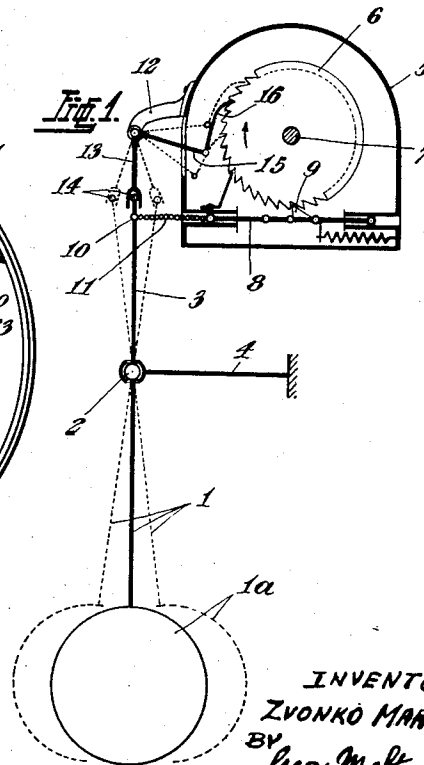
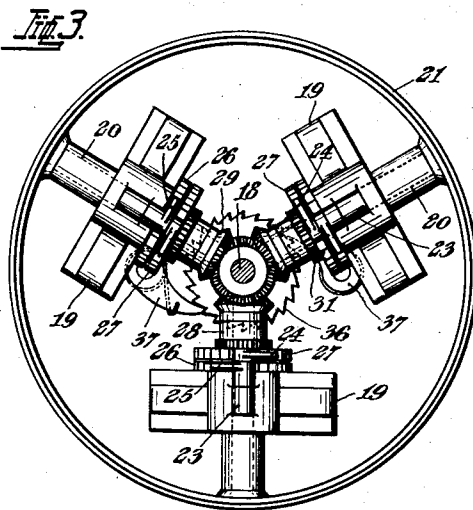
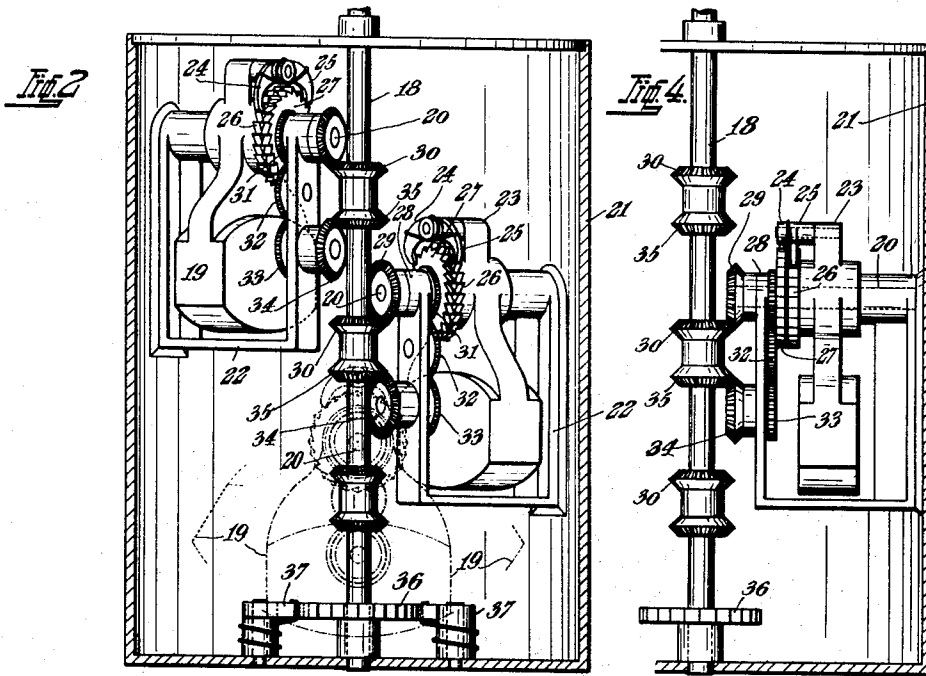


