Feb. 9, 1943. P. KNOPF 2,310,296

REGISTER MECHANISM

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Fig. 1

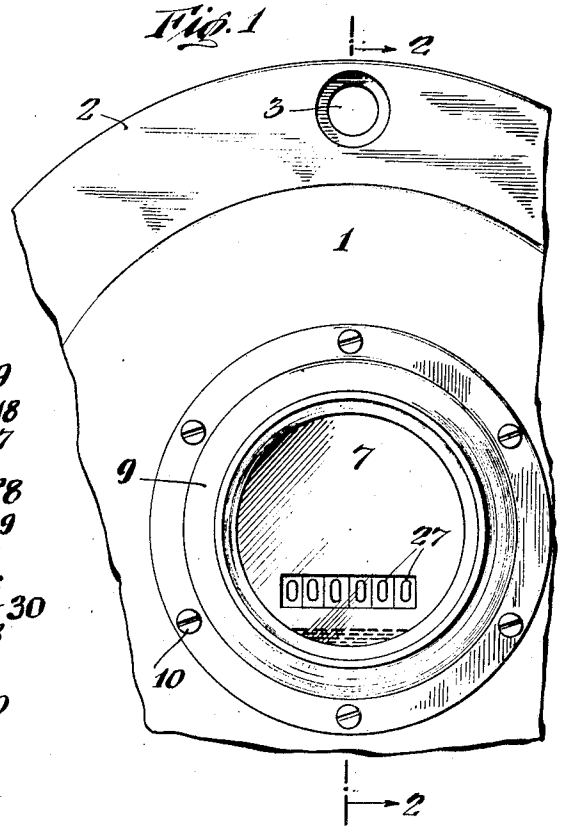


Fig. 2

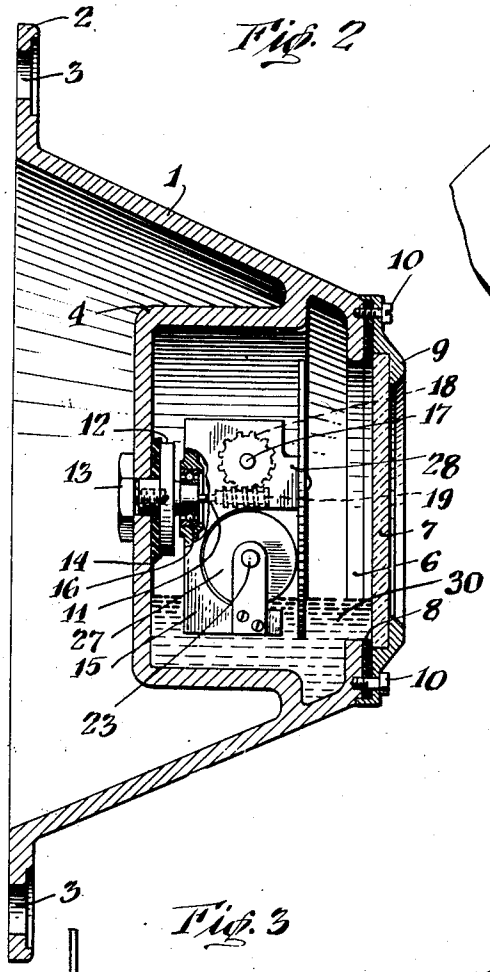


Fig. 3

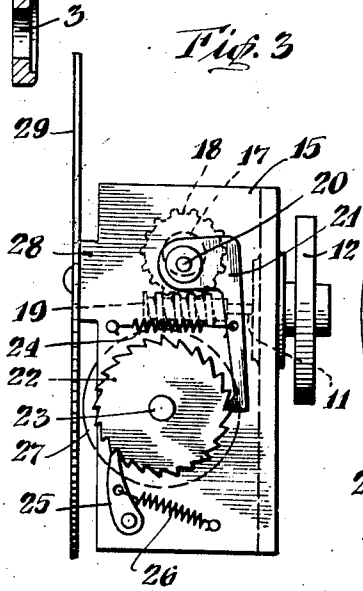
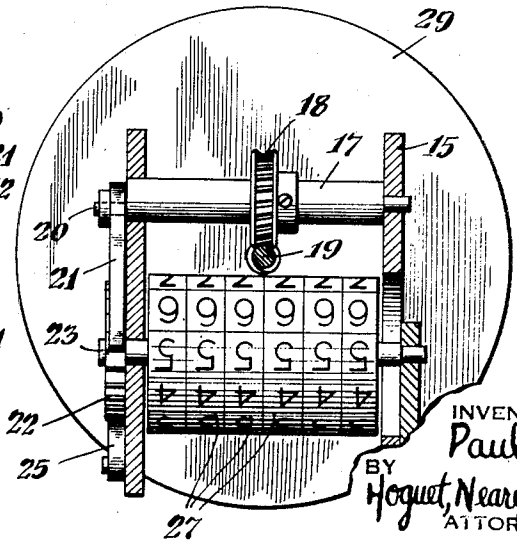


Fig. 4



INVENTOR
Paul Knopf
BY
Hoguet, Neary & Campbell
ATTORNEYS

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REGISTER MECHANISM

Paul Knopf, New York, N. Y.

