Dec. 3, 1935. J. HARWOOD 2,023,322

TIMEPIECE

Filed Feb. 27, 1934

Fig. 1.

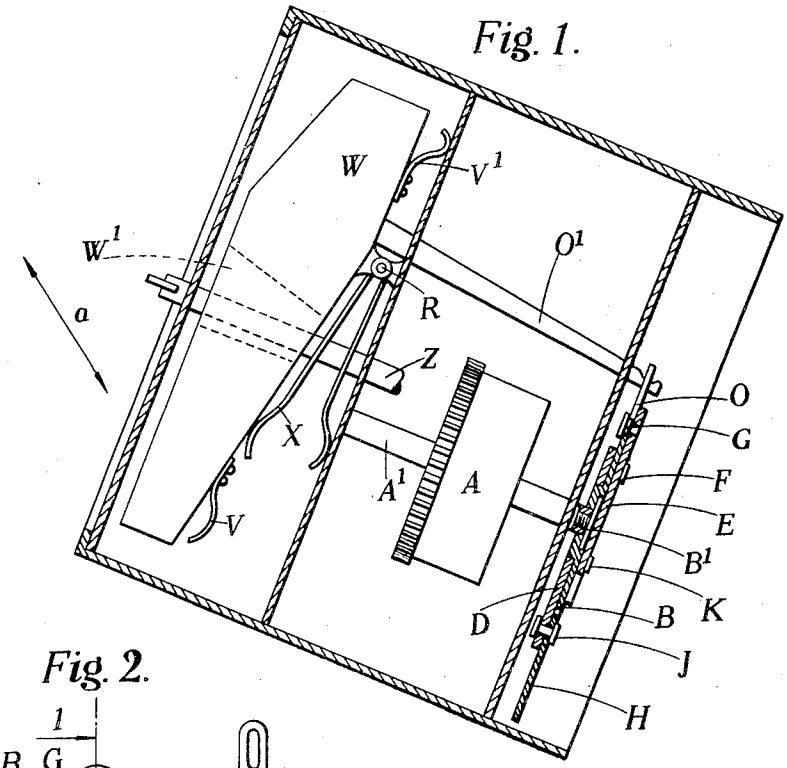
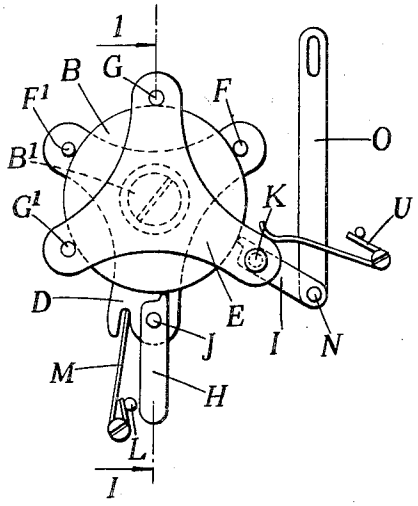


Fig. 2.



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TIMEPIECE

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3 Claims. (Cl. 58—46)

This invention relates to self-winding timepieces and has for an object to provide, for use particularly but not exclusively on vehicles (such as motor road vehicles and small power-propelled boats), improved self-winding timepieces of the type in which the mainspring is wound by a pendulous or oscillating mass or weight.

The production of commercially satisfactory timepieces as aforesaid is rendered difficult by the necessity for housing in a space of small dimensions means capable of effective winding. A toothed or ratchet winding mechanism requires a movement of the actuating pawl or like member sufficiently extensive to ride idly over two teeth in order to gather one tooth and effect a winding movement equivalent to one tooth. The attainment of this extensive movement often enough to maintain the timepiece wound is impossible, by means of a pendulous or oscillating mass as heretofore known, within the limited usual or standard overall size of timepieces such as those intended for vehicles, as there is space neither for sufficient amplitude of vibration of the mass nor for a large mass capable of operating through a multiplying lever system.

My invention provides a new and improved self-winding timepiece comprising, in combination, a face, a movement, a mainspring included in the movement and a hands arbor extending from the movement through the face, with a pivot disposed horizontally and transversely to the axis of the hands arbor, a mass pendulously mounted between the movement and the face on the pivot and having an aperture through which the hands arbor freely passes, a toothless winding mechanism associated with the mainspring, and linkage means operatively connecting the mass and the winding mechanism.

Conveniently, the toothless winding mechanism aforesaid is constituted in known manner by a toothless disc on a pin (which may be the mainspring arbor or which may be connected to the mainspring arbor through a toothed gear chain), a member mounted for rotation about the axis of the disc and having two studs bearing on the periphery thereof, and a lever pivoted on said member and actuable by the moving weight to engage the periphery of the disc, the whole achieving a uni-directional grip on the disc; and includes retaining mechanism which is preferably similarly constituted.

Other features of the invention will appear hereinafter.