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MECHANISM FOR UTILIZING SECONDARY MOVEMENTS
ARISING ON RUNNING VEHICLES
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MECHANISM FOR UTILIZING SECONDARY
MOVEMENTS ARISING ON RUNNING VE-
HICLES

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This invention relates to a mechanism adapted to utilize secondary movements caused by a moving vehicle, and more particularly to a mechanism which is adapted to transform automatically secondary movements from a moving vehicle, such as vibrations caused by the unevenness of the road or drive way, or oscillations produced by acceleration or retardation of the vehicle, into a form of energy which is readily suitable to drive any apparatus.

According to the present invention the vehicle is equipped with a device comprising at least one movably arranged mass adapted to be moved or oscillated by vibrations or other secondary movements imparted to the vehicle, and means which are operably connected with said mass to utilize the energy received from said moving mass.

The features of this invention will be apparent from the following description in connection with the accompanying drawing in which two preferred embodiments of the invention are illustrated by way of example.

In the drawings:

Fig. 1 is a diagrammatic sectional elevation of a first embodiment of a mechanism according to the invention comprising a pendulum suspended to freely oscillate to any side.

Fig. 2 is an isometric elevation of a second embodiment.

Fig. 3 is a top plan view to Fig. 2, and

Fig. 4 is a partial lateral elevation of the mechanism in Fig. 2.

The mechanism shown in Fig. 1 comprises a universal pendulum suspended to freely oscillate to any side. This universal pendulum 1 includes a pendulum bob 1a carried by a rod 3 extending upwards through a bearing 4, wherein it is supported by means of a ball 2 fixed to the rod 3. A case 5 is arranged laterally near the upper end 10 of rod 3 and encloses a ratchet wheel 6 of a control mechanism, which has an axle 7 which is pivotally mounted in case 5. A rod 8 carrying a click 9 which engages ratchet wheel 6 is horizontally arranged in the plane of ratchet wheel 6 to be endwise reciprocable under the action of a spring 8a. The end of rod 8 facing the upper end 10 of pendulum rod 3 is connected therewith by means of a chain 11, so that oscillations of the pendulum will drive the ratchet wheel 6 by steps. The described arrangement utilizes oscillations of the pendulum 1 only in one direction. In order to utilize oscillations of the pendulum also in the opposite direction, case 5 provides a bracket 12 which carries an angle lever 13 having the outer end of one arm 14 cup-

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shaped to engage therein the upper ball-shaped end of the pendulum rod 3, while the outer end of the other lever arm 15 is pivotally connected with a click 16 which engages with ratchet wheel 6. When pendulum 1 is oscillating in one way, it will move click 9 to rotate ratchet wheel 6, and in the other or opposite way, it will move click 16 to further rotate the ratchet wheel.

The second embodiment of the mechanism comprises, instead of a single universal pendulum suspended to freely swing to any side, one or several ordinary penduli each of which swinging in a separate plane angularly arranged round a shaft which is to be rotated by the combined result of the separate actions of the penduli, the effect thereof being thus the same as in the case of a universal pendulum.

The mechanism shown in Figs. 2 to 4 comprises three penduli 19 each suspended from a separate horizontal axle 20 to swing in a vertical plane, the three penduli 19 being pivotally mounted on bearing supports 22 secured in a common case 21 around a vertical shaft 18 and their planes of oscillation forming equal angles, namely 120° to one another. However, these planes may form any angle to one another and the penduli may also be suspended to swing in planes which are inclined with respect to the central shaft. Each pendulum 19 has formed at its upper end above axle 20 a lug 23 having operably secured thereto two clicks 24, 25 which engage ratchet wheels 26, 27 to rotate the same by steps when they swing to and fro together with the oscillating pendulum. Ratchet wheel 26 is secured on the hub 28 of a bevel wheel 29 which meshes with a bevel wheel 30 fixed on the central shaft 18 to the effect that the intermittent rotation of ratchet wheel 26 is transmitted upon shaft 18.

