

May 10, 1938.

R. O. HELGEBY ET AL

2,117,024

ODOMETER

Filed April 8, 1936

2 Sheets-Sheet 1

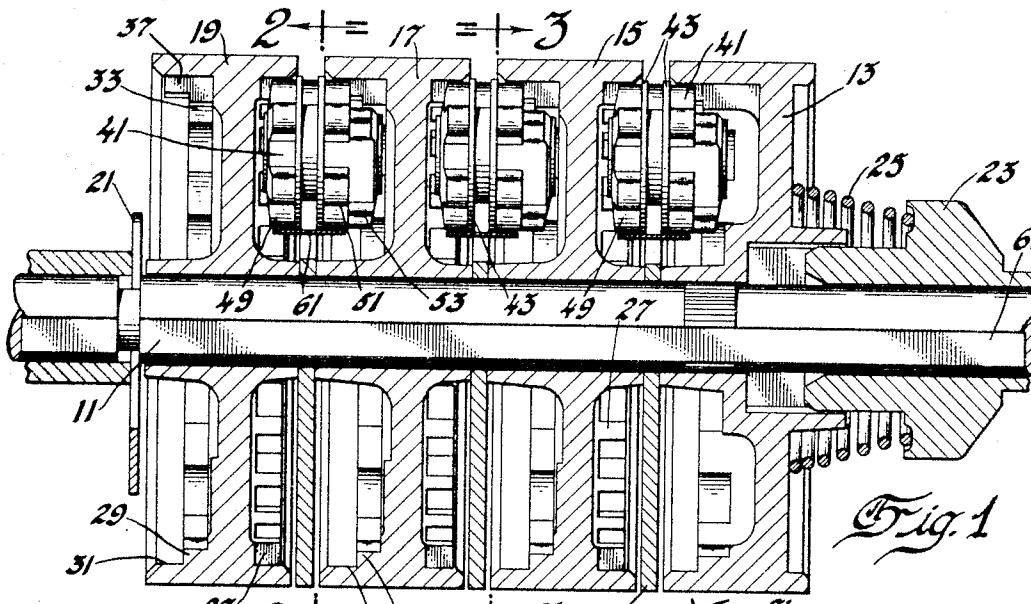


Fig. 1a

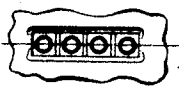


Fig. 1b

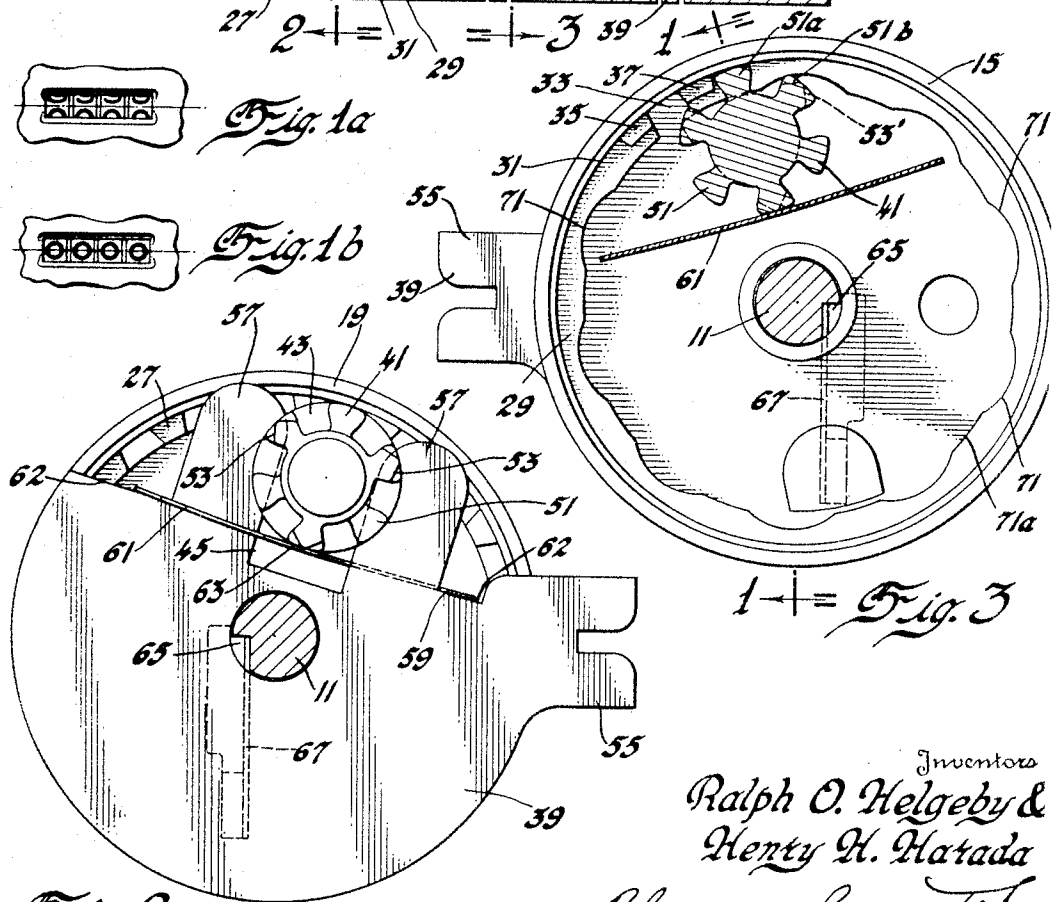


Fig. 2

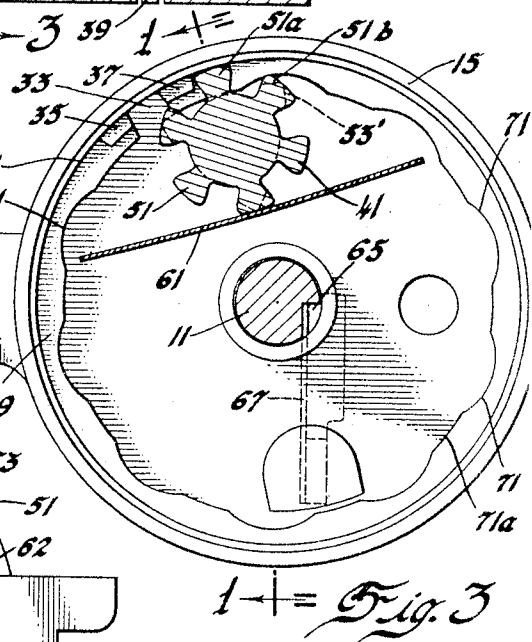


Fig. 3

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2 Sheets-Sheet 2

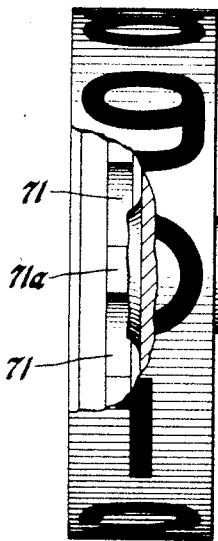


Fig. 5

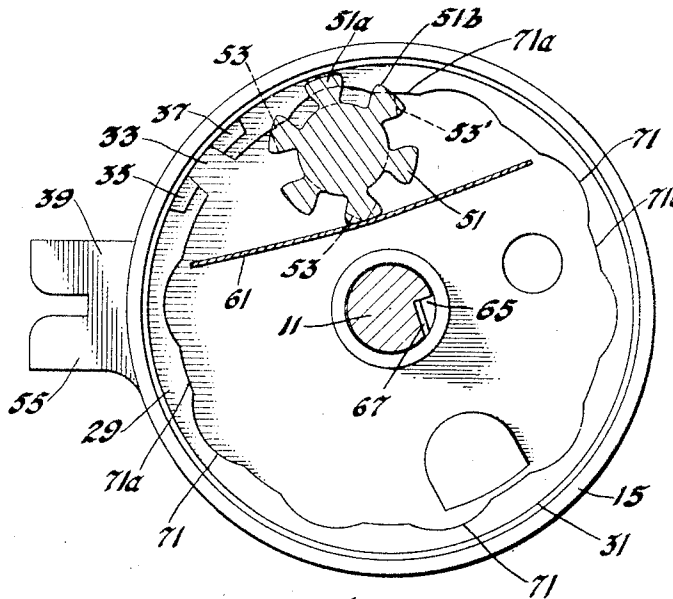


Fig. 4

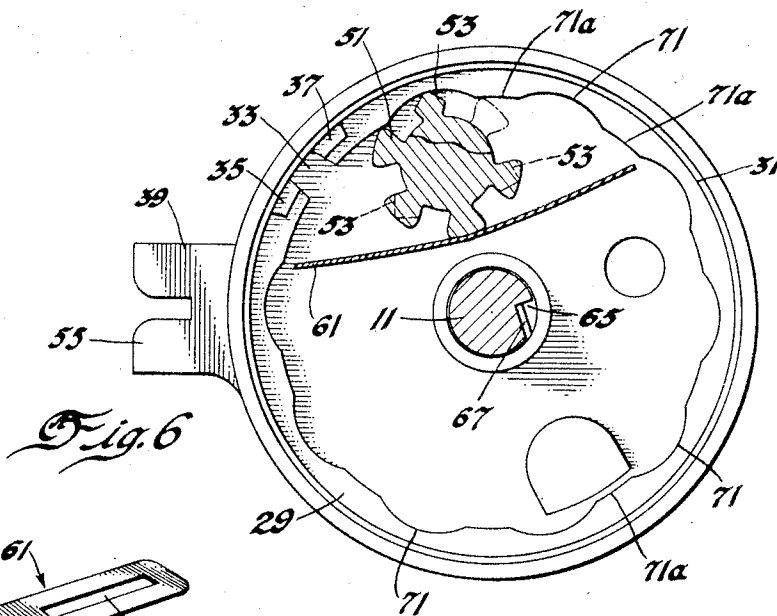


Fig. 6

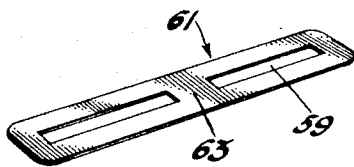


Fig. 7

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UNITED STATES PATENT OFFICE

2,117,024

ODOMETER

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Application April 8, 1936, Serial No. 73,270

5 Claims. (Cl. 235—144)

This invention relates to odometers and may be described as an improvement over the invention set forth in application Serial Number 38,365, both applications being assigned to a common assignee.

