April 11, 1961 H. EPPERLEIN 2,978,862

ELECTRIC WATCH

Filed Nov. 19, 1958 2 Sheets-Sheet 1

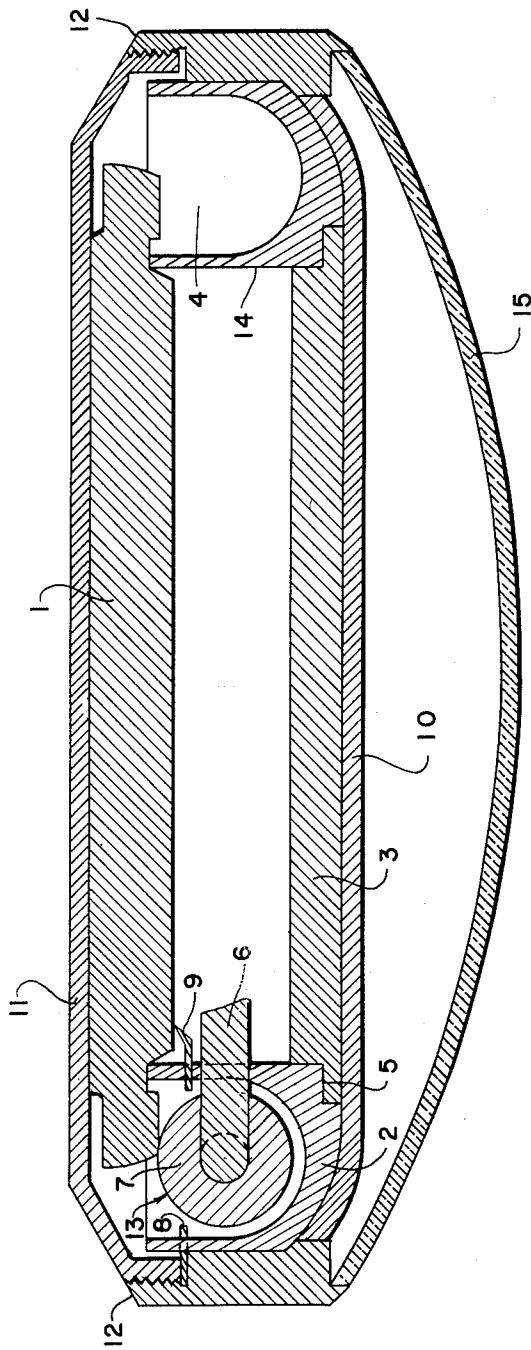


FIG. 1.

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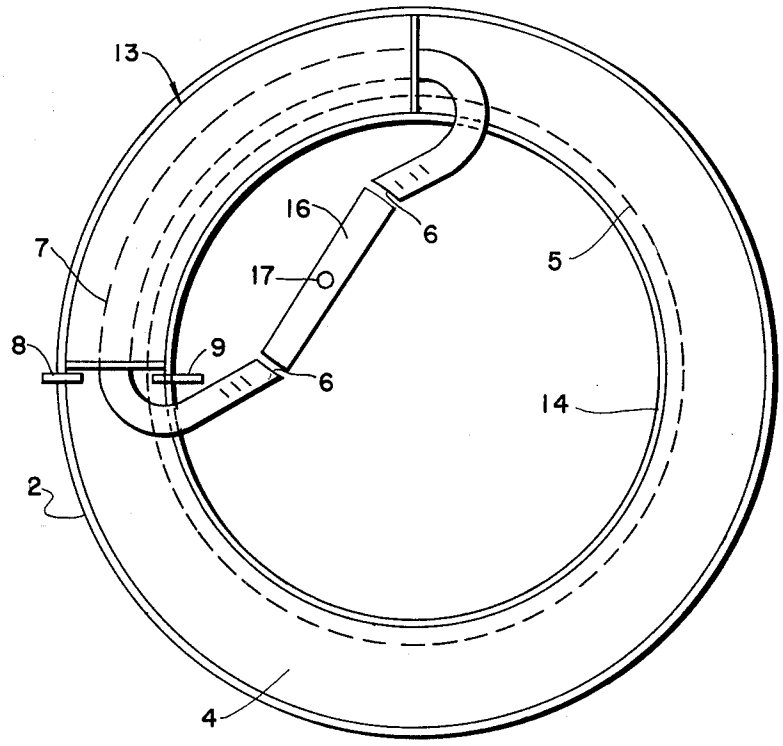


FIG. 2.

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ELECTRIC WATCH

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8 Claims. (Cl. 58—23)

This invention relates to a battery-powered electric watch and more particularly relates to a small battery-powered watch of the wrist watch type.

