Jan. 5, 1965 R. SIEFERT 3,164,758

ARMATURE FOR ELECTROMAGNETICALLY WOUND CLOCKS

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Fig. 1

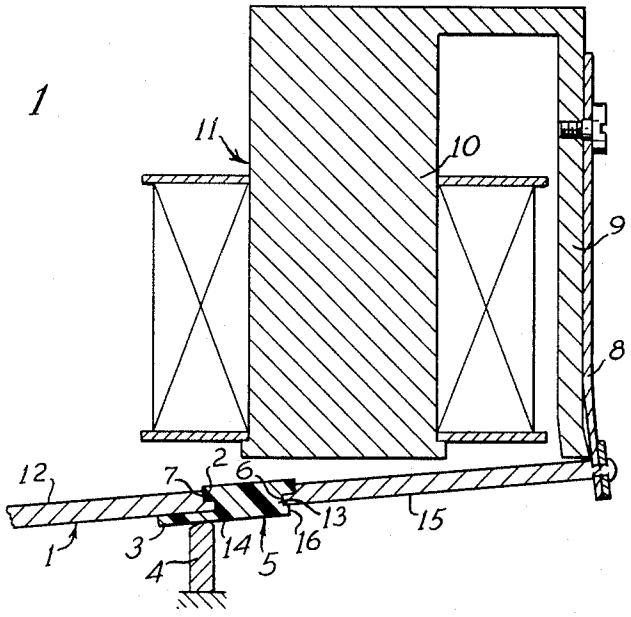
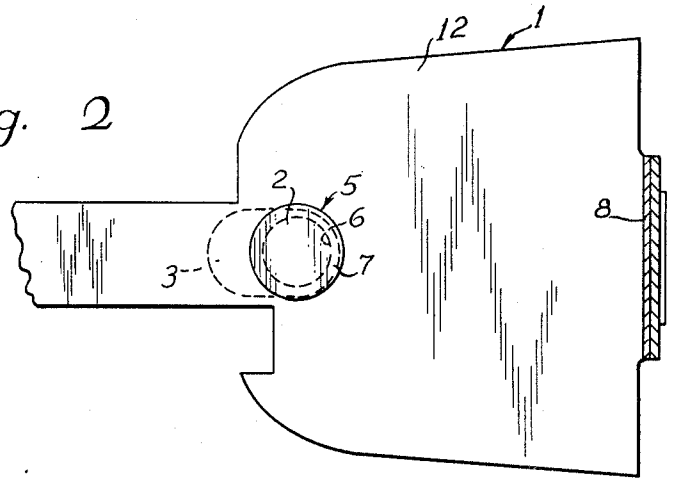


Fig. 2



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ARMATURE FOR ELECTROMAGNETICALLY WOUND CLOCKS

Roland Siefert, Schwenningen (Neckar), Germany, assignor to Kienzle Uhrenfabriken A.G., Schwenningen (Neckar), Germany, a corporation of Germany

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This invention relates to sound dampening means for clapper armatures in wind-up devices for electromagnetically wound clocks where a single stroke of an armature is used to wind a clock spring, usually to the full extent that the spring is to be wound, by ratchet and pawl means. The armature often acts on the inertia member carrying the "wound" end of the spring and through a springy element between the armature and the inertia member.

In wind-up-devices of this type the drive or winding stroke, as well as the return movement, of the usual intermittently actuated armature produces a more or less sharp noise. Such armatures are known as "clapper armatures" both from their resemblance to armatures used in electric bells and from the objectionable clicking noise they make. Another problem met with in such wind-up devices is the sticking of the armature on the electromagnet due to residual magnetism.

To overcome these disadvantages attempts were at one time usually in the nature of interposing a thin foil or layer of synthetic resin or plastic between the magnet core and the armature; in other instances the stop for limiting the rest position of the armature was encased in rubber. The disadvantages of these expedients are, first that the adhered plastic or resin becomes wrinkled or corrugated so that the magnetic air gap between magnet and armature becomes greater than that desired and second, that when the stop or pin is coated with gum the air gap is no longer sufficiently adjustable. Optimum air gap is of great importance when small electric cells are used to energize the wind up device.

The present invention overcomes these disadvantages and two sound deadening means for the drive stroke and the return to rest position are respectively provided on the armature.

In the accompanying drawing:

FIG. 1 shows the armature in cross section, and

FIG. 2 shows a plan of the armature.

In the drawing the armature **1** is, by means of a spring **8**, hinged on a leg **9** of a magnet **11** having a wound core **10**. The spring, with whatever force is required due to action of gravity in the normal position of the clock, biases the armature to remote or lower position where it is detained by a stop **4**.

The armature is of plate or strip material of sufficient rigidity to resist appreciable bending and is provided with a circular hole **6** therethrough with a right angular rabbet groove or countersink **7** in the armature face **12** toward the core and shown as the upper face.