In odometers having provision for quick resetting, the transfer pinions having fixed axes must be mounted to permit rotation thereof when two adjacent wheels are rotating together. This has been provided for in the application above referred to by so mounting the transfer pinion that it may move bodily radially against spring resistance. It has been found that after resetting to a position where like figures on the several wheels were aligned and positioned opposite the opening in the dial plate, the subsequent normal counting operation caused the series of wheels to turn slightly so that they became out of registration with the dial plate opening. It was necessary to reset to a position slightly beyond correct registration with the opening to make correction for this error.

The present invention has for its object the avoidance of the above difficulty.

As an object incidental to the above, the invention provides an improved yielding means to permit quick resetting.

Other objects including minimum cost to attain the major objects will be understood from the following description.

In the drawings:

Fig. 1 is a transverse section through the odometer.

Fig. 1a and Fig. 1b are diagrams to show the improvement over the older construction.

Fig. 2 is a section on line 2—2 of Fig. 1.

Fig. 3 is a section on line 3—3 of Fig. 1.

Fig. 4 is a section like Fig. 3 but with the wheel in a different position of rotation.

Fig. 5 is a view in edge elevation of a figure wheel.

Fig. 6 is a view like Fig. 4 showing a changed position of the transfer pinion.

Fig. 7 is a detail in perspective.

Referring by reference characters to the drawings, numeral 11 is an odometer shaft to which is fixed the wheel 13—the decimal wheel. Successive wheels 15, 17, and 19 are rotatably supported on shaft 11. Each wheel is peripherally marked with figures as shown by Fig. 5. Wheel 19 is held from reciprocation by a retainer 21. A clutch 23 is non-rotatably engaged with wheel 13 and is reciprocated toward the right by a spring 25. In one position it is rotated by suitable gearing and in another position it is rotated

by a reset stem. These details are not shown, being old and well known.

