

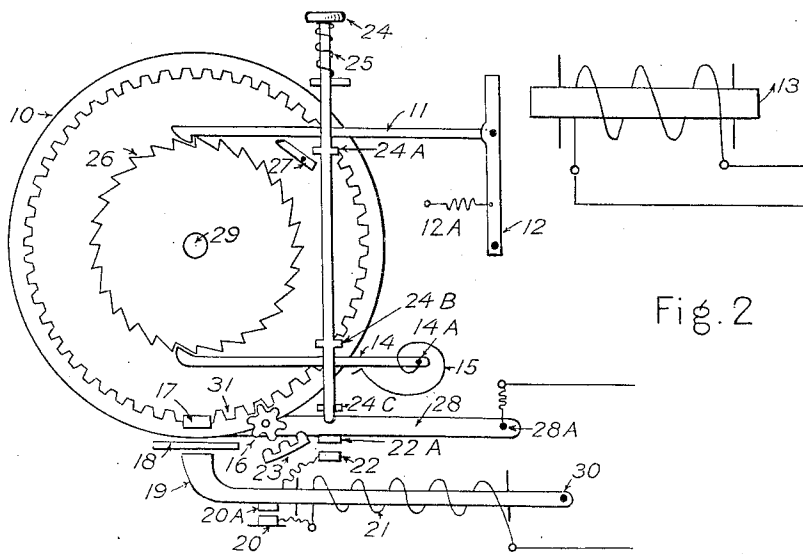
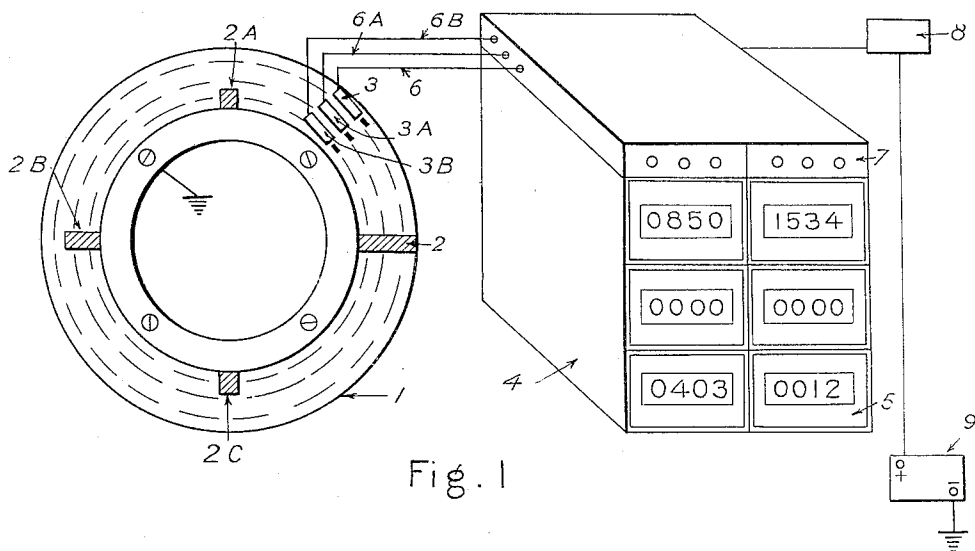
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ZEROIZING MECHANISM

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ZEROIZING MECHANISM

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1 Claim. (Cl. 235—144)

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The invention described herein may be manufactured and used by or for the Government of the United States for governmental purposes without the payment to me of any royalty thereon in accordance with the provisions of the act of April 30, 1928 (Ch. 460, 45 Stat. L. 467).

This invention relates to the class of devices generally known as "odometers," and has for its object to provide a mechanism for measuring and indicating a series of consecutive distances when the device is applied to an automobile.