By way of example an embodiment of the invention will be described with reference to the accompanying drawing, wherein,

Fig. 1 is a diagrammatic, partly sectional elevation of a clock; and

Fig. 2 is an end elevation of the toothless winding and retaining mechanisms of Fig. 1.

For simplicity the details of the clock movement have been omitted from Fig. 1, this movement being similar to an ordinary type of clock movement except for the winding means for the mainspring A. This spring is mounted on an arbor A' to the rear end of which a circular disc B is secured by means of a screw B' the head of which enters a recess in the disc B. Toothless winding mechanism comprises a trefoil plate E which carries two pins G, G' bearing on the periphery of the disc B. A lever I, pivoted on a pin K in the plate E, has a nose which bears upon the disc B when a link O articulated at N to the outer end of the lever I is subjected to an upwardly directed force. A spring U secured to a fixed mounting bears upon the trefoil plate E adjacent the pivot K to retain the nose of the lever I normally in engagement with the periphery of the disc B.

The upper end of the link O is engaged by an arm O' rigidly secured to a weight W mounted on a pivot R which is disposed horizontally and transversely to the hands arbor Z. The weight W is substantially circular in transverse section and has a slot W' which is penetrated by the arbor Z. A hairpin spring X is mounted at the pivot R and opposes the force of gravity exerted upon the weight W, while buffer springs V and V' are attached to the weight to prevent violent impact with the clock case in the event of excessive vibration.

A toothless retaining mechanism is constituted by a second trefoil plate D mounted loosely about the hub of the disc B and carrying two pins F, F' bearing on the periphery of the disc together with a lever H pivoted on a pin J mounted in the plate D, the said lever having a nose also bearing on the periphery of the disc. This mechanism serves to retain the disc B in the positions attained under the winding action of the toothless mechanism constituted by the trefoil member E with the pins G, G' and the lever I, since the outer end of the lever H is associated with a spring M secured to a fixed mounting and engaging a slot in the trefoil plate D to urge the said plate in the clockwise direction and retain the lever H in contact with a fixed stop L during anticlockwise movement of the disc B under a winding stress.

When a clock is mounted at an inclination (as shown in Fig. 1) in the dashboard of a vehicle such as a small power-propelled boat or more particularly a motor vehicle, it is subjected to vibration substantially in the vertical plane through its hands arbor Z and in the directions indicated by the double arrow *a*. This vibration causes the pendulous weight W to oscillate about its pivot R, and every downward movement raises the end of the arm O' fixed to the weight and imparts an upward pull to the link O. Hereby the lever I is turned to force its nose into engagement with the periphery of the disc B, so that the latter, being gripped between the said nose and the pins G, G', is turned in an anticlockwise direction (Fig. 2) so long as the link O is being pulled upwards. As soon as a downward movement of the weight is completed and it commences to rise, the arm O' depresses the link O, thereby freeing the nose of the lever I from the periphery of the disc B. The disc is, however, retained against clockwise rotation by the retaining mechanism constituted by the trefoil member D, whose pins F, F' and lever H automatically grip the periphery of the disc under any tendency of the latter to turn in the clockwise direction. Thus, the vibration of the weight W continually imparts winding movements to the mainspring A, these movements being all useful, regardless of their amplitude, by virtue of the properties of the toothless winding mechanism.

If desired, the face of a timepiece according to the invention may have an aperture through which a mark on the pendulous or vibrating mass or weight may be visible to indicate that the said mass or weight is freely oscillating.

Evidently many constructional modifications may be made without departing from the scope of the invention.

I claim:—

1. In a self-winding timepiece, the combination of a face, a movement, a mainspring included in the movement and a hands arbor extending from the movement through the face, with a pivot disposed horizontally and transversely to the axis of the hands arbor, a mass pendulously mounted between the movement and the face on the pivot and having an aperture through which the hands arbor freely passes, a toothless winding mechanism associated with the main-spring, and linkage means operatively connecting the mass and the winding mechanism.

2. In a self-winding timepiece, the combination of a face, a movement, a mainspring included in the movement, and a hands arbor extending from the movement through the face, with a pivot disposed horizontally and transversely to the axis of the hands arbor, a mass pendulously mounted between the movement and the face on the pivot and having an aperture in the mass through which the hands arbor freely passes, a toothless winding mechanism associated with the mainspring, linkage means operatively connecting the mass and the winding mechanism, and a toothless retaining mechanism associated with the mainspring.

3. A self-winding timepiece comprising, in combination, a frame securable to a supporting surface such as a vehicle dashboard, a face mounted in the frame, a movement mounted in the frame, a mainspring included in the movement, a hands arbor extending from the movement through the face, a pivot disposed horizontally and transversely to the axis of the hands arbor, a mass pendulously mounted on the pivot between the movement and the face and having an aperture through which the hands arbor freely passes, a toothless winding mechanism associated with the mainspring, an actuating member in said mechanism, an arm rigidly extending from the mass, a link operatively connecting said arm with said actuating member, and a toothless retaining mechanism associated with the mainspring.

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