

[54] WATCH ESCAPEMENT

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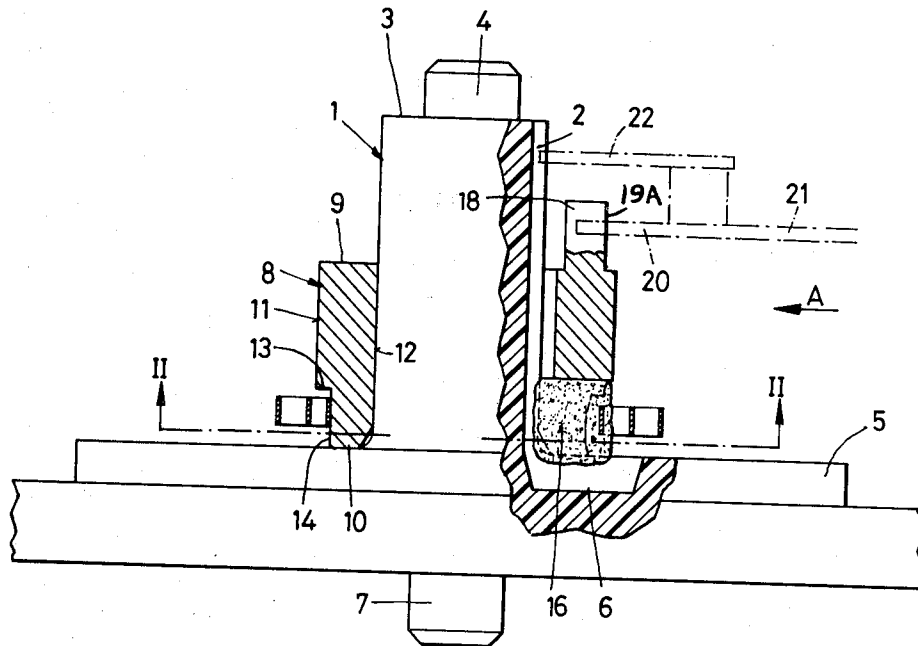
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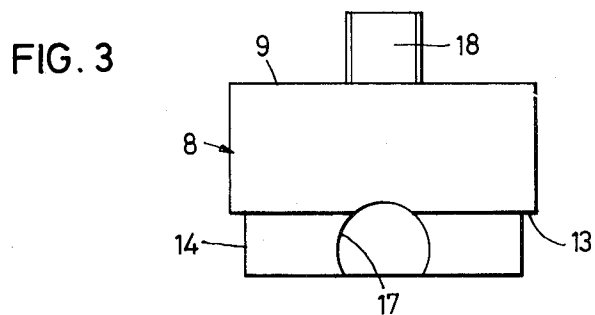
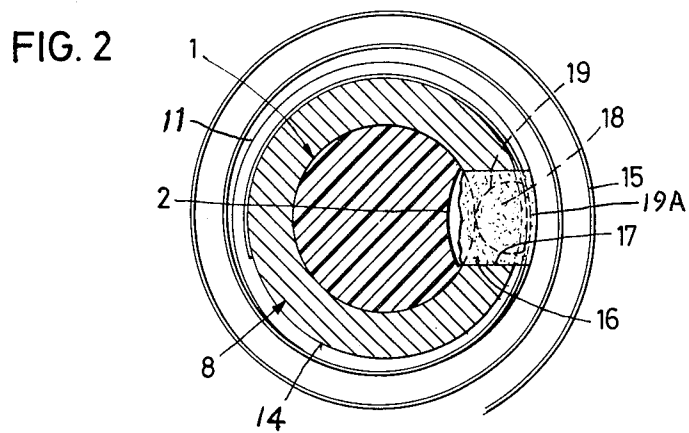
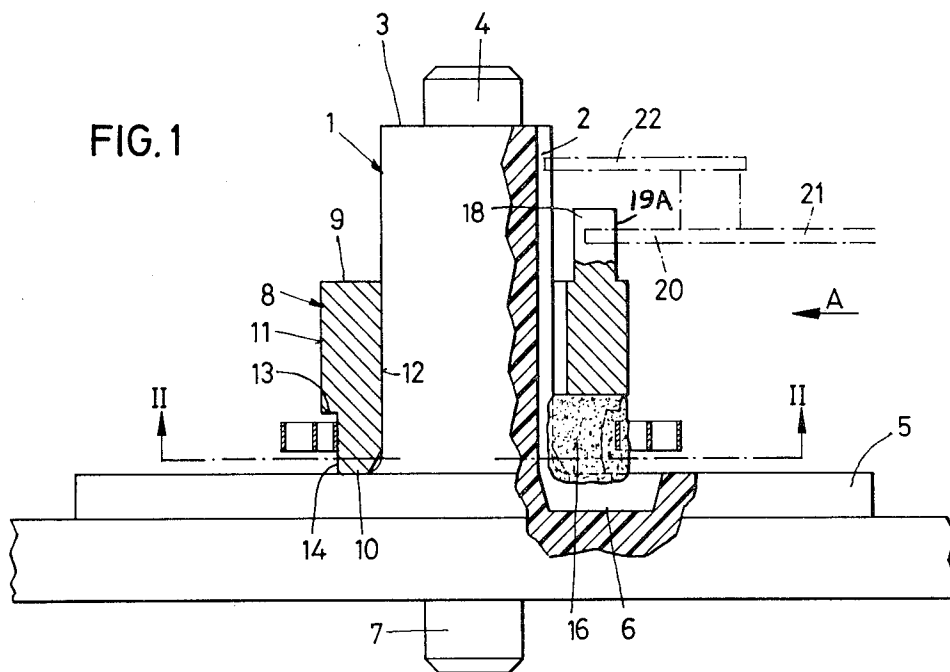
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ABSTRACT

