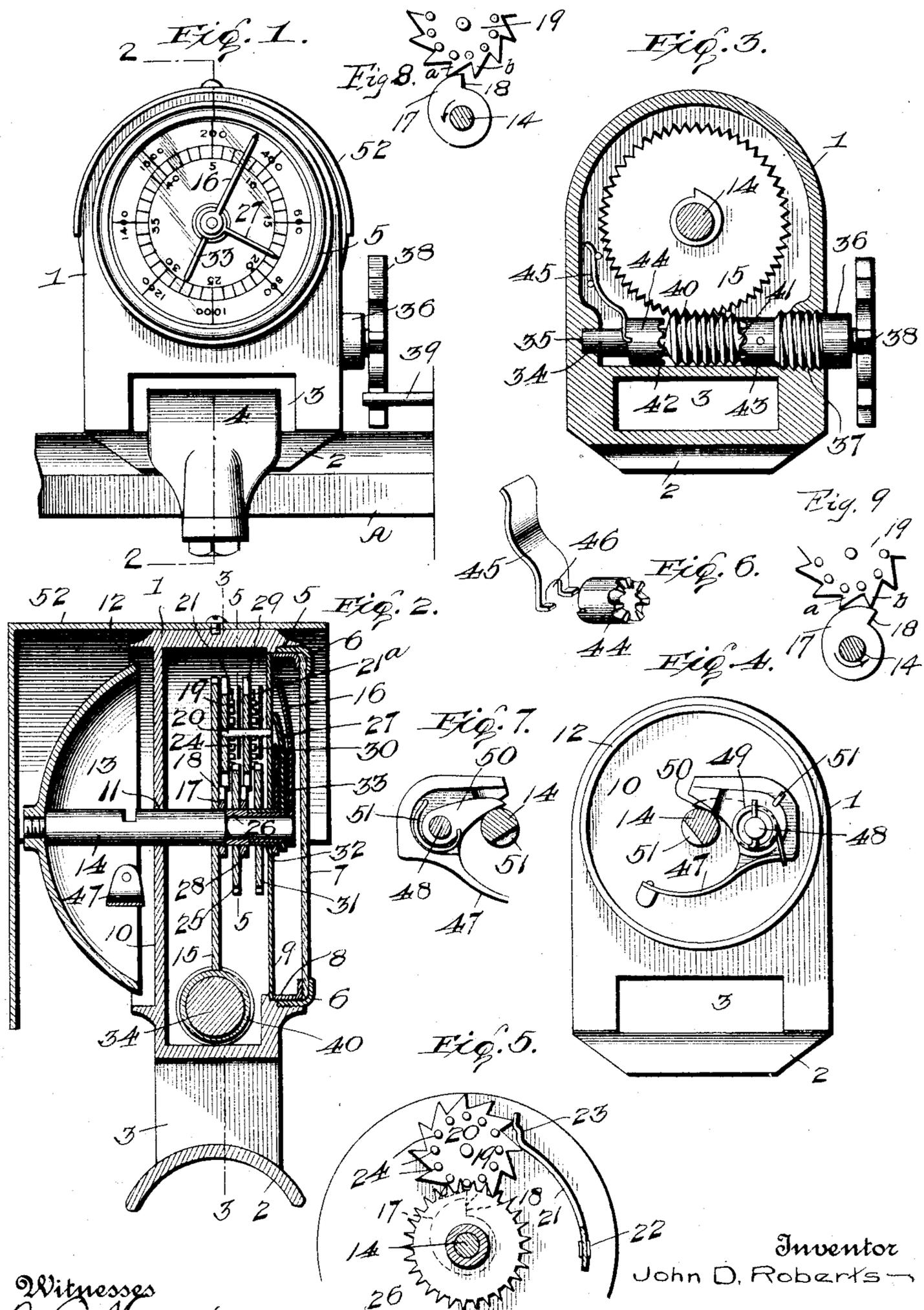


J. D. ROBERTS.  
ODOMETER.

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# UNITED STATES PATENT OFFICE.

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## ODOMETER.

SPECIFICATION forming part of Letters Patent No. 793,322, dated June 27, 1905.

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*To all whom it may concern:*

Be it known that I, JOHN D. ROBERTS, a citizen of the United States, residing at Oakmont, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Odometers, of which the following is a specification.

This invention relates to an improvement in odometers, and has special reference to a registering device of this character so constructed as to provide for a positive and accurate operation under any and all conditions of service.

To this end the invention contemplates an odometer possessing special utility for use in connection with vehicles for registering the distance traversed by the same, while at the same time embodying a strong and compact arrangement of parts which is capable of withstanding heavy vibrations or jars without becoming deranged or affecting the reliability of the instrument.