The hole and groove receive a die-cast damper **5** of soft elastic material such as rubber or synthetic plastic, for example polyvinyl chloride. The damper may be cast in situ or be cast prior to assembly and forced or drawn into position because of its deformability. The damper includes a head **2** of diameter substantially equal to the diameter of the countersink and projects slightly beyond the face **12** when the head is seated in the countersink so as to prevent contact of the armature and the core **10**.

Below the head **5** is a portion **13** of reduced diameter fitting rather snugly in the hole **6**. Beneath the portion **13** of the damper **5** there is integral therewith an oval shaped retaining portion **14** having a tab part **3** extending on the lower or outer face **15** of the armature so as to lie between the latter and the stop **4**. The tab acts as a cushion between the armature and stop when the armature falls.

The width of the tab and retaining portion is slightly greater than the diameter of the hole **6** and the end **16** opposite the tab does not project quite as far as the countersink but does overlie the outer face **15**. The thickness of the head is greater than that of the retaining portion. With these relative dimensions it is possible to insert the tab downwardly through the hole and under force, deforming the retaining and reduced diameter portions by a lateral pull on the tab, seat the damper **5** in the hole **6**. The greater size of the head **2** prevents the latter from being drawn through the hole when the pull on the tab is not excessive. Of course it is to be understood deformations during the seating are only temporary and the damper **5** returns to substantially its originally cast shape after becoming seated and snugly fits in the hole.

The stop **4** engages the tab **3** preferably wholly outside the region of the hole **6**. In this way there is no tendency of appreciable magnitude tending to force central portions of the damper upwardly relative to the armature and induce wear on retaining portion at the circumference of the hole **6**. Nor is there as much tendency to produce permanent deformation due to the resting of the armature on the stop **4** over long periods of time as may be the case if narrow peripheral parts of the retaining portion must bear the load.

Thus, the head **2** affords one means for dampening acoustic energy when the armature is attracted and the tab **3** the means for dampening when the armature returns to rest position.

The invention claimed is:

1. In an electromagnetically wound clock, an electromagnet to be intermittently energized; an armature hinged for movement toward and away from the magnet; an abutment substantially fixed relative to the magnet for limiting movement of the armature away from the magnet; and an integral piece of soft elastic material on the armature and having a first portion between the armature and magnet to prevent noisy contact and adhesion of the armature on the magnet, and said piece having a second portion between the armature and the abutment to avoid noise when the armature moves toward the abutment.

2. In a clock as claimed in claim 1, said armature being of sheet-like material and having a hole therethrough, and said second portion including a tab lying adjacent the outer face of the armature and extending therealong to lie upon the abutment, when the armature is in rest position, in a zone substantially remote from the center of the hole.

3. In a clock as claimed in claim 1, said armature being of sheet-like material and having a hole therethrough provided with a countersink in the face toward the magnet, said first portion being a head in countersink and projecting above said face and into the countersink, and said second portion including a tab extending along the opposite face of the armature, to engage the abutment member near the hole but remote from the central portion thereof.

4. In an electromagnetically wound clock, an electromagnet and a sheet-like armature mounted for movement toward and away from the core of the magnet, said armature having a hole therethrough in the general zone of magnet and provided with a countersink open toward the magnet in one face of the armature, a stop member for limiting movement of the armature away from the magnet, a cast generally rivet-shaped noise-deadening element of soft elastic material snugly fitting in the hole, the

element having a short head portion in the countersink and projecting therefrom to engage the end of the magnet and avoid noisy contact of said face of the armature on the magnet and to prevent adhesion of the armature on the magnet by residual magnetism, the element having peripheral portions including a tab adjacent the opposite face of the armature between the latter and the stop member to engage the stop member to prevent noise of contact of the armature against the stop member.

5. In an electromagnetically actuated clapper-armature device, an electro-magnet and a sheet-like armature mounted for movement toward and away from the core of the magnet, the armature having a hole therethrough in the general vicinity of the core and provided with a countersink opening toward the core, a stop member remote from the zone of the hole for limiting outward movement of the armature, a generally rivet-shaped preformed noise deadening element of soft elastic material snugly fitting in the hole, the element having at one end a head in the countersink and projecting from the armature face thereat toward the coil and adapted to engage

the latter, the element having integrally at the other end thereof a substantially flat oval shaped retaining portion lying along the opposite face of the armature past the armature margins at the hole to retain the element in the hole, the retaining portion being of oval shape to provide a tab extending well past the hole to engage on the stop, said oval portion having its maximum width only slightly greater than the diameter of the hole to permit the retaining portion to be passed through the hole by deformation of the element for mounting the element in the hole, the tab serving as a grip member on which to pull on and seat the element.

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JOHN F. BURNS, *Primary Examiner.*