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S. AAMOT ET AL

2,173,773

ODOMETER

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Fig. 1.

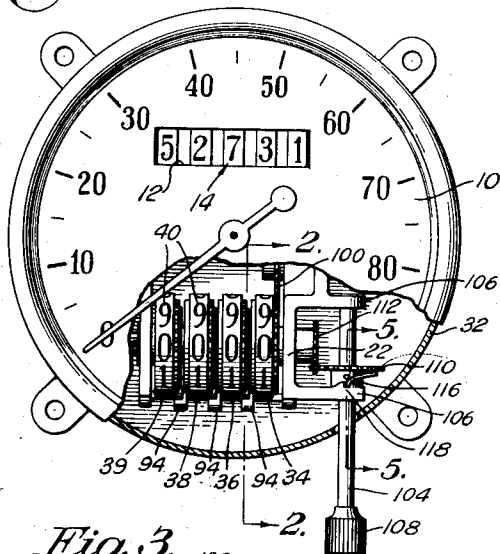


Fig. 2.

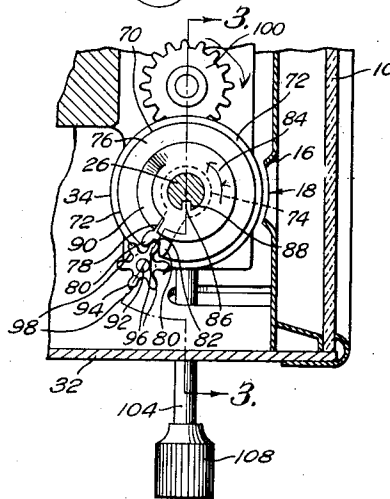


Fig. 3.

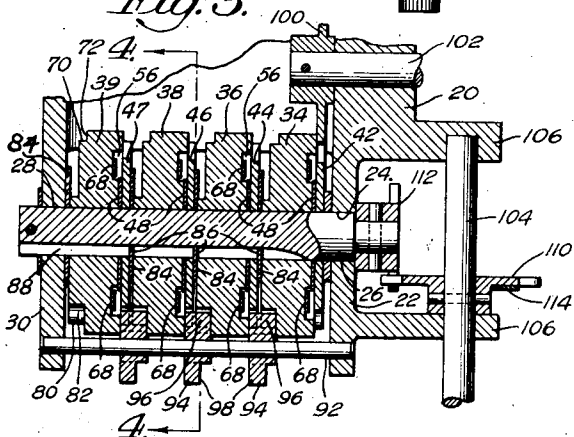


Fig. 4.

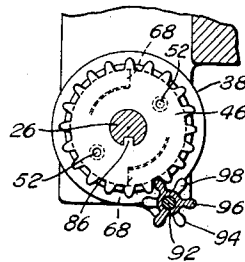
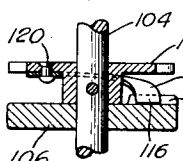


Fig. 5.



UNITED STATES PATENT OFFICE

2,173,773

ODOMETER

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2 Claims. (Cl. 235—144)

Our invention relates to registering devices, and has among its objects and advantages the provision of an improved odometer. Our invention embodies improvements on a structure such as that shown in our United States Patent 2,020,225 issued November 5, 1935.

An object of our invention is to provide an odometer of a simple and compact construction, one in which the number wheels and actuating elements associated with the wheels are interchangeable.

A further object is to provide an arrangement in which the number wheels are closely spaced and in which the greater part of the actuating mechanism associated with the wheels is housed within the contour thereof.

A further object is to provide a resetting mechanism which is efficient in operation and which functions to permit quick and easy resetting of the number wheels.

In the accompanying drawing:

Fig. 1 is a fragmentary view of a conventional speedometer showing our invention incorporated therein;

Fig. 2 is a sectional view along the line 2—2 of Fig. 1;

Fig. 3 is a sectional view along the line 3—3 of Fig. 2;

Fig. 4 is a sectional view along the line 4—4 of Fig. 3;

Fig. 5 is a sectional view along the line 5—5 of Fig. 1;

Fig. 6 is a perspective view of the gear illustrated in Fig. 5;

Fig. 7 is a perspective view of one of the number wheels and some of its associated operating parts in separated relation; and

Fig. 8 is a perspective view of the same wheel showing other parts associated therewith in separated relation.

In the embodiment selected to illustrate our invention, we make use of a conventional speedometer 10 having a sight opening 12 through which the usual total register 14 may be read. The speedometer is provided with a second sight opening 16 through which the trip register 18 may be read. The two registers are operatively connected for totalling purposes, but the trip register 18 may be reset without changing the reading of the total register 14.

The trip register comprises a support 20 including a flange 22 which is bored at 24 to provide a bearing for one end of a shaft 26. The opposite end of the shaft is rotatably positioned within an opening 28 in a wall 30. We mount the support 20

and the wall 30 within the speedometer housing 32.