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1 Claim. (Cl. 235—95)

The present invention relates to register mechanisms and, more particularly, to mechanisms for registering the revolutions of a rotating member which are of the so-called "driveless" type and are self-contained and adapted to be mounted bodily on the rotating member.

It is an object of my invention to provide a register mechanism of the "driveless" type which is effective and accurate under all conditions of operation and which, in particular, is provided with stabilizing means for dampening the vibrations and shocks normally occurring when such mechanisms are used.

Another object of my invention is to provide a register mechanism which is of an improved construction and compact design and which will not be susceptible to excessive wear and failure of the mechanism, nor require the frequent replacements and adjustments characteristic of the prior art devices.

A further object of my invention is to provide a register mechanism which is adapted to be used for a variety of commercial purposes and which is provided with easily readable indicating means calibrated to read in any desired units such as miles, revolutions, yards, pieces and the like.

Yet another object of my invention is to provide a register mechanism which positively registers both reverse and forward motion of the rotating member on which the same is mounted.

A well known register device of the prior art for registering the revolutions of a rotating member and which is mounted bodily on the rotating member is formed with a drive shaft which must be held in a fixed stationary position with respect to the rotating member and positioned at the axis of rotation. An apparent disadvantage of mechanisms of this type is that the same can be used only when means is available for supporting the driveshaft in the required manner. Accordingly, for example, the mechanism cannot be mounted on the rear wheels of trucks and buses, which is a preferred type of mounting from a safety standpoint. In addition, it is difficult to form devices of this type which are dust, oil and moisture-proof, and as a result, the devices are quickly rendered inoperative, necessitating frequent cleaning and adjustment.

A number of the above disadvantages of the prior art devices have been avoided in register mechanisms of the so-called "driveless" type which require no stationary mounting means, and when positioned in a suitable casing are entirely self-contained. The principle of operation utilized in devices of this type is that a weight rotatably suspended within the casing may be made to actuate the registering mechanism. These devices, however, have not met with commercial success because it has been found that the vibrations and shocks when the mechanisms are used, for example, as the result of sudden stops, frequently cause the suspended weights to oscillate to such an extent that the register mechanisms are actuated independently of the rotations of the member on which the same is mounted, thus rendering the readings inaccurate and undependable. In addition, such devices employed heretofore require a complicated arrangement and assembly of parts which effectively prevents the manufacture of small efficient units which may be contained in preferred mountings such as small hub caps and the like. The complicated mechanisms, moreover, show rapid wear and are frequently broken, thus necessitating frequent replacements and adjustments.

In accordance with my invention, I avoid the disadvantages of the prior art by providing an improved mechanism to be described more particularly hereinafter which is actuated and mounted within the casing by means of a driveshaft offset from the center of the register mechanism. This improved construction provides a register mechanism having a minimum of movable parts which are conveniently and compactly arranged and in which the deleterious effects of friction and inertia have been effectively minimized.

In conjunction with the improved mounting, I prefer to use a liquid stabilizing means which cooperates with the mechanism to effectively dampen the oscillations of the mechanism and thus prevents the errors in registration discussed above in connection with devices of the prior art.

In order that my invention may be more clearly understood, reference may be had to the accompanying drawing, in which:

Figure 1 is a front view of the register mechanism mounted in a casing;

Figure 2 is a cross-sectional view taken along line 2—2 of Figure 1 and looking in the direction of the arrows;

Figure 3 is a side view of the register mechanism; and

Figure 4 is a rear view partially in cross-section of the register mechanism.

Referring to the drawing, the register mechanism is mounted in a suitable casing 1 which is adapted to be mounted on a rotating member.

In the specific embodiment shown in the drawing, casing 1 is formed with a flange 2 having a plurality of bore holes 3 whereby the casing may be mounted, for example, on the hub of a bus or truck. It will be apparent that any other type of mounting means, such as threads and the like, may be utilized. The casing 1 is formed with a rear wall 4 upon which the register mechanism, to be described more particularly hereinafter is mounted rotatably. The front of the casing 1 is provided with an aperture 6 fitted with a window 7 through which the indicating mechanism may be read. The window 7 is supported by a gasket 8 and a ring 9 and maintained in moisture-proof contact by suitable fastening means, such as the screws 10. The rear wall 4 and the means closing the aperture 6 provide a receptacle within which the register mechanism may be mounted rotatably and which is adapted to receive a pool of stabilizing liquid 30 to be described more particularly hereinafter. The register mechanism is mounted on the rear wall 4 by means of a shaft 11 which is secured rigidly to the rear wall by means of a disc 12 and bolt 13 between which is received a gasket 14 to form a moisture-proof connection.