A watch escapement mechanism which includes a hairspring, a balance, a staff integral with the balance, and a metal ring which engages the staff on one side of the balance. The metal ring has two end faces. One of the end faces has a projection projecting therefrom parallel to the axis of the staff. The other end face has the inner end of the hairspring fastened thereto.

9 Claims, 3 Drawing Figures





WATCH ESCAPEMENT

This invention relates to a watch escapement comprising a balance with a staff bearing a metal ring and a hairspring.

The balances usually used in watch movements comprise a staff on which there is mounted an annular part formed of two elements constituting the roller and the safety-roller, the roller being equipped with a roller-pin intended to establish the connection between the balance and the pallet, and to ensure the transmission of the impulses from the one to the other of those two parts.

In certain watch movements of simplified construction, the roller-pin, generally made of synthetic stone or hardened steel, is replaced by a blanked element.

It is the object of this invention to provide a watch movement of simplified construction, equipped with a roller-pin having the precision and the surface finish necessary to ensure regular operation of the escapement.

To this end, in the watch escapement of the aforementioned type according to the present invention, the metal ring is profile-turned with a projection, parallel to the axis of the balance and acting as a roller-pin, in one of its end faces, and with means for fastening the hairspring.

A preferred embodiment of the invention will now be described in detail, by way of example, with reference to the accompanying drawings, in which:

FIG. 1 is a partial elevation, partially cut away,

FIG. 2 is a section taken on the line II—II of FIG. 1, and

FIG. 3 is an elevation of the roller in the direction of the arrow A in FIG. 1.

The staff, the hub, and the arms of the balance illustrated in FIG. 1 are molded in one piece of plastic material. As a variation, however, the staff might equally well consist of a profile-turned metal part, with the rim, the arms, and the hub themselves consisting of a blanked metal part driven on to the staff.

A staff 1 is molded with a groove 2 limited by a concave surface in the shape of an arc of a cylinder having its axis parallel to that of the staff 1. The groove 2 extends longitudinally starting from a shoulder 3, from which a pivoting element 4 projects, down to the level of a hub 5, where the groove 2 ends in a shallow recess 6 made in the hub 5. Beyond the hub 5, the staff 1 is prolonged by a second pivoting element 7. The rim of the balance is not shown in the drawing. It is fastened by known means to the ends of the arms which extend radially from the hub 5.

The staff 1 carries a roller 8 which acts as a collet and bears the roller-pin. The roller 8 consists of an annular metal part, generally cylindrical in shape, machined completely by profile-turning. This part is limited by two plane frontal end faces 9 and 10, a circular cylindrical lateral face 11, and a likewise circular cylindrical inner face 12, coaxial with the face 11. The dimensions of the inner face 12 are such that the roller 8 may be frictiontight on the staff 1 so as to be integral with the balance.

In the embodiment illustrated, the lateral face 11 is limited on the side toward the hub 5 of the balance by a shoulder 13, starting from which there extends a cylindrical bearing surface 14 which is coaxial with the lateral face 11 but is slightly smaller in diameter. The

bearing surface 14 serves for the guiding and fastening of the inner end of a hairspring 15. Its height is greater than that of the blade of the spring 15. As may be seen in the drawing, the inner end of the spring 15 rests against the bearing surface 14 over an arc of a circle of about 180° and encircles the bearing surface 14 freely starting from a spot of cement 16 formed in a notch 17 in the bearing surface 14. The notch 17 may be machined by milling by means of an auxiliary tool mounted on the automatic lathe and acting perpendicular to the axis of the bar in which the roller 8 is machined after the headstock has been stopped. The notch 17 might also be machined by means of a tool acting in the axial direction of the part, e.g., during an operation on another machine. The portion of the spring 15 which is fastened by the spot of cement 16 is completely embedded in the cement, but the cement does not extend beyond the cylindrical surface 11. The spring 15 rests against the bearing surface 14 up to the edge of the notch 17 and extends freely starting from the other edge of the notch 17, where it leaves the spot of cement 16 already slightly spaced from the bearing surface 14.