A further object of the invention is to provide novel means for causing a bell or similar sounding alarm to give a signal each time a certain distance is traversed; and another object is to provide a novel form of ratchet-operating device for the adding and registering mechanism whereby the same can only operate one way, and the backward movement of the vehicle with which the odometer is associated does not affect or operate that mechanism.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

The essential features of the invention involved in carrying out the objects before indicated are susceptible to structural modification without departing from the scope of the invention; but a preferred embodiment thereof is shown in the accompanying drawings, in which—

Figure 1 is a front elevation of an odometer embodying the present invention. Fig. 2 is a vertical cross-sectional view on the line 2 2 of Fig. 1. Fig. 3 is a vertical transverse

sectional view on the line 3 3 of Fig. 2. Fig. 4 is a back view or elevation of the odometer with the protective hood and signal-bell removed to expose the automatic striking device for the bell. Fig. 5 is a detail view on the line 5 5 of Fig. 2, showing the relation of one of the denominational adding-wheels to the ratchet counter-wheel cooperating therewith and also illustrating the action of the spring holding-pawl for said counter-wheel. Fig. 6 is a detail view of the ratchet-worm-operating device removed from the case. Fig. 7 is a detail view of the automatic striking device, showing the opposite side from that illustrated in Fig. 4. Figs. 8 and 9 are detail diagrammatic views showing more plainly the action of each tappet-cam on the backward rotation thereof.

Like numerals designate like parts throughout the figures.

In carrying out the present invention the working parts of the adding and registering mechanism are housed within a case 1, preferably of circular form and usually consisting of a one-piece casting. In its preferable construction the case 1 is provided at the lower side thereof with an integral saddle member 2, adapted to fit the upper side of the vehicle-axle A, contiguous to the hub of the wheel and provided with a clamp-receiving eye 3, designed to receive an axle-clamp or equivalent device 4 for rigidly securing the instrument in proper operative position.

The circular case 1 is of a hollow formation and is provided at its front side with a threaded opening 5, adapted to detachably receive a correspondingly-threaded retaining-ring 6 for holding in place the glass cover-plate 7 and also serving, through the medium of an interposed ring 8, to bear against the outer side of the dial-plate 9 for holding the entire adding and registering mechanism within the case. The latter is further provided with a closed back 10, having therein a central bearing-opening 11 and recessed at the outer side of the case, as at 12, to accommodate the striking device of the signal-bell 13, as will be more particularly referred to.

The adding and registering mechanism in-

cludes in its general organization a hand-arbor 14, extending through the central bearing-opening 11 in the back of the case and also having its front end extended through a central opening in the dial-plate 9, which latter is held against rotation by its fastening within the case. The hand-arbor 14 is free to rotate and has rigidly mounted thereon at an intermediate point a units-wheel 15, constituting one of a series of denominational adding-wheels bearing the desired denominational ratio to each other, such as units, tens, hundreds, &c. This wheel 15 receives its motion from the worm 40, hereinafter mentioned. In this connection with these denominational wheels there is necessarily employed a dial having a plurality of scales properly numbered and a series of indicating-hands. Associated with the units-wheel 15 is the units-indicating hand 16, which is secured directly to the front extremity of the arbor 14 and moved therewith, said units-hand indicating at each complete revolution thereof one, five, or ten miles, according to the distance to be indicated by such revolution of the units-hand. Carried by or with the units gear-wheel 15 is a tappet-cam 17, adapted at each revolution of the arbor 14 to have the shoulder 18 thereof engage against the shouldered side of a tooth of a ratchet counter-wheel 19, loosely mounted on an axle 20, fitted to and projected inwardly from the dial-plate 9.

The ratchet counter-wheel 19 is designed to be held from turning too freely and also from operating backward through the employment of a spring holding-pawl 21, having a fast mounting at one end, as at 22, at the rear side of the dial-plate and having its free end bearing upon the points of the teeth of the wheel 19. The said free end of the holding-pawl 21 is provided with a catch-notch 23, the function of which will presently appear. The ratchet counter-wheel 19 has projected from one side thereof a circular series of pins 24, constituting what may be properly termed a "pin-pinion," which meshes with the teeth of the next succeeding denominational adding-wheel 25, mounted on a shaft-sleeve 26, extending through the central opening of the dial and carrying upon its outer end an indicating-hand 27. Like the units-wheel 15, the said succeeding wheel 25 carries a shouldered tappet-cam 28, engaging at each revolution of the wheel 25 a tooth of a ratchet counter-wheel 29, also mounted upon the axle 20, and against which normally bears the free end of a spring holding-pawl 21<sup>a</sup>, similar in construction and action to the pawl 21, referred to. The second ratchet counter-wheel 29 is also provided at one side thereof with a pin-pinion 30, adapted to mesh with the teeth of the next succeeding denominational adding-wheel 31, mounted on the shaft-sleeve 32, extending through the central opening of the dial and carrying upon its outer end an indicating-

hand 33, which hand is only moved one point over its scale at each complete revolution of the preceding denominational wheel. This arrangement of denominational adding-wheels and counter-wheels can be multiplied indefinitely, according to the aggregate numbers which the instrument may be designed to register.

