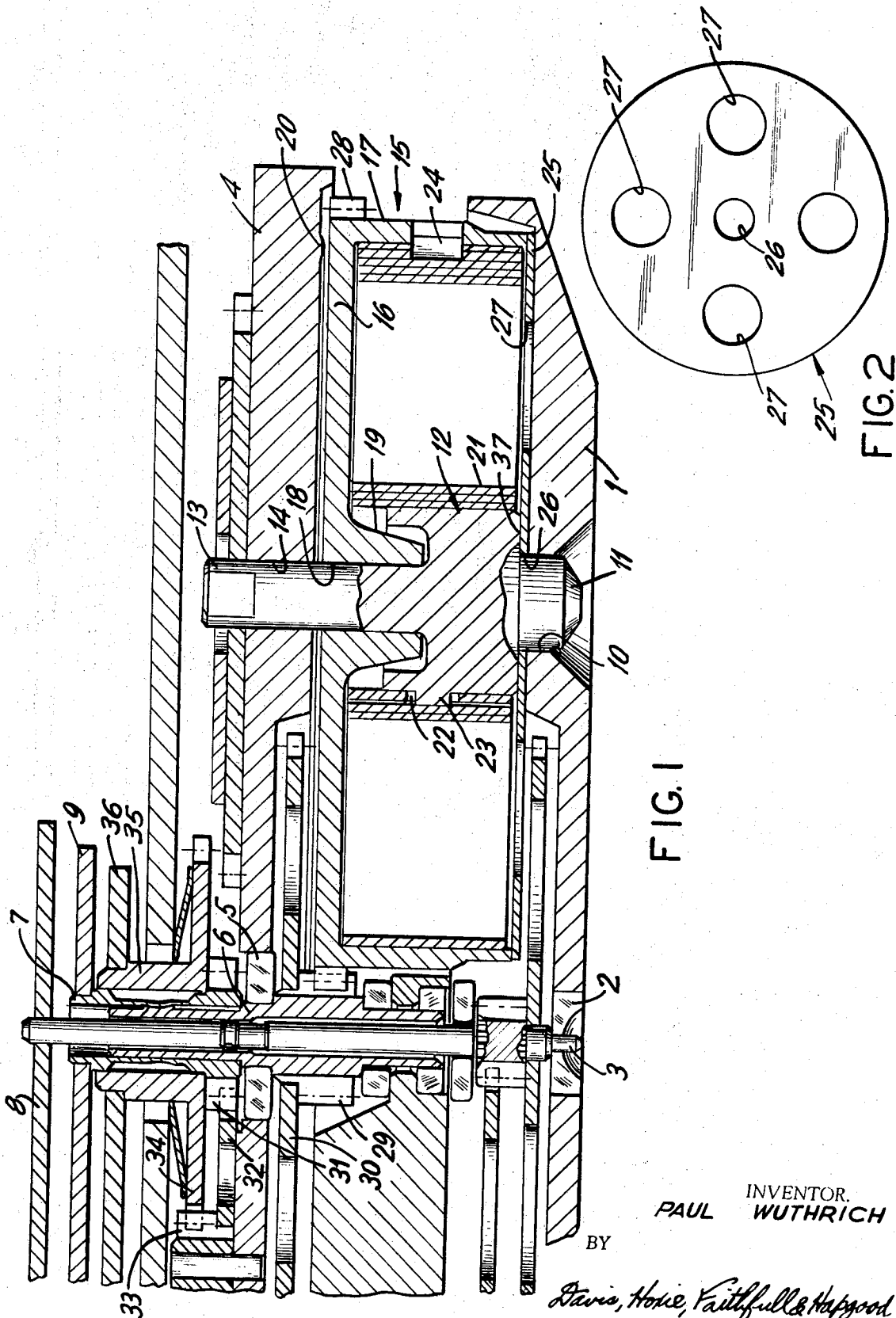
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WATCH MAINSPRING BARREL

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WATCH MAINSPRING BARREL

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1 Claim

ABSTRACT OF THE DISCLOSURE

The motive power of a watch consists of a flat coiled spring, called the mainspring. The inner end of the mainspring is attached to an arbor, i.e., a shaft. The outer end is connected to a barrel having cylindrical side walls and a covering top. The bottom edge of the side wall of the barrel rotates on a hard metal plate having a plurality of holes. The metal plate rests on a frame member of the watch.

