May 8, 1923. 1,454,047

W. EMERY

PENDULUM MECHANISM

Filed March 22, 1920 2 Sheets-Sheet 1

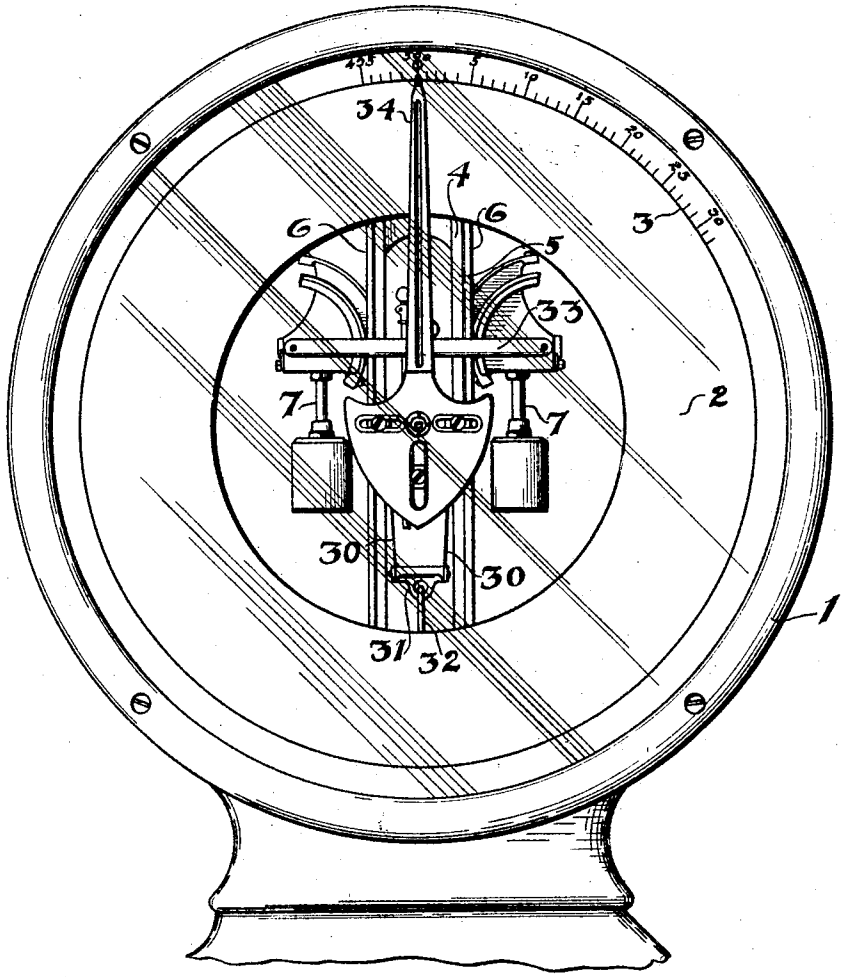

Fig. 1.

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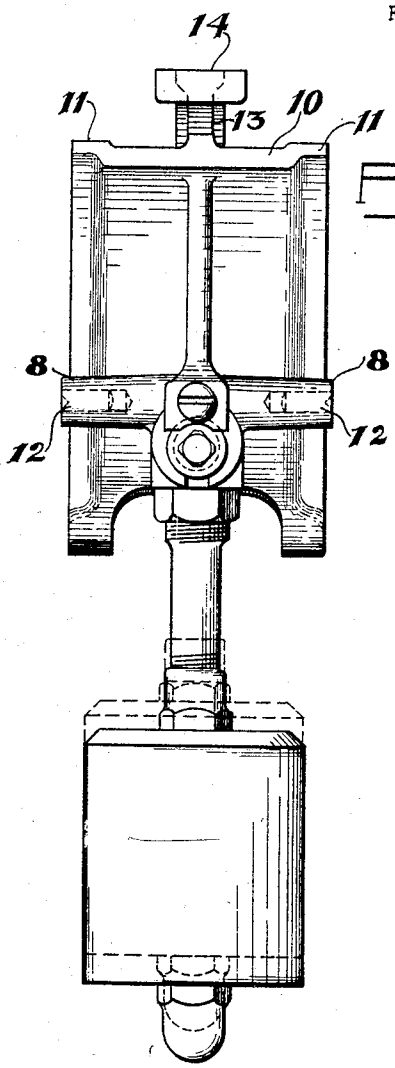

Fig. 3.

