May 19, 1959 H. S. DETWILER 2,887,551

CONTACT SPRING RETAINER

Filed Aug. 3, 1956

FIG. 1

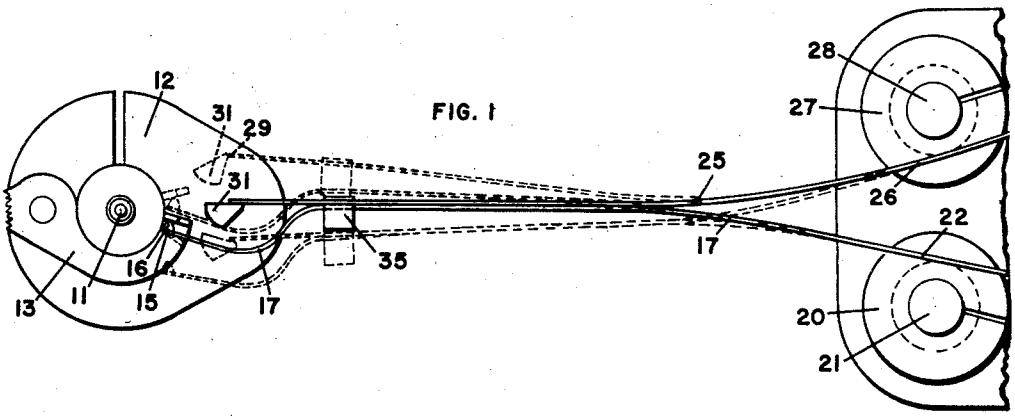


FIG. 2

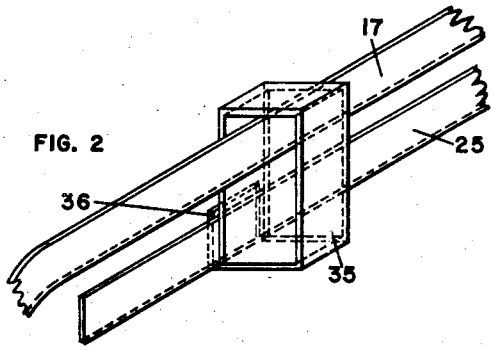
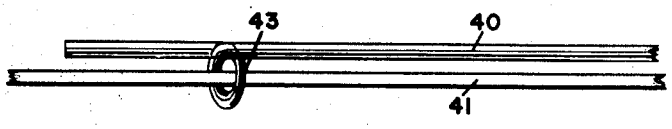


FIG. 3



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United States Patent Office 2,887,551 Patented May 19, 1959

2,887,551

CONTACT SPRING RETAINER

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Application August 3, 1956, Serial No. 601,900

7 Claims. (Cl. 200—166)

This invention relates to an improvement on the spring contacts used in electric watches, and more particularly to a means for preventing the spring contacts from getting out of alignment.

It is the object of the present invention to provide a retainer or restricting ring which may be attached to one of a pair of spring contacts used in an electric watch, the other contact being retained within the confines of the ring to prevent one of the contacts from springing over the other.

A further object of the present invention is to provide means for retaining a pair of contacting springs in contact making relation, one of said springs serving as an electrical conductor in an electrically operated watch.

It is a still further object of the present invention to provide a metallic closure or ring which may be affixed to one of a pair of spring arms and used to house the other of the spring arms to prevent said arms from becoming out of alignment.

A still further object of the present invention is to provide a retaining member attached to one of a pair of spring arms which are in stressed position and opposed to each other, said retaining member housing the other of said spring arms to prevent their losing contact with each other.

The invention is illustrated in the accompanying drawing in which:

Figure 1 is a plan view of the spring arms and the contact member carried on the oscillating balance staff of a watch.

Figure 2 is a detail of the spring arms showing the retaining member and spring arms greatly enlarged.

Figure 3 is a detail of a modification.

Referring to the drawings, Figure 1 is a greatly enlarged view of the contact system of an electric watch having a balance staff **11** which ordinarily supports a balance wheel and hairspring assembly, not shown, and carries a roller **12** and contact making arm **13**.

The contact arm is upturned at its end, as shown at **15**, and makes contact with a contact button **16** carried on the end of the spring wire **17**. This spring wire is mounted in a collet **20** which is carried on a contact post **21** which in turn is connected to a battery, not shown. The collet **20** is rotatable about the post **21** to angularly position the spring wire **17**. The spring wire **17** is furthermore slidable in the slot **22** of the collet which provides for longitudinal adjustment of the spring wire, and a consequent adjustment of the contact button **16** relative to the contact arm **15**.