The register mechanism is preferably carried on a frame 15 having a U-shaped cross-section. The drive shaft 11 extends through the back of the frame 15 and is positioned therein by means of ball bearings 16. It is essential that the mounting of the shaft 11 within the frame 15 be disposed above the central axis of the frame and offset with respect thereto, whereby as the casing 1 rotates with the member on which the same is mounted, the rear wall 4 secured rigidly to shaft 11 causes the shaft to rotate with the rotating member while the mechanism positioned within the frame remains substantially stationary by reason of the offset mounting of the shaft 11. The relative movement of shaft 11 with respect to frame 15 is utilized to actuate the indicating means described hereinafter.

A shaft 17 is mounted in the frame 15 at right angles to the driveshaft 11 and operatively connected thereto by means of worm gear 18 and worm 19. One end of shaft 17 is provided with an eccentric 20 on which is mounted a pawl 21. Pawl 21, in turn actuates a ratchet wheel 22 mounted upon a shaft 23 disposed parallel to shaft 17. The pawl 21 is maintained in engagement with ratchet wheel 22 by means of a spring 24. Reverse movement of the ratchet wheel 22 is prevented by a detent 25 maintained in engagement with ratchet wheel 22 by means of spring 26. It will be apparent that as shaft 17 is rotated, an oscillating movement is imparted to pawl 21 by reason of its mounting on the eccentric 20. This oscillating movement of pawl 21 causes ratchet wheel 22 to revolve in a clockwise direction, as viewed in Figure 3, and it will be apparent that this clockwise movement of ratchet wheel 22 is independent of the direction of rotation of shaft 17. Accordingly, the device will measure positively both reverse and forward relative movement of the shaft 11 with respect to the frame 15.

The shaft 23 is provided with a plurality of numeral wheels 27, the lower order wheel being actuated directly by the ratchet wheel 22. Suitable transfer mechanism is provided between the lower and higher order of numeral wheels, such as the well known Geneva gearing, whereby the higher order numeral wheels register a predetermined number of rotations of the lower order numeral wheels. The front of the frame 15 is provided with a rectangular member 28 upon which is mounted a face plate 29 positioned adjacent the window 7 and having an aperture therein cooperating with the numeral wheels 27 whereby the numeral wheels may be readily read.

By reason of the single connection of the register mechanism to the casing by means of driveshaft 11 which is mounted in the register mechanism frame 15 by means of ball bearings 16, and in view of the compact arrangement of a relatively small number of parts, the friction and inertia normally operating to rotate the register mechanism about the axis of the device and thus render the readings inaccurate, has been effectively minimized.

To insure that rotation of the register mechanism about the axis of the device will be effectively avoided, I prefer to partially fill the receptacle portion of casing 1 with a small amount of liquid 30 which acts to dampen oscillations of the register mechanism and tends to maintain the mechanism in an even plane. I do not wish to be restricted to the use of any specific stabilizing means, and it is believed that any unctuous liquid having non-corrosive characteristics will be effective. In general, I have found that a light mineral oil or mineral oil fraction will provide desirable results. It is to be noted that by reason of the offset mounting of the register mechanism, there is provided an effective lever arm upon which the stabilizing liquid may act.

It will be apparent from the above disclosure that my invention provides a compact register mechanism which may be mounted effectively in any desired type of casing and in connection with any of the usual type of rotating members, such as automobile wheels, elevator motors, manufacturing apparatus, and the like. The device may be calibrated to read in terms of revolutions, yards, pieces, etc., depending upon the particular use contemplated.

It will be apparent that my invention may be varied by one skilled in the art without departing from the spirit of the invention and all such variations are intended to be included within the scope of the following claim:

I claim:

A register device adapted to be mounted on a rotatable element for visibly indicating the number of rotations thereof comprising a casing having a window mounted therein forming a substantially liquid proof enclosed chamber, a drive shaft disposed within the chamber and fixed on the casing, a register mechanism mounted rotatably on the drive shaft with its center of gravity below the shaft, indicator wheels mounted on said register mechanism and adapted to be viewed through the window in said casing, means including a worm mounted on the shaft for driving the indicator wheels upon relative rotation of the mechanism and the drive shaft, and an unctuous liquid present in said chamber in an amount just sufficient to cover the lower portion of the register mechanism when the device is at rest.

PAUL KNOPF.