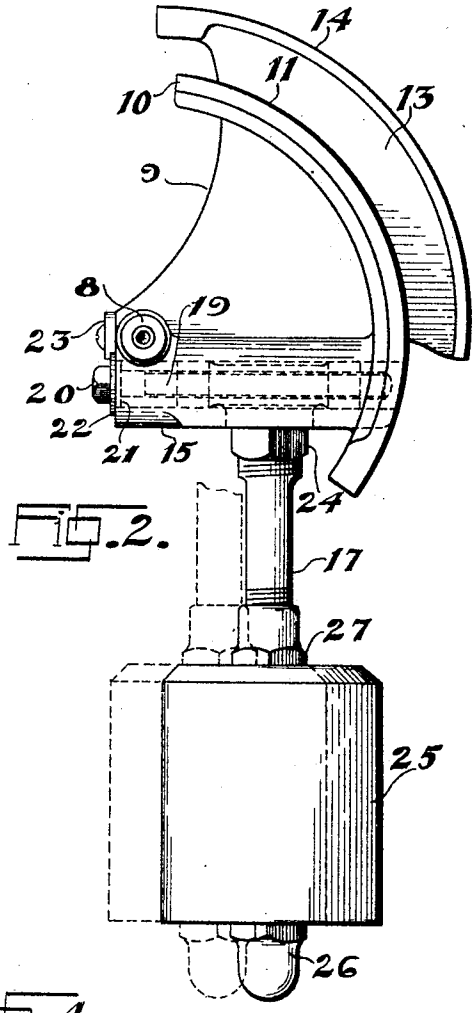

Fig. 2.

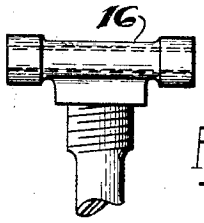

Fig. 4.

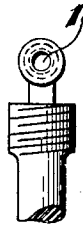

Fig. 5.

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Patented May 8, 1923. 1,454,047

UNITED STATES PATENT OFFICE.

WILBER EMERY, OF MONROE COUNTY, MICHIGAN, ASSIGNOR TO TOLEDO SCALE COMPANY, OF TOLEDO, OHIO, A CORPORATION OF NEW JERSEY.

PENDULUM MECHANISM.

Application filed March 22, 1920. Serial No. 367,632.

To all whom it may concern:

Be it known that I, WILBER EMERY, a citizen of the United States, residing in Monroe County, Michigan, have invented certain new and useful Improvements in Pendulum Mechanism, of which the following is a specification.

This invention relates to pendulum mechanism and particularly to means for shifting the center of mass of a pendulum. So-called floating pendulums of the type disclosed in the U. S. patent to Hapgood, No. 1,203,611, dated November 7, 1916, consists essentially of pendulum stems having weights adjustably mounted thereon, fulcrum sectors, power sectors eccentric thereto, and means for securing all of the parts in rigid relation. In order that the pendulum may function properly it is necessary that the angle between the line passing through the respective centers of curvature of the fulcrum sector and the power sector and the line passing through the center of mass and the center of the fulcrum sector be maintained substantially the same in all positions of the weight on the stem. Adjustment of the weight along the stem, however, often results in shifting the center of mass laterally and thus necessitates a compensating lateral adjustment. The principal object of my invention is the provision of inexpensive and efficient means for making such lateral adjustments.

Other objects and advantages will be apparent from the following description, in which reference is had to the accompanying drawings illustrating a preferred embodiment of my invention and wherein similar reference numerals designate similar parts throughout the several views.

In the drawings:—

Figure 1 is a front elevation of the head mechanism of a scale showing pendulums embodying my invention;

Figure 2 is a front elevation of one of the pendulums removed from the scale;

Figure 3 is a side elevation thereof;

Figure 4 is a front elevation of the upper end of the pendulum stem showing a slide by means of which it is attached to the pendulum center; and

Figure 5 is a side elevation thereof.

Referring to the drawings in detail, the pendulum mechanism incorporating my invention is shown as enclosed in a substantially watch-casing-shaped housing 1 having a transparent face 2 which displays a suitably graduated dial 3. Within the housing 1 is secured a frame 4 having vertical side members 5 to which are secured the upper ends of flexible steel bands or ribbons 6 that support pendulums 7 incorporating my invention.

Each of the pendulums 7 comprises a center, shown in this instance as a pair of bosses 8, integral with a web 9 which supports a fulcrum sector 10 having curved faces 11 machined with their centers of curvature coinciding with the apices of conical depressions in bearing pins 12 inserted in the ends of the bosses 8. An outwardly-projecting flange 13 midway between the faces 11 supports a face 14 curved eccentrically to the faces 11. The flange 13 and face 14 constitute the power sector of the pendulum. The lower edge of the web 9 is provided with a slotted tubular portion 15, the bore of which receives a slide 16 secured upon the upper end of the pendulum stem 17.