Referring briefly to the novel action of the adding and registering mechanism, (which is illustrated by the action of the units and tens wheels 15 and 25,) it will be observed that when the wheel 15 has made one complete revolution the shouldered side of the tappet-cam 17 engages the shouldered side of a tooth of the ratchet-wheel 19, which is thereupon moved a distance of one tooth, with the result of turning the tens-wheel 25 and its pointer 27 a similar distance. If under any condition the units-wheel should be revolved backward, either in the handling of the instrument or in the use thereof, the rounded side of the cam 17 would ride against the beveled side of a tooth of the wheel 19 and pass the point thereof. This would cause the counter-wheel to move a slight distance backward, bringing the point of a tooth into engagement with the catch-notch 23, which positively holds the wheel against a full movement in the direction for registering until caught up again by the movement of the cam 17 in the proper direction. (See Fig. 5.) As to the backward rotation thereof reference is made particularly to the diagrammatic or fragmentary views shown in Figs. 8 and 9 of the drawings. In these views two adjacent teeth of the ratchet counter-wheel are designated, respectively, *a* and *b*, to illustrate the slip-off engagement of the rounded side of the cam when rotated in a backward direction. Referring to one position shown in Fig. 8 of the drawings, it will be observed that upon the rotation of the cam 17 in a backward direction the rounded side thereof rides against the beveled side of the tooth *a*, which causes the counter-wheel to move only a slight distance backward to the point where one of its teeth becomes engaged with the catch-notch of the holding or guard pawl 21. This movement of the counter-wheel is less than a full-stroke movement, and the point of the cam slips off of the point of the tooth *a* without further tendency to rotate the counter-wheel, and if the tappet-cam makes another complete backward rotation the rounded side thereof first rides against the point of the tooth *b*, with the result of correcting the slight backward rotation of the counter-wheel before the said rounded side of the cam again moves against the point of the tooth *a* and repeats the operation already described. In this action the rounded side of the cam practically slidably engages between the two teeth *a* and *b* and positively prevents a full backward movement of the counter-wheel, while at the same time permitting a perfectly free

backward movement of the cam. This action is plainly illustrated in Figs. 8 and 9 of the drawings, and during the period that the widened part of the cam is entirely out of contact with the counter-wheel the holding or guard pawl serves its function of preventing accidental movement of the counter-wheel in either direction.

The adding and registering mechanism described is operated through the medium of a ratchet-worm-operating device which includes a rotatable operating-shaft 34, journaled at its inner end in a bearing 35 inside of the case and having its outer end journaled in and projecting through a removable bearing-bushing 36, exteriorly threaded and detachably fitted in a threaded opening 37 in one edge of the case and through which the entire operating device may be readily removed. To the outer extremity of the shaft 34 is fitted a star-wheel 38, adapted to be engaged by the tappet-pin 39, carried by the hub or other part of the vehicle-wheel. Within the case the operating-shaft 34 has loosely mounted thereon a ratchet worm-sleeve 40, provided at its opposite ends with the ratchet clutch-teeth 41 and 42, respectively, and which oppositely-located teeth are disposed in the same direction, as plainly shown in Fig. 3 of the drawings. The ratchet clutch-teeth 41 at one end of the worm-sleeve 40 are designed to be engaged in one direction by the teeth of the turning clutch-collar 43, fast on the shaft 34. The teeth 42 at the opposite end of the worm-sleeve are designed to interlock in one direction with the teeth of a non-rotatable ratchet check-collar 44, loose upon the shaft 34 and yieldingly held engaged with the worm-sleeve through the medium of a pressure-spring 45. One end of this spring is suitably held within the case, and the other end is forked, as at 46, to interlock with the collar 44 to prevent rotation thereof. From this construction it will be seen that in the direction for operating the mechanism the worm-sleeve 40 is carried around with the collar 43, while upon a backward rotation of the operating-shaft the collar 43 would slip over the teeth 41 and the teeth 42 would become interlocked with the check-collar 44.