This application is a continuation of the applicant's previous application Ser. No. 632,040, for "Watch Mainspring Barrel," filed Apr. 19, 1967, now abandoned.

The present invention relates to horology and more particularly to the mainspring barrel of a watch.

Watches having a flat 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 housing. The barrel usually consists of a round cylindrical structure having top and bottom covers and shaped like a flat round 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 precise 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 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 which is also relatively low in friction.

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, the barrel is constructed in the form of a round cylinder and having a top member, so that it is similar in shape to a short round can having only one end. A flat 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 open end of the barrel turns on a round hard flat plate, preferably blanked from steel in the form of a disc. The disc rests on a frame of the watch.

Other objectives of the present invention will be apparent from the following description of a preferred embodiment

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ment which should be considered along with the accompanying drawings. In the drawings:

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

FIG. 2 is a top plan view of the unconnected barrel plate.

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

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 with nickel. The bridge 1 contains a pivot jewel 2 within which the seconds shaft 3 rotates. The frame member 4 carries a jewel 5 which supports the tubular member 6 around which the minutes tube 7 rotates. The seconds shaft 3 rotates within 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. A set of gear teeth 31, integral with minute tube 7, meshes with gear wheel 32 which is attached to pinion 33. Pinion 33 meshes with the hour wheel 34, which is integral with the hour wheel shaft 35. An 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 the winding arbor 12 rotates. The arbor 12 has an elongated round top shaft portion 13 which rotates in hole 14 of 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 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 the bearing surface 18 formed by the bottom of the elongated top portion 13 of the arbor 12. The barrel is preferably machined out of brass.

The teeth 28 of the barrel mesh with teeth 29 which are integral with tubular member 6. The rotation of tubular member 6 turns the center gear wheel 30 which is fastened to the tubular member 6.

A bump (protrusion) 20 on the bottom side of frame member 4 acts to keep the top 16 of the barrel 15 from rubbing on the frame member 4, if the barrel should wobble slightly on its arbor.

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

A barrel plate (disc) 25 is positioned on the bridge 1. The barrel plate is preferably not fastened or attached to the bridge 1. A central hole 26 in the center of plate 25 is large enough to fit around the bottom portion 11 of arbor 12. The bottom flange 37 of arbor 12 bears on the top of the barrel plate 25 and rotates on that plate. The barrel plate 25 is preferably formed of steel in the shape of a flat circular disc 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 the back of the case is removed, into the barrel to obtain an indication of the condition and tensioning of the spring; secondly, to lubricate the spring, for example, by dropping oil into the barrel; and, thirdly, to permit the ready flow of cleaning fluid into, and out from, the barrel.

In watches using a conventional closed barrel, it is

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necessary for the manufacturer or watch repairer to remove the barrel prior 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, for example, in an ultrasonic bath, without removal of the barrel. This is a saving in time. In the case of those repairmen who do not remove the barrel from watches, the use of an easily flushed barrel may preserve 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 tend to rub against protrusion 20. Normally the bottom 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 on its top and bottom by joined members. The barrel plate 25 insures 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 barrel cover is simply omitted. The barrel cover 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 barrel plate 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 subjoined claim. 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.

I claim:

1. In a horological instrument including a top frame member, a bottom frame member having first and second flat portions, said first portion being at a different level

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than said second portion so that said first portion forms a ledge in regard to said second portion, a winding mechanism, an escapement and a gear train, the mainspring barrel assembly comprising a rotatable arbor connectable to said winding mechanism, a coiled flat spring connected near its inner end to said arbor, a barrel housing 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 housing, said barrel housing having gear teeth to drive the said gear train, and a barrel plate positioned between said lower edge of the barrel housing and said first and second portions of said bottom frame member and positioned so that said lower edge rotatably bears on said plate, said barrel plate resting on the ledge of said first portion and being cantilevered over said second portion, wherein said plate has a central hole within which the arbor rotates and at least one other hole, the said other hole being positioned over the said second section of the frame member, wherein said plate is of relatively hard metal compared to the hardness of the frame member.

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