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2,168,885

GRADE INDICATOR

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Fig. 1

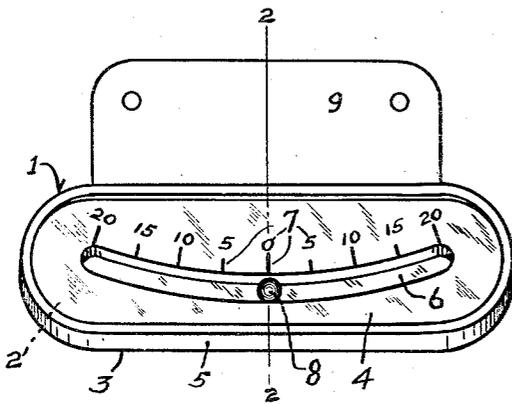


Fig. 2

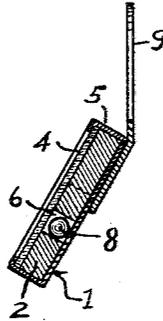
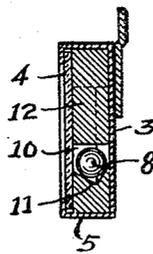


Fig. 3



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GRADE INDICATOR

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1 Claim. (Cl. 33—206)

This invention relates to a grade indicator, and while primarily designed and intended to be mounted in a motor vehicle for ascertaining the degree of the graded rise or descent from level of the highway upon which the vehicle is travelling, it will be obvious that the device may be employed in connection with another apparatus or for any other purposes wherein it is found to be applicable.

Important objects of the invention are to provide a simple and accurate device of the character described, which is adapted for installation in a motor vehicle, which will function automatically to register the degree of the rise or descent grade of a highway from level while the vehicle is travelling on the latter, which is durable and efficient in its use, compact, positive in its action, attractive in appearance, and comparatively inexpensive to manufacture.

With the foregoing and other objects in view which will appear as the description proceeds, the invention consists of the novel construction, combination and arrangement of parts herein specifically described and illustrated in the accompanying drawing, but it is to be understood that changes in the form, proportions and details of construction may be resorted to that come within the scope of the claim hereunto appended.

In the drawing wherein like numerals of reference designate corresponding parts throughout the several views:

Figure 1 is a front elevational view of a grade indicator constructed in accordance with the invention.

Figure 2 is transverse sectional view on line 2—2, Figure 1.

Figure 3 is a similar view of a modified form of the device.

Referring in detail to the drawing, 1 denotes the entire oblong body comprising a dial plate 2, a casing 3, and a front panel 4, all of which have a uniform peripheral contour. The casing covers the back of the dial plate, and the front panel covers the front of the latter. The casing is formed with a peripheral flange 5 overlapping the peripheral edge of the dial plate and further overlapping and engaging the peripheral edge margin of the front panel, thereby providing an assembly securely clamping the dial plate between the casing and the front panel.

The body 1 is disposed horizontally, and the dial plate 2 is provided with an elongated, arcuately-shaped slot 6, which extends longitudinally with an upward curvature and having all points thereof spaced equi-distant from its axis. The

slot forms a ball-race, with the casing 3 and the front panel 4 respectively providing the back and front walls of said ball-race.

A dial 7 is provided on the front face of the dial plate 2, and consists of graduated line markings, representing degrees, and of numerical designations for the latter. The line markings are disposed radially from the top wall of the slot 6, and the numerical designation, zero, designates the line marking at the center or maximum dip of the slot. The other numerical designations are arranged progressively in the sequence of five from both sides of the centrally disposed zero designation, as clearly illustrated in Figure 1.

A small spherical, indicating member, preferably in the form of a metallic ball 8, is mounted in the slot 6 forming a ball-race for said ball. The latter is freely shiftable in the slot by gravity action and consequently will normally assume the low point location of the slot regardless of the position of the latter.

The front panel 4 is constructed of glass, mica, or of any other suitably transparent sheet material, whereby the dial 7, slot 6, and indicating ball 8 will be readily visible and clearly exposed through the front panel to the view of an observer.

The body 1 carries a fixed supporting bracket 9, which is secured to the rear of the casing 3 and adapted for attaching the device in the operative position. When in the operative position, the transverse disposition of the body is at an angle from the vertical, as shown in Figure 2. If the device is installed in a motor vehicle, same is secured against the inner side of the vehicle body, preferably at a position convenient for visual inspection.

The position of the device, when installed in a motor vehicle, is such that, when the latter stands on a level surface or is travelling on a level highway, the gravity actuated indicating ball 8 will rest inertly in the center of the slot 6 directly beneath the zero designation of the dial 7, and in radial vertical alignment relative to the axis of the arcuate slot. It is obvious that the position of the ball never changes from such vertical alignment, for, when the level of the vehicle alters with the rise or descent of the grade of the highway, the ball will be rotated in the slot and the latter will shift to bring the respective degree designations of the dial 7 into registration with the ball to indicate the degree of variation from level. In other words, during the operation of the indication device, the position of the slot varies

with grade variations, but the position of the ball does not.

The angular disposition of the body 1, in the manner set forth, provides for the constant contact of the ball 8 with the bottom of the slot 6 and with the casing 3, which latter forms the rear wall of said slot. Such dual contact of the ball stabilizes its operation by effecting pronounced retardation against untoward movement, and by minimizing the potential shifting of the ball from its operative position through the momentum created by the travel of the motor vehicle equipped with the device.

The modified form of the grade indicator, shown in Figure 3, differs from the embodiment of the invention hereinbefore described, only in that the body is not disposed at an angle but extends vertically edgewise. To provide the necessary dual contact of the ball 8 the latter rides on a substantially V-shaped groove 11, which is formed in the bottom of the slot 10 in the dial plate 12.

The present invention provides a most efficient device of its kind, which may be economically manufactured and successfully employed for ac-

curately determining the degrees of angularity from the horizontal of moving apparatus, in the manner set forth.

What we claim is:

A grade indicator of the character described, comprising the combination of an oblong horizontally disposed dial plate provided with a longitudinally extending slot having an upward curvature, a transparent panel mounted against the front face of said plate, a casing mounted against the rear face of said plate and providing the rear wall of said slot, said casing including a peripheral flange overlapping the peripheral edge of said plate and overlapping and engaging the peripheral edge margin of said panel for securing said plate between the latter and said rear wall, a ball member shiftably mounted in said slot on the lower wall of the latter, and means fixed to said casing for supporting the latter at an angle from the vertical to cause the contact of said ball with said rear wall to retard the movements of said ball in said slot.

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