The signal-bell 13 is detachably mounted on the rear end of the hand-arbor 14, and thus constitutes a part of the fastening for the mechanism, and said bell is struck by an automatic striking device including a bell-crank hammer-arm 47, loosely mounted at its angle on the pivot-post 48 and normally moved in a direction toward the bell by the actuating-spring 49. Also pivotally mounted on the pivot-post 48 is a tripping-dog 50, held against a shoulder on the short arm of the bell-crank through the medium of a holding-spring 51, connected with the dog and the said bell-crank. The dog 50 is adapted to ride on the periphery of the arbor 14 and once each rev-

olution of the latter to drop into the trip-notch 51, provided in the arbor, and thus permit the striking of the bell. Upon backward rotation of the hand-arbor the base of the notch 51 bears against and trips past the point of the dog 50, which yields for that purpose.

The working parts are positively dust and weather proof, but for additional protection there is employed a protective hood 52, detachably mounted on top of the case and having a back-shield overlying and housing the bell 13. The protective hood is preferably of a semicylindrical form, so as to fit the curved top portion of the case, and the pendent back shield of the hood is offset from the back of the case, so as to house the bell in the intervening space.

Changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of the invention.

Having thus described the invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an odometer, the case having an open side and a closed back, adding and registering mechanism arranged within the case and including an arbor extending through the closed back, a retaining-cover detachably fitted in the open side of the case and arranged to hold the mechanism therein from that side, an exterior bell detachably mounted on the outer end of the arbor, and an automatic striking device supported upon the said closed back and having a direct tripping engagement with the arbor.

2. In an odometer, the case, adding and registering mechanism arranged within the case and including an arbor having therein a trip-notch, a bell mounted on the arbor, and a striking device mounted on the case and comprising a spring-actuated hammer-arm and a spring-retracted tripping-dog, yieldingly connected with the hammer-arm.

3. In an odometer, the case, adding and registering mechanism arranged within the case, a suitably-operated bell arranged at the rear side of the case, and a semicylindrical protective hood mounted on the curved top portion of the case and having a pendent back-shield offset from the back of the case and housing the bell in the intervening space.

4. In an odometer, the case, adding and registering mechanism comprising a suitably-rotated arbor, a series of denominational adding-wheels, each carrying therewith a shouldered tappet-cam and an indicating-hand, a ratchet counter-wheel associated with each denominational wheel and having the shouldered sides of its teeth engaged by the shoulder of the tappet-cam, each of said counter-wheels also being provided with a pinion meshing with the next succeeding denominational wheel, a spring holding-pawl associated with each

counter-wheel, and having a fast support at one end and at its free end provided with a notch engaging the points of the ratchet-teeth, and a support carried by the dial-plate for supporting the several counter-wheels and the parts directly associated therewith.

5. In an odometer, the case, adding and registering mechanism including a gear, an operating-shaft journaled in the case and bearing an exterior star-wheel, and a turning clutch-collar fast therewith, a ratchet worm-sleeve loosely mounted on the shaft and provided at opposite ends with ratchet clutch-teeth, and a ratchet check device yieldingly held engaged with the teeth at one end of the worm-sleeve.

6. In an odometer, the case, adding and registering mechanism including a gear, an operating-shaft journaled in the case and bearing an exterior star-wheel, and a turning clutch-collar fast therewith, a ratchet worm-sleeve loosely mounted on the shaft and provided at opposite ends with ratchet clutch-teeth disposed in the same direction, and a non-rotatable ratchet check-collar loosely mounted on the shaft and yieldingly held engaged with the teeth at one end of the worm-sleeve.

7. In an odometer, adding and registering mechanism comprising a suitably-rotated arbor, a series of denominational adding-wheels, each carrying therewith a tappet-cam and an indicating-hand, and a ratchet counter-wheel associated with each denominational wheel,

said tappet-cam having a full-stroke-forward engagement with a tooth of the ratchet-wheel in one direction of rotation, and a slip-off engagement with a tooth of said wheel when rotated backward.

8. In an odometer, adding and registering mechanism comprising a suitably-rotated arbor, a series of denominational wheels, each carrying therewith a tappet-cam, and an indicating-hand, and a ratchet counter-wheel associated with each denominational wheel, said tappet-cam having a sliding engagement with two teeth of the ratchet-wheel when rotated backward to provide for holding said wheel against backward movement while freely permitting such movement for the cam.

9. In an odometer, adding and registering mechanism comprising a suitably-rotated arbor, a series of denominational wheels, each carrying therewith a shouldered tappet-cam having a rounded side, and an indicating-hand, and a ratchet counter-wheel associated with each denominational wheel, said tappet-cam having a full-stroke engagement with a tooth of the ratchet-wheel in one direction of rotation and a slip-off engagement on its rounded side with a tooth of the wheel when the cam is rotated backward.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN D. ROBERTS.

Witnesses:

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SUSAN V. TIERS.