Units, tens, hundreds, and thousands wheels 34, 36, 38, and 39, respectively, are rotatably mounted on the shaft 26. Upon the peripheries of the wheels 34, 36, 38, and 39 we provide numerals 40 which read from zero to nine, inclusive, upon each wheel. In Fig. 2, the peripheries of the wheels are mounted in close relation with the sight opening 16 for reading purposes.

The units wheel 34 is advanced one step per numeral each tenth of a mile traveled so that it registers tenths of a mile, while the tens, hundreds, and thousands wheel 36, 38, and 39 indicate miles.

Gears 42, 44, 46, and 47 are respectively associated with the wheels 34, 36, 38, and 39 and are separated from their respective wheels by thin washers 48. All the gears 42 to 47 are identical in construction, which is also true of the washers 48.

In Fig. 7, we illustrate the washer 48 associated with the gear 42 as being provided with openings 50 for the reception of lugs 52 carried by the gear 42 for connecting the two parts into a unitary whole. These lugs are formed by pressing small areas of the gears out of the normal plane of the gears. The washers 48 are loosely mounted on the shaft 26.

The units wheel 34, of Fig. 7, is provided with a plurality of recesses 54, each of which comprises an abutment 56 and an inclined plane 58. One such recess is provided for each numeral 40 upon that wheel. The wheels 36, 38, and 39 are similarly formed.

According to Fig. 7, the highest points 60 of the inclined planes 58 terminate short of the face 62 of the wheel 34 so that the washer 48 lies within the contour of the wheel 34 with the gear 42 lying in contact with the surface 62. Such an arrangement provides a compact relation between the nested parts which permits the wheels 34, 36, 38, and 39 to be closely spaced.

In Fig. 7, the washer 48 is of resilient material and is cut along lines 64 and 66 to provide resilient latch fingers 68 which are bent out of the normal plane of the washer for latching relation with the abutments 56. Both fingers 68 project in the same direction so that the wheels 34, 36, 38, and 39 may be rotated relatively to the washers 48 and the gears 42, 44, 46, and 47 for resetting. The fingers 68 are bent sufficiently far out of the plane of the washer 48 to have pressure relation with the inclined planes 58, thus insuring abutting re-

lation between the ends of the fingers and the abutments 56.

Fig. 8 illustrates the opposite side of the wheel 34. This side is grooved at 70 to provide a ledge 72. A hub 74 extends beyond the wheel surface 76 and includes a rib 78 terminating in spaced gear teeth 80. The recess 82 between the two teeth 80 extends into the wheel 34 a distance equal to the depth of the ledge 72.

A latch washer 84 is positioned adjacent the hub 74 of each of the wheels 34, 36, 38, and 39. In Fig. 8, the washer 84 includes a key 86 which is arranged to lie within the keyway 88 in the shaft 26. Each latch washer 84 includes a finger 90 bent out of the normal plane of the washer so as to have abutting relation with the rib 78 when the shaft 26 is rotated in its resetting direction. The direction of the fingers 90 is such as to permit the wheels 34, 36, 38, and 39 to rotate in the counting direction without interference from the fingers.

A shaft 92 is carried by the flange 22 and the wall 30, which shaft rotatably supports three pinions 94. Each pinion 94 includes alternately spaced wide teeth 96 and narrow teeth 98. The pinions 94 are associated with the gears 44, 46, and 47. The wide teeth of the pinion 94 associated with the gear 44 have sufficient width to mesh with the teeth of the gear and the teeth 80 on the wheel 34. Similarly, the wide teeth of the pinion 94 associated with the gear 46 may mesh with the teeth thereon as well as the teeth 80 associated with the wheel 36. The narrow teeth 98 on the pinion 94 associated with the gear 44 terminate short of the face 76 on the wheel 34, while the narrow teeth 98 of the pinion associated with the gear 46 terminate short of the face 76 on the wheel 36. This is also true of the pinion 94 associated with the gear 47 and the wheel 38.

In operation, the gear 42 is driven by a gear 100 driven by a power shaft 102. Gear 100 also operates the total register 14. The shaft 102 is operated by any suitable means, not shown, which means form no part of the invention. In operation, the gear 100 is rotated in a clockwise direction when viewing Fig. 2. Such rotation will turn the wheel 34 in a counterclockwise direction when viewing Fig. 2 because of the abutting relation between the fingers 90 and the abutments 56. The wheel 34 rotates constantly while the gear 100 is moving, but the wheels 36 and 38 are rotated intermittently. As the wheel 34 completes its revolution, one of the wide teeth 96 will drop into the notch 82 between the teeth 80. The following tooth 80 will then cause a one-step rotation of the transfer pinion 94 and the narrow teeth 98, which are in continuous mesh with the gear 44, cause rotation of that gear and through the washer 43 effects rotation of the higher order wheel 36. At other times, two wide teeth 96 ride on the ledge 72 upon the wheel 34, which prevents rotation of the pinion 94 associated with the gear 44 except during completion of the travel of the wheel 34 for advancing the wheel 36 another step. The pinion 94 associated with the gear 46 advances the wheel 38 one step for each revolution of the wheel 36 in the same manner as the wheel 34 advances the wheel 36. Wheel 39 is advanced one step for each revolution of the wheel 38.