The invention more particularly consists in the odometer-reset mechanism so arranged in association with the counter wheels that the counter wheels are rotated and reset to their zero positions under the influence of vibration, gravity and magnetism, which reset mechanism may or may not be used in connection with the particular commutator assembly hereinafter described, but, in connection with which, it is herein disclosed as being particularly adapted for use.

The invention further consists of certain combinations of parts, all of which will first be fully described and afterwards specifically pointed out in the appended claim.

Referring to the accompanying drawing:

Fig. 1 is a diagrammatic illustration of a preferred form of the measuring device and shows a commutator and distributor and also a counter box, automatic relay and battery.

Fig. 2 is a diagrammatic illustration of the odometer or counter-reset mechanism.

With reference to the form of commutator preferred for use with the odometer which constitutes the subject matter of this invention, it will be seen from Fig. 1, that the commutator 1 has a three course track, upon which is arranged a plurality of grounded segments 2, 2A, 2B and 2C, each of a different length. This commutator is positioned within the brake-drum housing of the wheel of an automobile and rotates with the wheel. On the brake-drum housing of the wheel, three electrically independent roller or brush contacts 3, 3A and 3B are arranged so as to ride on the courses on the face of the commutator 1, so that the innermost contact 3B engages all four of the said segments at each revolution of the commutator; the intermediate contact 3A engages two of the said segments 2B and 2, while the outer-most contact 3 engages only the one segment 2, at each revolution of the commutator 1.

Suitably located in the vehicles and readily accessible to the operator is a case 4 upon which

is mounted a switch box 7. The said contacts 3, 3A and 3B are connected by wires 6, 6A and 6B to this switch box while a plurality of independent counters or odometers 5 are arranged in the case 4 under the switch box. By any suitable arrangement any one of the contacts 3, 3A and 3B may be connected to any of the independent counters or odometers 5 arranged within the case 4 for ready removal therefrom.

In circuit between the counters 5 and the battery 9 is an automatic cut-out relay 8 to open the circuit in the event the vehicle is stopped with one of the said contacts 3, 3A or 3B in contact with one of the said commutator segments.

While the apparatus just described is considered to be preferable, any other construction of commutator and any other arrangement of the apparatus shown in Fig. 1, and as just described may be employed.

Referring now to the reset mechanism which forms the subject matter of the invention, 10 indicates the first or units counter wheel of the odometer. On the periphery of this counter wheel appear the numerals 0 to 9, as is usual in odometer practice, while the balance of the counter wheels are similarly supplied with numerals 0 to 9 and are face to face on a common shaft 29 in regular odometer fashion. Also the usual odometer mechanism is employed for communicating the movement of one counter wheel to the next adjacent counter wheel.

In Fig. 2 the movement of the first or units counter wheel 10 is communicated to the balance of the usual counter wheels by a pinion gear 16 which is normally in mesh with the large spur gear wheel 31 on the outer face of the first or unit counter wheel 10.

An electro-magnet 13 is provided for each odometer 5 which electro-magnet may be connected in circuit with any one of the commutator contacts 3, 3A or 3B through the switch box 7, so that when the circuit is closed by engagement of one of the commutator segments 2, 2A, 2B or 2C with one of the said contacts 3, 3A or 3B, the electro-magnet 13 is energized.

In proper relation to the electro-magnet 13, there is arranged a pivoted armature 12, which in turn is pivotally connected to a pawl 11 which coacts with a ratchet wheel 26 centrally arranged on the face of the spur gear wheel 31 of the counter wheel 10. Each time the circuit is closed by the commutator 1, and one of its associated contacts 3, 3A or 3B, and the electro-magnet 13 thereby energized, the pivoted armature 12, which is normally held away from the said elec-