On the side of each wheel adjacent the wheel of lower denomination is a series of internal teeth 27. The side of each wheel adjacent the wheel of higher denomination is stepped to form a ledge 29 and an annular surface 31. Ledge 29 is cut out at 33 and on either side of the cut-out region surface 31 has internal teeth 35 and 37. These teeth extend radially inward less than teeth 27. Between each pair of adjacent wheels is a carrier plate 39 for supporting a transfer pinion 41. The pinion 41 has spaced radial rings 43 engaging the side walls of plate 39 adjacent a slot 45 formed therein. On one side of the rings 43 are teeth 49 in engagement with teeth 27. On the other side of the rings 43 are teeth 51 in alignment with teeth 49. These teeth 51 extend over the annular surface 31 and are adapted to engage teeth 35 and 37. Alternate ones of these teeth 51 are elongated and tapered as shown at 53. These teeth 53 are in the plane of the ledge and spaced ones of said teeth may engage the ledge to prevent undesired rotation of the pinion in normal counting.

The plate 39 is held from rotation in any preferred way as by means of a slotted arm 55, the slot to engage some convenient part of the instrument with which the odometer is used. The extensions 57 of the plate 39 on either side of the slot 45 pass through openings 59 in a flat resilient plate 61 seated on the surfaces 62 formed by cutting the plate. The intermediate part 63 of the spring plate is adapted to engage the teeth 49 and 51 and yieldingly hold the pinion in engagement with the teeth 27 and 35—37 of the wheels. The slot 45 is of sufficient depth to permit the pinion to withdraw from active position as will be seen by reference to Fig. 2.

For the purpose of quick resetting the shaft has a longitudinal notch 65. Each wheel except 13 carries a pawl 67 adapted to be engaged with the notch of the shaft and rotated with and by the shaft in one direction of rotation of the latter so that each of the wheels may be picked up and rotated in the course of one complete rotation of the shaft, a process well known to accomplish the so-called quick resetting. In normal forward counting the pinion is held outwardly by spring 61 as in Figs. 2, 3, and 4. During the rotation of a given wheel the flat surfaces of teeth 53 rest on the ledge 29 as in Fig. 4, thereby preventing an undesired rotation of the pinion and any consequent rotation of the next higher denomination wheel until the teeth 35 and 37 reach the teeth 51.

Fig. 4, for example, shows a movement from Fig. 2 in the counterclockwise direction of rotation of wheel 15. Teeth 35 and 37 continue to travel around in a counterclockwise direction until tooth 35 engages tooth 51a and rotates the pinion, tooth 51b entering the space between teeth 35 and 37. In this way wheel 17 is turned one-tenth of a revolution for one complete rotation of wheel 15. During this movement it will be clear from Fig. 4 that tooth 53' is received within the opening 33 of the ledge to permit the action to take place.

To effect the quick reset operation, the shaft 11 is rotated clockwise, as seen in Fig. 3 carrying wheel 13 with it. The notch 65 picks up one and another of the pawls 57 of the other wheels until all wheels are rotating together in a direction the reverse of that for normal counting. Thus, in Fig. 6, it may be assumed that teeth 37 and 35 are approaching the teeth of the pinion. However, before the position of Fig. 6 is reached, it may be assumed that the next higher wheel has been picked up by the notch and pawl and is being rotated. If the flat tooth extensions 53 should remain on the ledge as shown in Fig. 3, such a rotation of the pinion could not occur. To accommodate this rotation the spring 61 yields, permitting the pinion to be moved inward radially as it is rotated from the position of Fig. 3 to that of Fig. 6 where one tooth 53 (not two teeth 53) engages the ledge. As a result of this movement its teeth 51 are moved out of the path of movement of teeth 35 and 37 but teeth 49 remain in engagement with teeth 27. A continued rotation of the shaft aligns the figures on all the wheels as they rotate together because the position of the pawl of each wheel is similarly located relative to the figures.

