Oct. 2, 1962 A. BEYNER ET AL 3,056,253

ELECTRICALLY OPERATED OSCILLATORY SYSTEM FOR TIMEPIECES

Filed May 26, 1961

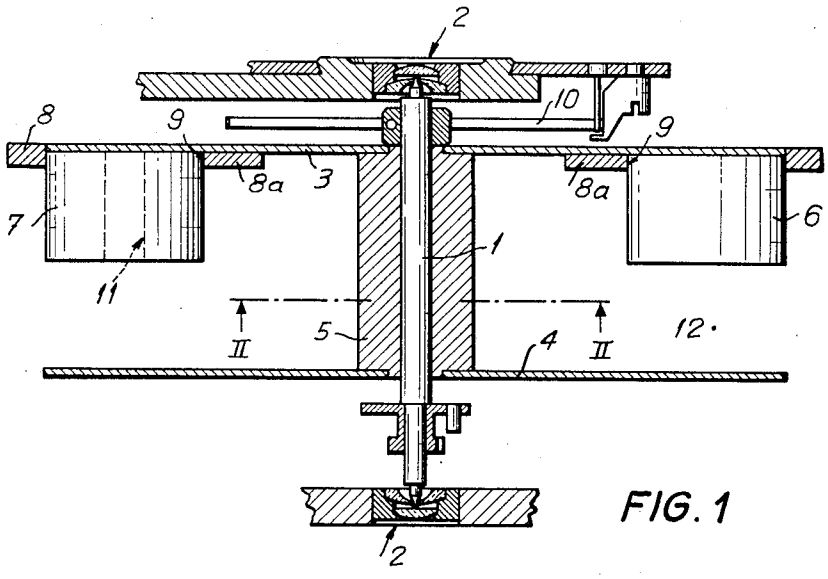


FIG. 1

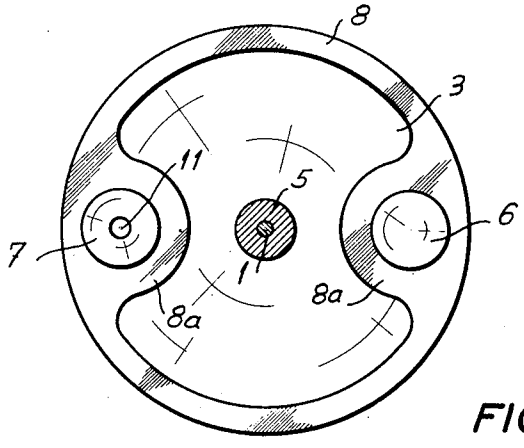


FIG. 2

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United States Patent Office

3,056,253

Patented Oct. 2, 1962

3,056,253
ELECTRICALLY OPERATED OSCILLATORY SYSTEM FOR TIMEPIECES

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Filed May 26, 1961, Ser. No. 112,994
Claims priority, application Switzerland June 10, 1960
1 Claim. (Cl. 58—28)

The present invention relates to an oscillatory system for timepieces, whose oscillations are maintained electrically.

This oscillatory system is characterized in that it comprises a circular plate made of ferro-magnetic material, carried by the shaft on which the said system oscillates, and an annular mount constituting a fixing frame, and made of non-magnetic material, to which the said plate is fixed, the said mount comprising two internal lugs which are diametrally opposite one another and to which a permanent magnet and a balancing counter-weight are fixed respectively, the said magnet being in contact with the said plate.

The drawings show by way of example one form of embodiment of the subject of the invention.

FIGURE 1 is an axial sectional view of an oscillatory system for a timepiece, and

FIGURE 2 is a sectional view thereof taken on the line II—II of FIGURE 1.

The oscillatory system illustrated comprises a shaft **1** rotating between two bearings **2** carried by the frame of the timepiece movement. This shaft carries two co-axial circular plates **3** and **4** made of ferro-magnetic material and spaced apart from one another by a spacer element **5** which is also made of ferro-magnetic material and is force-fitted on to the shaft. These plates are crimped to the spacer element.

The plate **3** carries a permanent magnet **6** and a balancing counter-weight **7**. This magnet and this counter-weight are fixed to a common mount constituted by a ring or fixing frame **8** made of non-magnetic material such as, for example, nickel silver, and the said ring is force-fitted about the plate **3** but could also be welded electrically. The said ring comprises two inner lugs **8***a*, which are arranged diametrally opposite one another and in whose housings **9** there are force-fitted the magnet **6** and the counter-weight **7** respectively. The magnet is in contact with the plate **3**.

The system is provided with a spiral-type return spring **10**.

The advantages of the present construction reside in the simplicity and the facility with which it permits of adjustment. Thus, the system can be balanced by slightly enlarging a central hole **11** provided in the counter-weight **7**. The adjustment of its moment of inertia is easily obtained by retouching the external diameter of the ring **8**. This adjustment thus does not affect the magnetic circuit in any way.

The electric elements for maintaining the oscillatory movements of the system have not been shown in the drawings, since they do not form part of the present invention. They comprise fixed coils which are in relative movement with respect to the air gap **12**, provided between the magnet **6** and the plate **3**, during the oscillations of the system. The magnetic circuit forms a loop situated in a radial zone with respect to the axis of oscillation; it passes through the two plates **3** and **4**, through the central spacer element **5**, and is closed at the air gap **12**.

It should be noted that this system is astatic, and that it is not influenced by the vicinity of ferro-magnetic parts, since the magnetic losses exhibit a circular symmetry. The disturbing torques thus do not depend on the amplitude, but produce a constant braking torque independent of the amplitude of the oscillations.

What we claim is:

In an oscillatory system for timepieces, the oscillations of which are maintained electrically, a shaft on which the said system oscillates, a circular plate made of ferro-magnetic material which is carried by the said shaft, an annular mount forming a fixing frame and consisting of non-magnetic material, to which the said plate is fixed, the said mount comprising two inner lugs which are situated diametrally opposite one another, a permanent magnet, extending parallely to the said shaft, in contact with the said plate, a balancing counter-weight, said magnet and said counter-weight being fixed respectively to the said lugs, and a second circular plate coaxial with the first plate, carried by the said shaft, also made of ferro-magnetic material, said second plate being situated at a certain distance from the end of the said magnet.

References Cited in the file of this patent

UNITED STATES PATENTS

2,800,763	Ensign et al.	July 30, 1957
2,986,683	Lanet et al.	May 30, 1961

FOREIGN PATENTS

1,074,506	Germany	Jan. 28, 1960