Both the fastening of the spring 15 to the bearing surface 14 and the determination of the active length of the spring 15 may be carried out without the roller 8 having to be mounted on the staff 1, by means of an auxiliary installation known per se which makes it possible to determine the active length of the spring 15 with sufficient accuracy. The roller 8 is then fitted on the staff 1, with the end face 10 coming to rest against the hub 5.

Projecting from its other flat end face 9, the roller 8 also has an extension 18 which is limited by two cylindrical surface portions 19, 19A having parallel axes. Extension 18 thus constitutes a roller-pin. The surface portion 19A is coaxial with the roller 8, and its radius is slightly less than that of the lateral face 11. It forms the outer face of the roller-pin 18. Also, the surface portion 19A could have the same radius as that of the lateral face 11 so that the outer lateral face of the extension 18 is continuous with the lateral face 11 of the roller 8. As for the other cylindrical surface portion 19, its radius is appreciably less than that of the roller 8, and its axis is situated at a certain distance from the axis of the roller 8, which distance is very slightly less than the radius of the surface 11. The roller-pin 18 will be machined in the front face of the bar by means of a cutter which may be an annular-shaped diamond cutter disposed coaxially with the headstock, but so that its axis is slightly offset with respect to that of the bar. The inside radius of the cutter will correspond to that of the inner cylindrical face 19 of the roller-pin 18. The same cutter or another tool will serve to finish the flat face 9 of the roller 8, these operations being carried out while the headstock of the lathe is stopped and the bar of material to be machined is blocked. Thus the part 8 may be machined completely on an automatic lathe without any operation on another machine.

The roller-pin 18 extends parallel to the staff 1 facing the central axis of the groove 2, the roller 8 being suitably positioned at the time of its fitting. The roller-pin 18 cooperates with a fork 20 of a pallet 21 which will be associated with the balance described. A dart 22 engages in the groove 2 during the unlocking and the impulse as in the conventional escapements. Obviously, the roller-pin need not necessarily be positioned to co-

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incide with the notch 17. It might also be differently positioned.

The balances described above have the advantage of being extremely simple since the staff, the hub, and the arms are molded in one piece, whereas the roller 8, which acts simultaneously as the roller and the collet, is a metal part, e.g., of nickel silver, which may be machined completely by profile-turning starting from a cylindrical-shaped bar of material.

What is claimed is:

1. In a watch escapement:

a hairspring,

a balance,

a staff integral with said balance, and

a metal ring engaging said staff on one side of said balance, said metal ring having two end faces, one of said end faces having a projection projecting therefrom parallel to the axis of the staff and acting as a roller-pin, the other one of said end faces having means for fastening the inner end of the hairspring thereon.

2. In an escapement in accordance with claim 1, wherein said projection is limited by two cylindrical surface portions, one of which is coaxial with the said ring and comprises the outer face of the projection, and the other of which has a radius smaller than that of the first one and forms the inner face of the projection.

3. In an escapement in accordance with claim 2, wherein the outer lateral face of the projection is con-

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tinuous with the lateral face of the said ring.

4. In an escapement in accordance with claim 1, wherein the staff comprises a notch facing said projection, said notch defined therein being intended for the engagement of a dart of a pallet.

5. In an escapement in accordance with claim 4, wherein said notch comprises a groove of arcuate section in the lateral face of the staff parallel to its axis.

6. In an escapement in accordance with claim 1, wherein said ring comprises a cylindrical bearing surface adjacent to its other end face, and the inner end of the hairspring is kept in contact with the lateral face of said bearing surface.

7. In an escapement in accordance with claim 6, wherein said bearing surface is coaxial with said ring, and the radius of said bearing surface is less than that of the lateral face of said ring.

8. In an escapement in accordance with claim 6, wherein the said other end face of ring comprises a notch defined therein which takes up the entire height of the said bearing surface and is intended to be filled with a spot of cement fastening the hairspring to the said ring.

9. In an escapement in accordance with claim 6, wherein the balance comprises a hub and arms made in one piece with the staff, and said ring is mounted on the staff in such a way that the bearing surface supporting the hairspring is adjacent to said hub.

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