To reset the wheels 34, 36, 38, and 39 to their zero position, the shaft 26 is rotated in a counterclockwise direction when viewing Fig. 2. A resetting shaft 104 is rotatably carried by flanges

106 on the support 20, which shaft includes a knob 108 to facilitate turning of the shaft. A gear 110 is fixedly connected with the shaft 104 and is arranged in mesh with a smaller gear 112 fixedly connected with the shaft 26. Counterclockwise rotation of the shaft 26 when viewing Fig. 2 causes the fingers 90 to move into abutting relation with the ribs 78 to rotate the wheels 34, 36, 38, and 39 with the shaft after such engagement has been established. When the wheels 34, 36, 38, and 39 are rotated in the registering direction, the ribs 78 pass freely over the fingers 90 so that the wheels may be rotated independently of the shaft. The ribs 78 on the four numeral wheels are so arranged that when all the wheels have been engaged by the fingers 90, the zeros on the wheels will be aligned.

Gear 110 carries a resilient finger 114 which has its free end 116 shaped to press into the recess 118 for yieldingly latching the shaft 104 in the zero position of the numeral wheels. The opposite end of the spring finger 114 is riveted to the gear 110 at 120. The ribs 78 may be provided with inclined planes 122, which provide a gentle climbing surface for the fingers 90 during rotation of the wheels 34, 36, 38, and 39 in their counting directions. The ribs 78 are depressed slightly at 123 to provide space for the fingers 90 (see Fig. 3).

Our device embodies a simple construction, one in which the parts are compactly arranged. The wheels 34, 36, 38, and 39 house the washers 43. All the wheels and the washers are interchangeable. In resetting the wheels, quick action is attained by merely turning the shaft 104. While we have illustrated the invention as being associated with an odometer, it will be understood that the registering device may be employed in other arts. The arrangement is such that the numeral wheels 34, 36, 38, and 39 may be adjusted to their zero position without rotating the gear 100 so that the trip register 18 may be reset without interfering with the total register 14. We ratio the gears 100 and 112 so that one complete turn of the shaft 104 will impart two complete turns to the shaft 26, which insures at least a complete revolution of each of the number wheels so as to bring them back to their zero positions.

Without further elaboration, the foregoing will so fully explain our invention that others may, by applying current knowledge, readily adapt the same for use under various conditions of service.

We claim:

1. In an odometer, a support, a rotatable shaft carried by said support, a pair of numeral wheels of lower and higher order, respectively, rotatably mounted on said rotatable shaft, a gear for one of the numeral wheels loosely mounted on said rotatable shaft, the side of the higher order numeral wheel adjacent its respective gear being recessed and provided with notches, a thin washer positioned between the gear and its respective numeral wheel and keyed to that gear, said thin washer having a resilient finger cooperating with the notches of its respective numeral wheel for turning the same, the opposite face of said higher order numeral wheel being provided with an abutment, a thin washer lying against said other face of the higher order numeral wheel and keyed to said rotatable shaft, the last-named washer having a resilient finger cooperating with said abutment for turning the numeral wheel to zero position when the rotatable shaft is rotated in a predetermined direction, said abutment being depressed to provide accommodation for said re-

silient finger, to permit close nesting of the washer and the numeral wheel, and a manually rotatable shaft geared to said rotatable shaft for rotating the latter to return the numeral wheels to zero positions.

5 2. In an odometer, a rotatable shaft, a numeral wheel rotatable on said shaft, a drive gear rotatable on said shaft adjacent one face of the numeral wheel, the said one face of the numeral
10 wheel being recessed and provided with notches, a thin washer positioned between the drive gear and the recessed face of the numeral wheel and having means cooperating with the notches therein for imparting rotation to the numeral wheel,
15 the opposite face of the numeral wheel being

provided with an abutment, a washer positioned adjacent the opposite side of the numeral wheel and keyed to said rotatable shaft, said washer having a spring finger arranged for cooperation with the abutment for turning the numeral wheel
5 to zero position when the rotatable shaft is rotated in a predetermined direction, said abutment being recessed to provide accommodation for the resilient finger, to permit close nesting
10 of its washer with the numeral wheel, and a manually actuated shaft geared to said rotatable shaft for rotating the latter to return the numeral wheel to zero position.

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