In prior constructions of this kind the equivalent of ledge 29 was in the form of a continuous circle broken only by such an opening as 33. In the present case there are nine grooves 71 which, added to notch 33, constitute ten equally distributed depressions in the ledge. These depressions 71 produce certain very advantageous results. As the pinion was pushed radially inward in prior constructions, it was moved further inward so that the equivalent of teeth 53 engaged the uniform ledge. The difference will be obvious from Fig. 6 where the teeth 53 are shown as successively received not on the flats 71a but in the grooves 71. Less radial movement of the pinion is therefore required. This means the saving of expense in the spring device for the pinion in that it can be made much simpler and this makes possible a simpler and cheaper pinion carrier plate.

There is another very important advantage resulting from the use of the grooved ledge. In the older construction when resetting, the transfer pinion was rotated and pressed inwardly so that two teeth like teeth 53 were moved away from the ledge and one tooth was brought into engagement with the ledge along a radius thereof, being moved further inward than as shown in Fig. 6, of course. Since this movement of the pinion removed its teeth from contact with the wheel teeth, the described radial position of pinion teeth 53 relative to the wheel was present when the quick resetting was completed with the figures on the wheels opposite the dial opening just prior to beginning normal forward counting. As forward counting began, there was a slight rotation of the pinion and therefore of the wheels in the process of shifting the pinion to the

position shown by Fig. 3 when two teeth 53 engaged the ledge. This removed the horizontal line of figures from a position immediately opposite the dial opening. To correct this defect in operation, it was customary to continue the resetting slightly beyond the position where the figures registered with the opening in the dial plate. The beginning of normal operation then produced the slight rotation described and effected a correct position of the figures.

In the present arrangement, the figures are located opposite the flats 71a of the ledge. The pinion is rotated by joint rotation of successive wheels and teeth 53 travel in the grooves 71. The teeth of the next higher wheel are thus continuously rotating the pinion, it being understood that a tooth 49 in alignment with 53 (Fig. 6) is engaged with one of the teeth 27, owing to the lesser inward movement of the pinion. The pinion, as it rotates, makes a series of audible clicks as it shifts from the position of Fig. 6 to that of Fig. 3 where it moves outwardly and two teeth (not one only) engage the arcuate surface or ledge 29. At the moment of the click and the double tooth contact one of the figures is opposite the dial opening. The subsequent normal operation therefore starts with the figures in registration with the opening and with no occasion for the slightly excessive rotation in the resetting direction because, at the time the figure is opposite the opening, the teeth are in correct position for normal operation.

The improved operation will be understood by comparing Fig. 1b with Fig. 1a.

We claim:

1. In an odometer, a first figure wheel, a second figure wheel, a transfer pinion therebetween, the second figure wheel having an annular series of teeth to engage the transfer pinion, the first figure wheel having a plurality of teeth at one part of its periphery to engage the transfer pinion, the first figure wheel having a ledge formed with a series of circumferentially distributed grooves, and the transfer pinion having tooth extensions to contact said grooved ledge.

2. In an odometer, figure wheels having teeth, a carrier plate between said wheels, said plate having parts removed to form spaced tongues and flat surfaces at the base thereof, a flat spring resting on said surfaces and having openings embracing said tongues, a toothed transfer pinion in the space between said tongues and projected by said spring into engagement with said wheel teeth.

3. The invention defined by claim 2, said space between said tongues being radially elongated to permit bodily movement of said pinion inwardly in a radial direction.

4. In an odometer, a wheel having on one side thereof a circumferential ledge and an axially disposed annular surface, said ledge having circumferentially arranged grooves and said surface having a plurality of teeth at one part only of its circumference.

5. In an odometer, first and second wheels, teeth on said wheels, an interposed pinion having teeth to engage the wheel teeth and alternate extension teeth, means to resiliently mount said pinion for radial movement to accommodate quick resetting, said first wheel having a circular ledge provided with grooves to contact said extension teeth to facilitate normal operation after resetting.

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