



an increasing number of hands are to be supplied with power, the contact members mounted on the periphery of each drive shaft become like an increasing number of concentric layers so that the diameter of a central shaft portion becomes considerable and the construction becomes complicated. Further, since said contact members extend from the inside of a timepiece movement, a conventional timepiece movement cannot be used so that the design of the timepiece movement itself also has to be changed.

According, therefore, to the present invention, there is provided apparatus for use in a timepiece comprising a rotatable timepiece hand having a luminescence element mounted thereon; two annular conductors which are carried by the hand and are disposed on one side of the latter, the annular conductors being arranged concentrically of the centre of rotation of the hand; two contact members which are respectively electrically connected to the annular conductors and to the luminescence element for supplying power to the latter, the contact members being carried by the hand and being disposed on the side of the latter opposite to the said one side; and contact segments which extend from the contact members and which in operation trace concentric circles with respect to the centre of rotation of the hand so that the contact segments may be in electrical contact with further annular conductors which are concentric therewith, the first-mentioned annular conductors being adapted to be contacted by further contact segments.

The apparatus may also comprise two fixed annular conductors which constitute the said further annular conductors and each of which is connected to a drive circuit.



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

Figure 1 is an enlarged sectional side view of a portion of an apparatus for use in a timepiece according to the present invention;

Figure 2 is a plan view of the structure shown in Figure 1;

Figure 3 is a bottom view thereof;

Figure 4 is a plan view of a portion of the structure shown in Figure 3 so as to illustrate the method of assembly; and

Figure 5 is a broken away sectional view of a timepiece provided with the apparatus of Figures 1-4.

In Figures 1-3 there is shown apparatus for use in a timepiece comprising an annular contact receiver 1 which is made of an insulating material and which has downwardly-extending projections 1a provided on the under side thereof. Holes 2a are bored in a timepiece hand 2 in alignment with the projections 1a of the contact receiver 1. The contact receiver 1 is secured on the hand 2 with the projections 1a passing through the holes 2a and projecting from the under side of the hand 2. An annular protrusion 1b is provided on the upper side of the contact receiver 1 concentrically with the centre of rotation of the hand 2, and two annular conductors 3 and 4 are disposed on the radially outer and inner sides of the protrusion 1b. The annular conductors 3 and 4 respectively have L-shaped connecting members 3a, 4a formed in a portion thereof, each of the connecting members 3a, 4a passing through the contact receiver 1 and projecting from the under side of the hand 2.

Contact members 6 and 7 are secured on an insulating plate 5. The insulating plate 5 has holes 5a



luminescence element 8 to the remaining parts described above will now be described.

As shown in Figure 4, the insulating plate 5 has both the holes 5a, 5b and disconnection-purpose holes 5c bored therein. The contact members 6 and 7 are formed integrally together or are interconnected by a coupling member 10 and respectively have holes 6c and 7c bored therein. The parts are arranged so that the holes 5b and the holes 6c and 7c overlap each other and so that projecting portions (not shown) of an assembly jig or the like are fitted therein. The contact members 6 and 7 are then bonded to the insulating plate 5. Then, the coupling member 10 is disconnected or removed by the use of a punch or the like (not shown) which is adapted to pass through the hole 5c. In this way, the contact members 6 and 7 can be readily secured to appropriate positions on the insulating plate 5 without deformation.

Then, with the projections 1a of the contact receiver 1 passing through the holes 2a of the hand 2 and through the holes 5a of the insulating plate 5, the contact receiver 1 and the insulating plate 5 are secured to the hand 2. The distal ends of the projections 1a are then deformed over and/or fused to the under side of the insulating plate 5. In this way, the contact members 6 and 7 and the contact receiver 1 are attached to appropriate positions on the hand 2.

Figure 5 is a broken away sectional view of a timepiece provided with the apparatus described above, the hand 2 being an hour hand.

As shown in Figure 5, a fixed contact receiver 11 is press-fitted onto the upper end portion of a bush 15 secured on a timepiece movement 12. The upper side of the fixed contact receiver 11 has fixed



the same time, from the lead wire 16b to the fixed annular conductor 14, and thence to the contact member 7 via the contact segments 7a and 7b sliding on this fixed conductor, and so to the other lead electrode 8b of the luminescence element 8, whereby power is supplied to the luminescence element 8 of the hour hand 2.

Similarly, power is transmitted from the contact member 7 to one lead electrode of the luminescence element of the minute hand 22 via the annular conductor 4 and the contact member 27, and from the contact member 6 to the other lead electrode of the luminescence element of the minute hand 22 via the annular conductor 3 and the contact member 26, whereby power is supplied to the luminescence element of the minute hand 22.

Since the two contact segments 6a and 6b, and 7a and 7b, and the contact segments 26a and 26b, and 27a and 27b are adapted to slide on the fixed conductors 13 and 14 and on the conductors 3 and 4, respectively, it is possible to enhance the reliability of conduction by changing the spring pressure, spring height, spring length, sliding radius, etc. of each component. Further, the annular protrusions 1b and 11a which are respectively provided on the contact receivers 1 and 11 prevent the contact segments from contacting the opposite conductor or fixed conductor even when they deviate a little from their proper sliding routes.

As described above, the power supplied from a lower portion of the timepiece is used to drive the luminescence element 8 mounted on the hand 2 and, at the same time, it is further transmitted to the hand 22 disposed above it. Thus, power is successively supplied to a number of hands disposed in superposed relation at the same axial position so as to drive loads mounted on the individual hands. A simplified construction is thus

CLAIMS

1. Apparatus for use in a timepiece comprising a rotatable timepiece hand having a luminescence element mounted thereon; two annular conductors which are carried by the hand and are disposed on one side of the latter, the annular conductors being arranged concentrically of the centre of rotation of the hand; two contact members which are respectively electrically connected to the annular conductors and to the luminescence element for supplying power to the latter, the contact members being carried by the hand and being disposed on the side of the latter opposite to the said one side; and contact segments which extend from the contact members and which in operation trace concentric circles with respect to the centre of rotation of the hand so that the contact segments may be in electrical contact with further annular conductors which are concentric therewith, the first-mentioned annular conductors being adapted to be contacted by further contact segments.
2. Apparatus as claimed in claim 1 in which the apparatus also comprises two fixed annular conductors which constitute the said further annular conductors and each of which is connected to a drive circuit.
3. Apparatus as claimed in claim 1 or 2 in which the apparatus also comprises another hand which carries further contact members having the said further contact segments which contact the first-mentioned annular conductors.
4. Apparatus as claimed in any preceding claim in which the luminescence element is an electroluminescence element.