A second spring arm **25** is mounted in a slot **26** in collet **27** carried on post **28**, which spring wire is likewise adjustable longitudinally and angularly on the post **28** in a manner similar to that of the spring wire **17**. The extreme end **29** of the wire **25** contacts the jewel pin **31** carried on the roller **12** during the oscillating movement of the balance staff **11**.

A retaining member **35** in the form of a rectangular

band having one end **36** overlapping is supported by the spring wire **25** and confines spring wire **17** within its limits. This retaining member prevents the contact spring wire **17** from changing its relative position to the wire **25** except by an exceedingly small amount and insures that the wire **17** will maintain a position below the wire **25**, referring to Figure 1. It is necessary for the operation of the watch that the wire **17** be below or in back of (referring to Figure 1) the wire **25** so that the inherent resiliency of the wires is effective towards maintaining a stressed position in the contacts.

The wires **17** and **25** due to the angular position and to their inherent resiliency are held in a stresesd position, exerting a force against each other through the retainer member. This stressed condition is necessary so that upon engagement of the contact button **16** with the contact face **15** there is no undue vibration or chatter in the contact, the force against the surface of the contact will be constant throughout the entire contact period and will not change due to change of position of the contact face **15** through rotation of the roller **12**.

In the operation of the contacting mechanism and the part which the retaining member plays, a counterclockwise movement of the balance staff **11** brings the jewel pin **31** into contact with the extreme end **29** of the spring **25**, as shown in the lower dotted position of Figure 1. At this time the two wires **17** and **25** are urged toward each other, the wire **17** being restrained by the retaining member **35** from passing over the wire **25**. Continued movement of the roller brings the wires to the solid line position shown in Figure 1, in which the contact button first makes contact with the contacting face **15** of the arm **13**. The upper dotted line position shows the wires in the last stage of the contact making interval in which the end **29** is about to lose contact with the jewel pin **31** and the button **16** is still in contact with the face **15**, the wires **25** and **17** being separated by the extent of the retaining member, being forced away from each other by the influence of the jewel pin **31** and the contact face **15** during the rotation of the balance staff in a counterclockwise direction. At the moment at which the end **29** passes the end of the jewel pin, the wire **25** is released and springs backward bringing the side of the retaining member against the wire **17** and sharply breaking the contact between the button **16** and the face **15**. The retaining member permits sufficient separation of the wires to avoid any interference during the contact making interval, but is sufficiently small to retain the wires in practical contact with each other. On the return motion of the balance staff **11**, the end **29** is engaged by the jewel pin **31** and through the retaining member **35** swings the wire **17** clear of any contact with the contact face **15**.

Referring particularly to Figure 3, a modification of the retainer ring is shown in which instead of the substantially ribbon shaped strips used for the spring wires, round wires **40** and **41** are used. The wire **41** carries a contact making member similar to the wire **17**, while the wire **40** serves the same purpose as the wire **25**. Instead of a separate retaining member, such as **35**, the wire **40** is bent into a loop **43** through which the contact carrying wire **41** is threaded. This serves the same purpose as the retaining member **35** and would be especially appropriate should round wires be found desirable. The ribbon shaped wires, such as **17** and **25**, are used because they permit greater flexibility in one direction and retain a certain amount of rigidity in the other direction.

What is claimed is:

1. In an electric watch a stressed elongated spring contact member, a stressed elongated spring member in engagement therewith and opposing the spring force of said

contact member, and retaining means permitting complete separation of said members only in a direction substantially in the plane of said members.

2. In an electric watch, a stressed elongated spring contact member, a stressed elongated spring member in engagement therewith and opposing the spring force of said contact member, and retaining means carried by one of said members permitting complete separation of said members only in a direction substantially in the plane of said members.

3. Apparatus as defined in claim 2 in which said retaining means is detachably secured to said one member.

4. Apparatus as defined in claim 2 in which said retaining means is integral with said one member.

5. In an electric watch, a stressed elongated spring contact member, a stressed elongated spring member in engagement therewith along the length of said members and opposing the spring force of said contact member, and retaining means comprising a loop carried by one of said members and completely encircling the other of said members.

6. Apparatus as defined in claim 5 in which said encircling loop is spaced from said other member permitting limited separation of said members.

7. Apparatus as defined in claim 6 in which said loop is positioned at a point of contact between said members.

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