

PATENT SPECIFICATION

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(54) BATTERY APPARATUS

(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 battery apparatus.

When electrical equipment is powered by a conventional dry battery or batteries, it is normally important to ensure that the batteries are located the right way round in housings provided therefor. Frequently, in fact, the equipment is marked to indicate which way round the batteries have to be placed. However, where space is extremely limited, as it is in an electrically operated timepiece such as a wrist watch, it may be very difficult to indicate which way round the batteries are to be inserted.

If, however, a battery is inserted the wrong way round, there is a risk that the battery will be short circuited and its power thus rapidly dissipated, while the incorrect disposition of the battery may result in the equipment driven thereby being inoperative, and may even damage the latter. There is also the risk of mechanical damage being caused by a careless user trying to force the battery in the wrong way round.

According to the present invention, there is provided apparatus comprising an elongated electric battery having a main portion provided with a first electrode, the battery having a projection portion which projects laterally from the main portion and which is provided with a second electrode, a container in which the battery is adapted to be mounted both in a first and in a second position, the container having an aperture through which the projecting portion extends only when the battery is disposed in the container in the said first position, no part of the battery extending through the aperture when the battery is mounted in the container in the said second position, and first and second terminal means which respectively make electrical contact with the first

and second electrodes when the battery is in the said first position, but at least one of which terminal means does not make electrical contact with either of said electrodes when the battery is in the said second position.

The said projecting portion may project outwardly of the outer casing of the battery by an amount not less than one sixth of the width of the latter.

The first and second terminal means may be respectively disposed internally and externally of the container. Moreover, the container may be cup-shaped in cross-section, the first terminal means comprising a conductive plate which closes the container.

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

Figure 1 is a diagrammatic view of apparatus according to the present invention, showing a battery therein in a first position, and

Figure 2 is a view corresponding to Figure 1, but showing the battery in a second position.

In Figure 1 there is shown battery apparatus comprising an electric dry battery 1 of elongated shape (which may, alternatively, be of cylindrical or rectangular shape). The battery 1 has a projecting negative electrode 1a which projects laterally outwardly of, and is insulated from, the outer casing 1b of the latter. The projecting negative electrode 1a projects outwardly of the outer casing 1b by an amount which is preferably not less than one sixth of the width W of the battery 1. The outer casing of the battery 1, and in particular a part 1c thereof, forms the positive electrode of the battery. The battery 1 is mounted in a container 2 of insulating material, the container 2 being cup-shaped in cross-section. A pair of contacts 3, which constitute a positive terminal and which are disposed internally of the container 2, are carried by a conductive plate 3a which closes the open upper end of the container 2. When the battery 1 is disposed in a first, or operative, position which is illustrated in Figure 1, 100

the negative electrode 1a is disposed downwardly and extends freely through an aperture 2a at the bottom of the container 2. The negative electrode 1a in this position contacts a negative terminal 4 which is disposed externally of the container 2. Thus, when the battery is in the first or operative position shown in Figure 1, the electrodes 1c, 1a respectively make electrical contact with the terminals 3, 4, the latter being connected to equipment (not shown) to be powered by the battery 1.

The structure shown in Figure 2 is the same as that in Figure 1, but the battery 1 instead of being in the first or operative position in which the negative terminal 1a extends downwardly, is in a second or inoperative position in which the terminal 1a extends upwardly. In the Figure 2 position, the positive terminal 3 contacts the negative electrode 1a but the negative terminal 4 is out of contact with the positive electrode 1c, whether or not contact occurs between the negative terminal 4 and the insulating container 2. Consequently, the battery, in the disposition of Figure 2, is on open circuit and thus short circuiting of the battery when in the position shown in Figure 2 cannot occur.

In the construction shown in Figures 1 and 2, one only of the electrodes, namely the electrode 1c is out of contact with a terminal when the battery is in the said second position, but the construction could be such that when the battery is in the said second position both electrodes were out of contact with their terminals.

Thus the arrangement shown in Figures 1 and 2 prevents either the battery or any equipment which is powered thereby from being damaged as a result of the fact that the user has placed the battery in the container 2 the wrong way round.

Accordingly, in the embodiment illustrated in the drawings, unnecessary draining of the power provided by the battery is avoided. The embodiment of the invention is particularly suitable for use in an electric wrist watch where the lack of space makes it

impossible to indicate very clearly how the battery is to be inserted.

WHAT WE CLAIM IS:—

1. Apparatus comprising an elongated electric battery having a main portion provided with a first electrode, the battery having a projection portion which projects laterally from the main portion and which is provided with a second electrode, a container in which the battery is adapted to be mounted both in a first and in a second position, the container having an aperture through which the projecting portion extends only when the battery is disposed in the container in the said first position, no part of the battery extending through the aperture when the battery is mounted in the container in the said second position, and first and second terminal means which respectively make electrical contact with the first and second electrodes when the battery is in the said first position, but at least one of which terminal means does not make electrical contact with either of said electrodes when the battery is in the said second position.

2. Apparatus as claimed in claim 1 in which the said projecting portion projects outwardly of the outer casing of the battery by an amount not less than one sixth of the width of the latter.

3. Apparatus as claimed in claim 1 or 2 in which the first and second terminal means are respectively disposed internally and externally of the container.

4. Apparatus as claimed in any preceding claim in which the container is cup-shaped in cross-section, the first terminal means comprising a conductive plate which closes the container.

5. Apparatus substantially as hereinbefore described with reference to and as shown in the accompanying drawings.

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WHAT WE CLAIM IS:—

1. Apparatus comprising an elongated electric battery having a main portion provided with a first electrode, the battery having a projection portion which projects laterally from the main portion and which is provided with a second electrode, a container in which the battery is adapted to be mounted both in a first and in a second position, the container having an aperture through which the projecting portion extends only when the battery is disposed in the container in the said first position, no part of the battery extending through the aperture when the battery is mounted in the container in the said second position, and first and second terminal means which respectively make electrical contact with the first and second electrodes when the battery is in the said first position, but at least one of which terminal means does not make electrical contact with either of said electrodes when the battery is in the said second position.

2. Apparatus as claimed in claim 1 in which the said projecting portion projects outwardly of the outer casing of the battery by an amount not less than one sixth of the width of the latter.

3. Apparatus as claimed in claim 1 or 2 in which the first and second terminal means are respectively disposed internally and externally of the container.

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