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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFCATION

Device for Transforming Oscillating Movement into Rotational Movement in Particular for Timepieces

We, CENTRE ELECTRONIQUE HORLOGER S.A., of rue Bréguet, 2, 2001 Neuchatel, Switzerland, a Swiss Body Corporate, 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 relates to devices for transforming oscillating movement into rotational movement.

In an electromechanical watch which has a mechanical resonator driving the gear train of the watch through a device for transforming oscillating movement into rotational movement by means of at least one part driving a ratchet wheel, it has already been proposed to provide a magnetic pinion on the shaft of the ratchet wheel and magnetically driving the first wheel of the gear work.

This device for transforming movement has the advantage of great simplicity, of eliminating to a large measure power losses due to friction and constituting an excellent mechanical filter isolating the resonator from the gear train. In addition the relative positions of the magnetic pinion and the driven wheel require setting to a precision which is far less than that of the gears of a mechanical gear work. This makes possible a completely independent manufacture, on the one hand of the oscillator with its device for transforming movement comprising the pawl, the ratchet wheel and the magnetic pinion, and on the other hand, the gear work mounted on the plate and comprising the driven wheel, and of later assembling without difficulty these two parts.

According to the invention there is provided a device for transforming oscillatory movement into rotational movement, comprising a toothed wheel the teeth of which cooperate with a pawl to rotationally drive said wheel, said toothed wheel having magnetic poles at its periphery, and a second wheel magnetically driven by said toothed wheel.

The combination of the ratchet wheel with the magnetic pinion makes possible a simple construction, reduction in the length of the shaft carrying the magnetic toothed wheel and a decrease in the moment of inertia of the wheel and shaft driven by the pawl.

The accompanying drawing illustrates, by way of non limiting example, an embodiment of the invention.

Figure 1 is a schematic view thereof and Figure 2 an elevational cross-sectional view.

The device shown in the drawing is constituted by a toothed wheel comprising a ring 1 with triangular teeth and made of magnetic material having very high coercivity, for example the wheel is made of a cobalt-platinum alloy and has 6 poles of alternating polarity along its periphery. This ring is secured on a shaft 2 pivoted between two sets of stones 3, 4 and 5, 6 fixed in two bridges 7 and 8, secured on the opposite faces of the foot of a resonator 13.

Wheel 1 is driven by pawl 9, pawl 10 preventing backward motion of the wheel 1. The pawl can also both be driving pawls.

Wheel 1 magnetically drives a wheel 11 of greater diameter whose pinion 12 meshes with the next wheel of the gear work. Wheel 11 is magnetised in order to have alternate poles along its periphery, the spacing of these poles being approximately equal to the spacing of the poles of wheel 1.

In order to reduce to the minimum the inertia of wheel 1, whose irregular movement is a source of perturbations and loss of power, its diameter is very small, in this case it is equal to 0.5 mm and it may, advantageously, have a diameter approximately twice that of

its shaft. For a thickness of 0.1 mm, there is thus obtained, for a wheel of cobalt-platinum, a moment of inertia about its shaft 2 of the order of 10^{-7} gr cm^2. The number of teeth on wheel 1 is, for example, 36.

Wheel 11 is smooth, but it could also have projecting poles. It can consist of a ring of high coercivity magnetic material such as a cobalt-platinum alloy mounted on a core of non-ferromagnetic material, such as brass, which economises the amount of magnetic material used. Wheel 11 could alternatively, be made of a ferro-nickel alloy or even of soft iron in order to reduce the cost thereof.

The pierced stone 3 and the counter-pivot 4 are additionally transparent in order to facilitate observations of the beaks of the pawls in order to check their position and the adjustment of their phases. The two wheels 1, 11 are disposed substantially in the same plane.

WHAT WE CLAIM IS:—

1. A device for transforming oscillatory movement into rotational movement, comprising a toothed wheel the teeth of which co-operate with a pawl to rotationally drive said wheel said toothed wheel having magnetic poles at its periphery, and a second wheel magnetically driven by said toothed wheel.

2. A device according to claim 1, wherein said toothed wheel is at least partly formed of high coercivity magnetic material, for example a cobalt-platinum alloy.

3. A device according to claim 1 or 2, wherein each of the wheels has a plurality of magnetic poles disposed around its periphery, the polarities of adjacent poles around the peripheries of the wheels being opposed.

4. A device according to claim 1, 2 or 3, wherein the two wheels are disposed substantially in the same plane.

5. A device according to any one of the preceding claims wherein said toothed wheel is mounted on a shaft, said toothed wheel having a diameter approximately twice that of said shaft.

6. A device according to any one of the preceding claims, wherein said second wheel is made of soft iron.

7. A device according to any one of claims 1 to 5, wherein said second wheel is made at least in part of a ferro-magnetic material.

8. A device according to any one of claims 1 to 5, wherein said second wheel comprises a ring of high coercivity magnetic material, for example a cobalt-platinum alloy, mounted on a non-magnetic core.

9. A device according to any one of the preceding claims wherein said toothed wheel is mounted on a shaft, and comprises a transparent bearing in which one of the extremities of said shaft is mounted.

10. A device substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

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1,176,619
1 SHEET

COMPLETE SPECIFICATION

This drawing is a reproduction of the Original on a reduced scale.

FIG.1

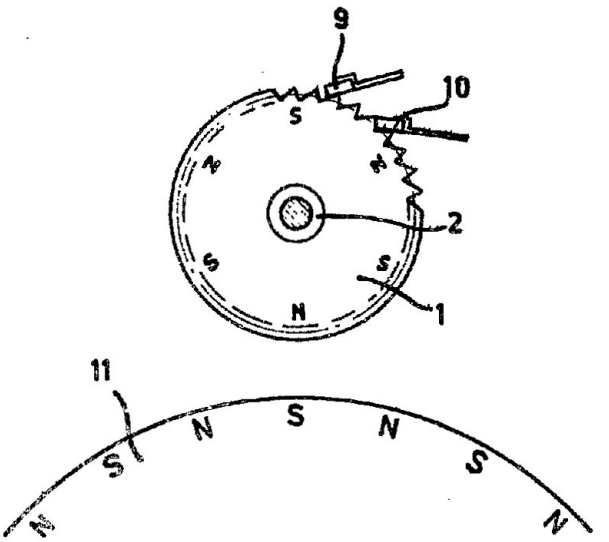

FIG.2