In the past, it has been proposed to provide a powering mechanism for an electric watch utilizing a generally circular core having a pair of coils wound thereon and cooperating with an oscillatory magnetic bar mounted for oscillation between the pole pieces of the core. Other workers in the watch field have proposed different configurations of cores which cooperate with an oscillating bar.

According to the present invention, it has now been found that through the use of certain unique expedients, it is possible to locate the core or electromagnet in a much smaller portion of the watch casing.

It is accordingly a primary object of the present invention to provide a battery powered electric watch having an electromagnet disposed therein for cooperation with an oscillating magnetic bar with the electromagnet being so disposed so as to occupy a minimum portion of the watch casing.

It is another object of the invention to provide an electric watch having mounted in the casing thereof an arcuate electromagnet cooperating with an oscillating magnetic bar wherein the electromagnet occupies only from one-fourth to one-third of the circumference of the wall of the watch case.

These and further objects and advantages of the invention will become more apparent upon reference to the following specification and claims and the appended drawings wherein:

Figure 1 is a vertical section through a wrist watch showing the construction of the present invention but with the watch train and unnecessary parts removed; and

Figure 2 is a partial bottom view of the watch of Figure 1 showing the placement of the electromagnet in the insulating body.

Referring to the figures of the drawing there is shown in Figure 1 a watch casing **12** carrying a dial plate **10** and crystal **15**. Screw threadedly engaging the back of the casing **12** is a disk-shaped back **11**.

An annular insulating ring **2** is seated within the casing **12** against the dial plate **10** and carries an annular recess **5** which secures into position the pillar plate **3**. The ring **2** is provided with an annular groove **4** and the innermost upper edge of this groove engages the periphery of the energizing battery **1**. The upper surface of the battery engages the back **11** of the watch casing which forms one terminal connection for the cell. Contact to this terminal of the battery is made through a small contact **8** which extends through the wall of the ring **2** into the groove **4** and which is compressed between the threaded edge of the casing back **11** and the casing **12** as is seen in Figure 1. The other connection to the battery is made by means of contact **9** extending through the inner peripheral wall of the ring **2** and engaging the under surface of the battery as seen in Figure 1.

Mounted within the insulating ring **2** is an arcuate

electromagnet which consists of a core having pole pieces **6** and a coil or coils **7** mounted thereon. The pole pieces **6** may cooperate with an armature **16** mounted upon a balance staff **17** in a manner well known to those skilled in the horology art. The remainder of the groove **4** in the insulating ring **2** may be utilized to house other elements of the electric powering arrangement, such as the transistor and any resistors or condensors which may be found desirable, as is discussed in deail in the aforementioned copending application.

The insulating ring **2** is preferably formed of a material capable of being cast or compressed, such as a synthetic resin, and, instead of being round, it may well be oval or angular.

It will be appreciated that by means of this arrangement, the insulating ring provides at its center a space for mounting the train of the watch including the balance wheel and the armature. Additionally, one edge of the ring supports the pillar plate while the other engages one surface of the battery.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiment is therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. A battery-powered electric watch having an annular casing member; a back closing one opening in said casing; a battery mounted adjacent said back; a watch movement centrally positioned in said casing member; an annular insulating member between said watch movement and said casing member, said insulating member having an interior void for housing at least a portion of the motive power mechanism for said watch, said insulating member being provided with means bearing against said battery to urge it against said back, whereby said battery will be fixed in position in said watch.

2. The watch defined in claim 1 wherein said battery has an annular groove in its bottom face and wherein said bearing means extends into said groove.

3. The watch defined in claim 2 wherein said insulating member is U-shaped in cross-section having legs in the form of annuli, at least one of said legs serving as the bearing means urging said battery against said back.

4. The watch defined in claim 1 wherein said insulating ring is provided with a shoulder which seats upon the pillar plate of said watch.

5. The watch defined in claim 1 wherein an arcuate electromagnet is mounted in the void in said insulating member, the core of said electromagnet being effective to induce rotation of an armature fixed to the balance wheel of said watch.

6. The watch defined in claim 5 wherein said electromagnet is mounted within an arc of less than 120°, the poles of said core extending into the sector bounded by said arc.

7. An insulating-support member for a battery-powered electric watch having an annular casing member, a back closing one opening in said casing, a battery having an annular groove in its bottom face mounted adjacent said back, and a watch movement centrally positioned in said casing member, comprising: an annulus having a diameter sufficient to permit its insertion in said watch between said casing and said watch movement, said annulus being U-shaped in cross-section with legs in the form of annuli, at least one of said legs being positionable in said annular

groove in the bottom face of said battery when said battery and annulus are situated in said watch as assembled.

8. The insulating support member defined in claim 7 wherein said annulus is provided with a shoulder adapted to seat upon the pillar plate of said watch in the assembled condition thereof.

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