The slide 16 is provided with a threaded longitudinal bore 18 which receives a worm or screw 19 by means of which the slide may be moved forward and back in the tubular portion 15. The screw 19 has a head 20, adapted to be engaged by a wrench, and adjacent the head 20 is provided with an integral collar 21 which rotatably fits within the end of the tubular portion 15. The collar 21 carries a flange 22 which limits the movement of the screw 19 into the tubular member, and a plate 23 having a rabbeted lower edge to receive the flange 22 is secured to the web 9 so that the screw is held against longitudinal movement in either direction. A nut 24 threaded on the pendulum stem may be turned up against the tubular portion of the web to hold the parts firmly in adjusted position. The pendulum weight is slidably mounted on the pendulum stem so that it may be raised and lowered by means of adjusting nuts 26 and 27.

The lower ends of the ribbons 6 are secured to the lower ends of the fulcrum sector faces 11 so that they lie between the faces 11 and the side members 5 of the frame 4. Power ribbons 30 of flexible metal overlie the curved power sector faces 14 and are secured at their upper ends to the upper ends of the said faces, the lower ends

being secured to an equalizer bar 31 to which is connected a steelyard 32 extending to the platform lever mechanism (not shown) of the scale.

Pivoted in the conical depressions in the bearing pins 12 is a compensating frame 33, to the center of which, through suitable transmission mechanism (not shown), is connected the indicator hand 34.

In the operation of the scale, when a load is placed upon the commodity-receiver, a downwardly-acting force is applied to the steelyard 32. The power ribbons 30 are thus pulled downwardly, causing the pendulums 7 to swing outwardly and upwardly and the fulcrum sectors 10 to roll upwardly on the ribbons 6, carrying the compensating frame vertically upwardly and causing the hand 34 to move over the dial 3 to indicate the weight of the load offset. The side members 5 of the frame 4 act as guides for the fulcrum sectors. If the scale be tipped slightly out of level, one fulcrum sector will roll upwardly on its ribbon while the other rolls downwardly an equal distance, and the indicator hand will remain on the same graduation as though the scale were not tilted. In adjusting the scale the pendulum weights 25 must be so positioned on the stems that any given load on the scale will swing the pendulums just enough to cause the hand 34 to indicate the proper graduation on the chart. In adjusting the weight on the stem the center of mass of the pendulum as a whole is unavoidably shifted laterally. In order, then, to properly position the center of mass, the nut 24 is loosened and the screw 19 is turned by means of a wrench, thus causing translation of the stem and weight. When the pendulum has been properly adjusted, the nut 24 is turned up so that the parts are firmly held in proper relation.

While it will be apparent that the illustrated embodiment of my invention herein disclosed is well calculated to adequately fulfill the objects primarily stated, it is to be understood that the invention is susceptible to variation, modification and change within the spirit and scope of the subjoined claims.

Having described my invention, I claim:

1. In a weighing pendulum, in combination an eccentric power sector, a movable weight connected to said eccentric power sector, means for rectilinearly moving said weight in one direction, and means for translating said weight in another direction, substantially as described.

2. In a weighing pendulum, in combination, eccentric fulcrum and power sectors, a pendulum weight connected to said power sector, means for moving said weight rectilinearly in one direction, and means for translating said weight in a direction at right angles thereto.

3. In a weighing pendulum, in combination, a fulcrum sector, a power sector eccentric thereto, a weight connected to said power sector, a support therefor, means for moving said weight rectilinearly on said support, and means for rectilinearly moving said support.

4. In a weighing pendulum, in combination, a pendulum center, a fulcrum sector, a power sector eccentric thereto, a stem extending from said pendulum center, a weight on said stem, means for moving said weight along said stem, and means for translating said stem transversely with respect to its length.

5. In a weighing pendulum, in combination, a pendulum center, a slide supported thereby, screw means for moving said slide rectilinearly, a stem projecting from said slide at right angles to its direction of movement, and a weight adjustably supported on said stem.

6. In a weighing pendulum, in combination, a pendulum center having a tubular portion, a slide mounted in said tubular portion, screw means for moving said slide therein, a stem projecting from said slide at right angles to its direction of movement, and a weight adjustably supported on said stem.

WILBER EMERY.

Witnesses:
C. E. WILCOX,
C. O. MARSHALL.