tro-magnet, by the spring 12A, is biased toward the electro-magnet. This movement of the pivoted armature 12, moves the pawl 11 and rotates the ratchet wheel 26 the distance equal to one tooth thereof. The counter wheel 10 rotates with the ratchet wheel 26, and this rotatable movement is communicated to the small pinion 16 through the medium of the large spur gear 31 in the manner as will be clearly understood from Fig. 2. If the electro-magnet 13 is in circuit with the outer-most contact 3 of the commutator assembly, the electro-magnet 13 will be energized only once for each revolution of the commutator and vehicle wheel to which it is attached. If the electro-magnet 13 is in circuit with the intermediate contact 3A, the circuit will be closed twice, that is to say, by the two commutator segments 2 and 2B for each revolution of the commutator, while if the electro-magnet 13 is in circuit with the inner-most contact 3B, the circuit will be closed four times, that is to say by all four of the commutator segments 2, 2A, 2B and 2C for each revolution of the commutator. In this case, the electro-magnet is energized four times and the ratchet wheel 26 is rotated the distance equal to four teeth thereof for each revolution of the commutator.

In order to prevent casual rotation of the ratchet wheel 26 during the time that the actuating pawl 11 is being returned back to its normal position under the influence of the spring 12A acting on the pivoted armature 12, a detent 14 pivoted at 14A is biased by the spring 15 into engagement with the ratchet wheel 26. This detent 14, while permitting free rotation of the ratchet wheel 26 under the influence of the pivoted armature and its pawl 11, in a clockwise direction, effectually locks the ratchet wheel 26 against anti-clock-wise rotation.

With reference to the counter re-setting mechanism, it is necessary that all of the counter wheels be relieved of all locking or restraining influence, in order to permit each of the counter wheels to be returned to their zero positions. To accomplish this I provide a manually operable vertical plunger 25 normally held in raised position by a spring 25. Pivoted adjacent said plunger and in the path of movement of an extension 24A on the plunger 24, is a pivoted detent 27, which, upon downward movement of the plunger 24 is engaged by said extension 24A and is rocked into engagement with the pawl 11 and raises the same out of engagement with its ratchet wheel 26. Simultaneously an extension 24B on the plunger 24 engages the pivoted detent 14 and depresses the same out of engagement with the ratchet wheel 26. The same downward movement of the plunger 24 causes an extension 24C thereon to engage the arm 28 in which the shaft of the pinion 16 is mounted. This arm 28 is pivoted at 28A and normally maintains the pinion 16 in mesh with the large spur gear wheel 31 under spring influence, and being arranged in the path of movement of the said extension 24C on the plunger 24, said arm is depressed thereby and the pinion 16 is moved out of mesh with the large spur gear 31 and into mesh in a short toothed rack 23 located under the pinion 16. This movement of the pinion 16 and its shaft out of its normal operative meshed position likewise disengages the balance of the counter wheels from their motivating connections, and disengages all of the counter wheels

from all restraining influence and leaves them free to be rotated on their common shaft 29.

Each of the counter wheels 10 is provided on or near the periphery thereof with an iron counter weight 17, while the number wheels themselves are of non-magnetic material. This iron counter weight on each number wheel 10 is sufficiently heavy to tend to cause each wheel to rotate until the counter weight 17 approaches its lowermost point, as shown in Fig. 2, and is disposed on each number wheel 10 in such position that when all the counter weights are at their lowermost position, as shown in Fig. 2, the reading on each wheel will show zero.

In order to accomplish this zero re-setting of the counter wheels, they are subjected to a simultaneous vibrating, gravity and magnetic influence as will be now described.

Pivoted at 30 adjacent the counter wheels 10 is an electro-magnet 19 having its free end enlarged and upturned for magnetic cooperation with a stationary plate 18 arranged as close as may be to the peripheries of the counter wheels 10 and extending directly under center of each wheel. Arranged on the electro-magnet 19 is a contact piece 20A which is normally in contact with a similar contact piece 20 in circuit with the electro-magnet winding 21, it being understood that the weight of the electro-magnet 19 normally maintains the pieces 20 and 20A in electrical contact.