Ratchet wheel 27 is integral with toothed wheel 31 and freely rotates on hub 28 of bevel wheel 29. Toothed wheel 31 drives a toothed wheel 33 over an intermediate wheel 32. Wheel 33 is secured to the hub of a bevel wheel 34 meshing with a bevel wheel 35, which is integral with bevel wheel 30 and therefore fixed on central shaft 18, whereby the intermittent rotation of ratchet wheel 26 will be transmitted upon shaft 18. Ratchet wheels 26, 27 have contrarily directed ratchet teeth, that consequently the oscillation of pendulum 19 in one direction will cause click 24 to rotate ratchet wheel 26 and the oscillation of pendulum 19 in the other direction will cause click 25 to rotate ratchet wheel 27 in opposite direction. As shaft 18 is to be driven in only one direction, rotation of ratchet wheel 27

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is transmitted thereto by the intermediary of gearing 31, 32, 33, 34. Bevel gear 34, 35 drives thus shaft 18 in the same direction as bevel gear 29, 30, and consequently the full oscillations of pendulum 19 will be utilized to rotate shaft 18 in one and the same direction. For each of the three penduli 19 a similar device is provided to transform the pendulous oscillations into intermittent rotation and transmit the latter in the same direction upon central shaft 18.

A ratchet wheel 36 is secured on the lower end of shaft 18, which is engaged by two spring actuated clicks 37 tending to prevent shaft 18 from being rotated backwards due to the idle motion of the clicks 24, 25, respectively, when pendulum 19 is on its respective way back. Shaft 18 projects beyond case 21 and may serve to drive for instance a watch or like apparatus directly or through an intermediate bevel gear.

Any number of penduli may be arranged in the above described manner around the vertical central shaft.

In the mechanism described the amplitude of the pendulum in either direction is utilized for driving the shaft. However, the amplitude in only one direction may be utilized if desired. In this case click 25, ratchet wheel 27, and intermediate and transmission gear 31, 32, 33, 34, 35 are omitted.

The energy recovered from secondary movements of a running vehicle by means of the pendulum driven mechanism may be transmitted upon a utilizing apparatus through mechanical, electric, electro-optic, hydraulic, or pneumatic means.

In a motor car, the pendulum mass may also be suspended from the steering wheel to additionally utilize movements of the steering wheel when the latter is manipulated. The energy recovering mechanism may be secured to any part of the carriage body, whereby transmission of recovered energy upon a utilizing apparatus may be performed through mechanical, hydraulic, or pneumatic means.

Having thus described the invention, what is claimed as new and desired to be secured by Letters Patent, is:

1. A mechanism for utilizing secondary move-

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ments imparted to a vehicle in motion, such as vibrations caused by unevenness of the road and oscillations due to change of speed of such vehicle; comprising a housing having a wall and adapted to be mounted on said vehicle, a plurality of pendulum masses each adapted to swing back and forth and supported on said wall within said housing, a spindle centrally arranged with respect to said pendulum masses and passing through said housing, respective axle supporting said masses and arranged to extend angularly to each other and radially to said spindle at different levels, and respective transmission means on said axles and on said spindle and operatively connecting said pendulum masses with said spindle to thereby transfer said back-and-forth swinging movements of said pendulum masses to said spindle, said transmission means being shaped and arranged so as to rotate said spindle in one direction only.

2. A mechanism according to claim 1, wherein said spindle is provided with a ratchet wheel, and pawl means fixed to said wall of said housing and in engagement with said ratchet wheel to prevent turning of said spindle in undesired direction.

3. A mechanism according to claim 1, wherein three axles are arranged carrying said pendulum masses, respectively, said axles forming angles of 120° with respect to each other.

4. A mechanism according to claim 1, wherein said respective transmission means include two adjacent ratchet wheels seated on each axle, and respective detents operatively connected with said pendulum masses for actuating said ratchet wheels.

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