Referring now to the pivoted pinion-carrying arm 28, it will be seen that it is also an electrical conductor, in that it is located in the circuit which energizes the electro-magnet 19. It will be also seen that this arm 28 is provided with a contact piece 22A arranged for electrical cooperation with an adjacent contact piece 22 in circuit with the electro-magnet 19.

The operation of this vibrator mechanism is as follows:

The contact pieces 20 and 20A being normally in electrical contact under the influence of the weight of the electro-magnet 19, downward movement of the plunger 24 depresses the pinion-carrying arm 28 and brings the contact piece 22A thereon in contact with its associated contact piece 20. This closes the circuit and the electro-magnet 19 being thereby energized, it swings upwardly on its pivot 30 into striking contact with the stationary plate 18. This upward movement of the electro-magnet 19 breaks the electrical contact between the contact pieces 20 and 20A and opens the circuit which de-energizes the electro-magnet and causes the same to drop down of its own weight to again bring the contact pieces 20 and 20A together. This again closes the circuit, energizing the electro-magnet 19 and causes it to again be drawn into striking engagement with the stationary plate 18. Thus a rapid vibrating motion is imparted to the electro-magnet 19 which results in its rapidly striking the stationary plate 18 sufficient to set the entire counter wheel assembly in rapid vibration. This vibratory action is continued as long as the plunger 24 is maintained in a depressed position, and ceases as soon as said plunger is permitted to assume its normal raised position. The effect of this rapid vibration impressed upon the counter wheel assembly is to jar or vibrate the counter weights 17 into their lowermost position and directly above the stationary plate 18. Assisting in bringing the iron counter weights into and maintaining them in their lowermost position is the magnetic attraction exerted thereon by the

electro-magnet 19 during its period of vibration as will be at once apparent. As soon as all of the counter wheels 10 have been rotated into zero position by vibration and magnetic influence as just described, the plunger 24 is released into its normal position which movement permits the several elements affected by the depression of the plunger 24 to again assume their normal operative positions to lock the counter wheels in zero position and put the device in condition for further service.

It will be seen that the vibration of the device jars the counterweights 17 to overcome any inertia which may have the effect of retarding the influence of gravity on them and facilitates the movement of the counterweights under the influence of gravity to positions at or near the lowermost positions directly under the central axes of the wheels. As these counterweights 17 approach their lowermost positions, their tendencies to rotate the wheels gradually decrease, so that under their influence alone, the wheels may stop short of their actual zero positions, or may pass beyond their actual zero positions. As soon, therefore, as these counterweights 17, which are of magnetic material reach positions over or closely adjacent the plate 18, they come within the magnetic field set up in the plate 18 each time the electro-magnet 19 strikes the plate 18 during its vibratory action, and are thus caused to be moved and come to rest at their lowermost positions which are closest to the plate 18, and which are the zero positions of the wheels.

Since the introduction of the front wheel

brake, no automobile so equipped is free running at all times, although it may be considered to be sufficiently close for most reconnaissance purposes. If great accuracy, however, is required, a fifth wheel for mounting the commutator may be attached.

With the 28 inch tire having a circumference of approximately 88 inches, now in common use, very small measurements, approximately two feet, can be made by the commutator of Fig. 1 when making four contacts per revolution.

Having thus described the invention, I claim:

A reset mechanism for a counterwheel including an electro-magnet and plate closely adjacent the counterwheel, the said plate being disposed directly under the center of the counterwheel, an iron counterweight near the periphery of the counterwheel and tending to rotate the wheel by gravity, and manually operable means for closing an electrical circuit to energize the electro-magnet and cause the electro-magnet to strike the said plate to vibrate the counterwheel to assist the action of gravity on the counter-weight and rotate the wheel until the counter-weight is over or closely adjacent the said plate and within the magnetic field set up by the said plate when it is struck by the said electro-magnet, whereby the said counter-weight is caused to be moved by magnetic attraction into its lowermost position and closest to the said plate and thus bring the counterwheel to its actual zero position.

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