W. G. WOLFE.

COUNTER.

APPLICATION FILED JAN. 10, 1910.

1,003,022.

Patented Sept. 12, 1911.

5 SHEETS—SHEET 1.

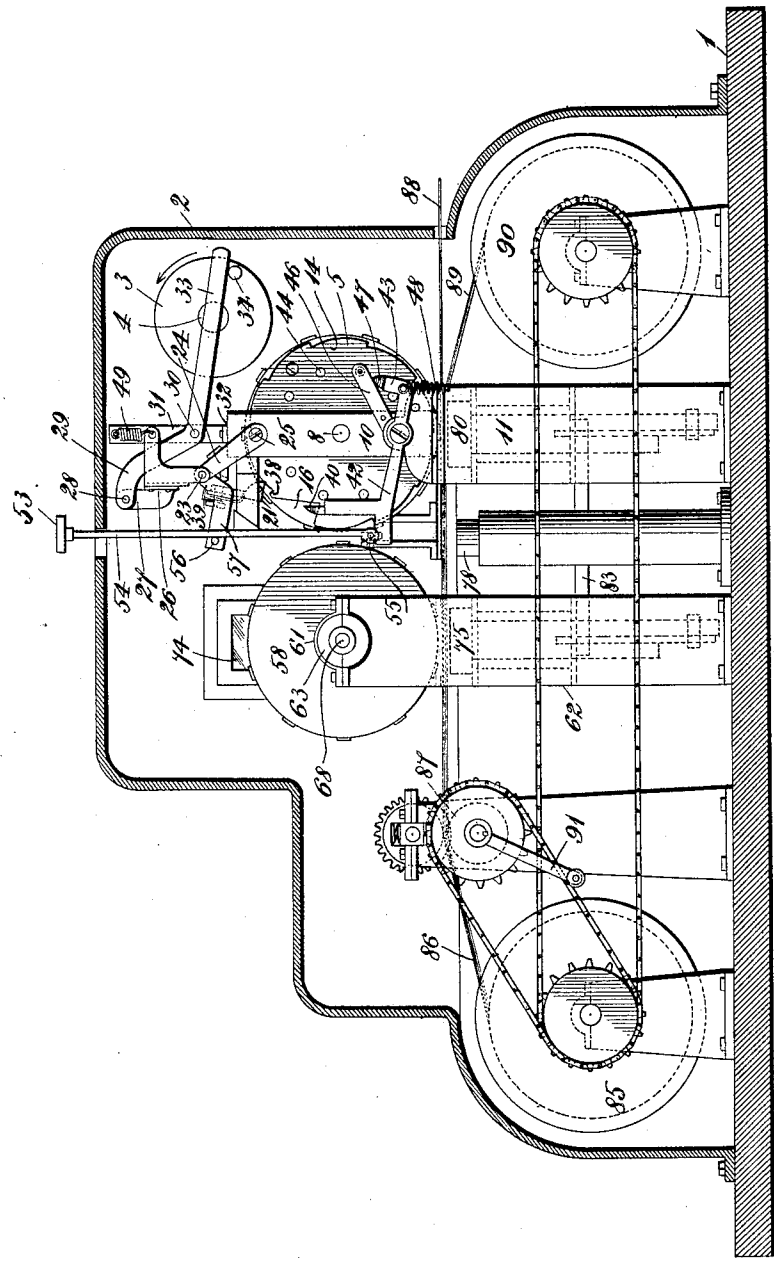

Fig. 1.

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6 SHEETS—SHEET 2.

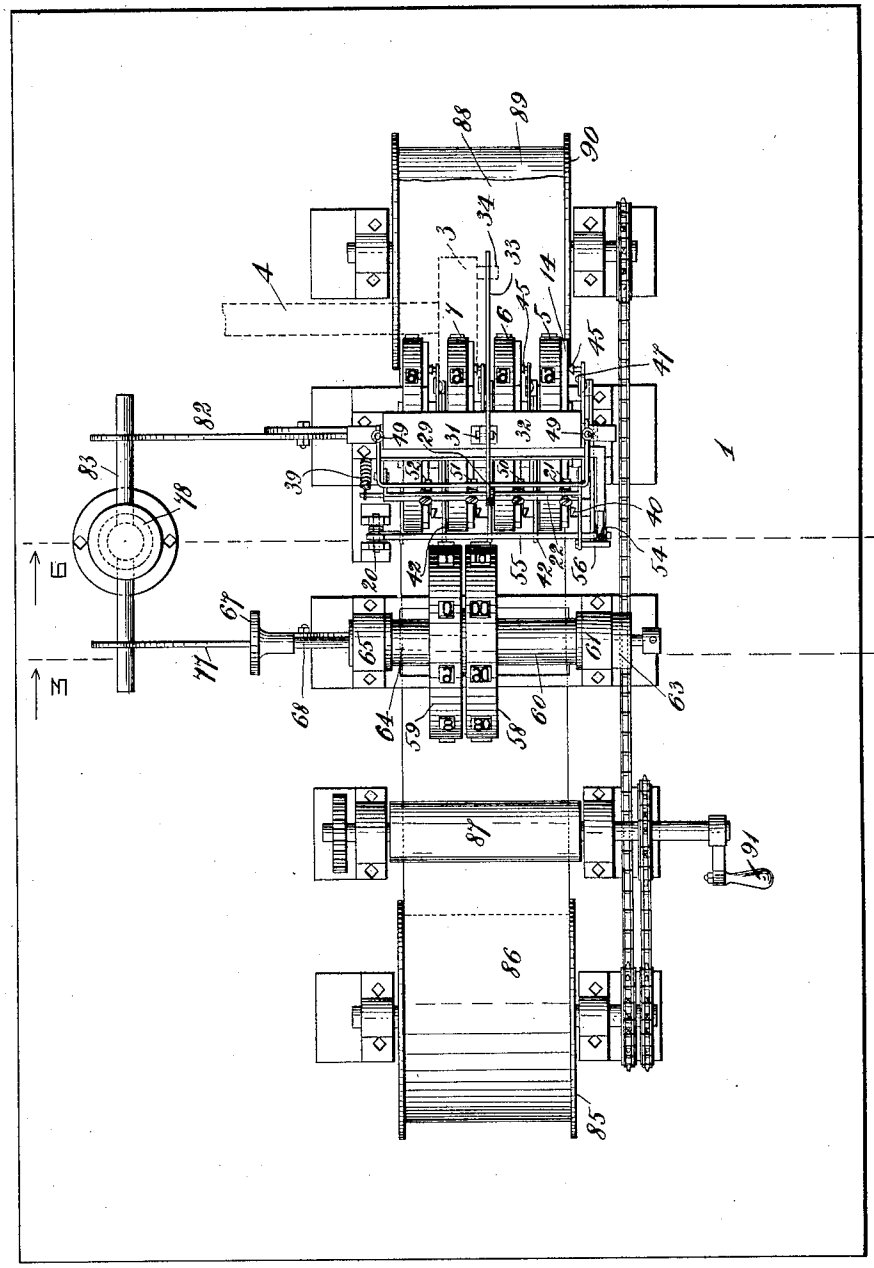

FIG. 2

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5 SHEETS—SHEET 3.

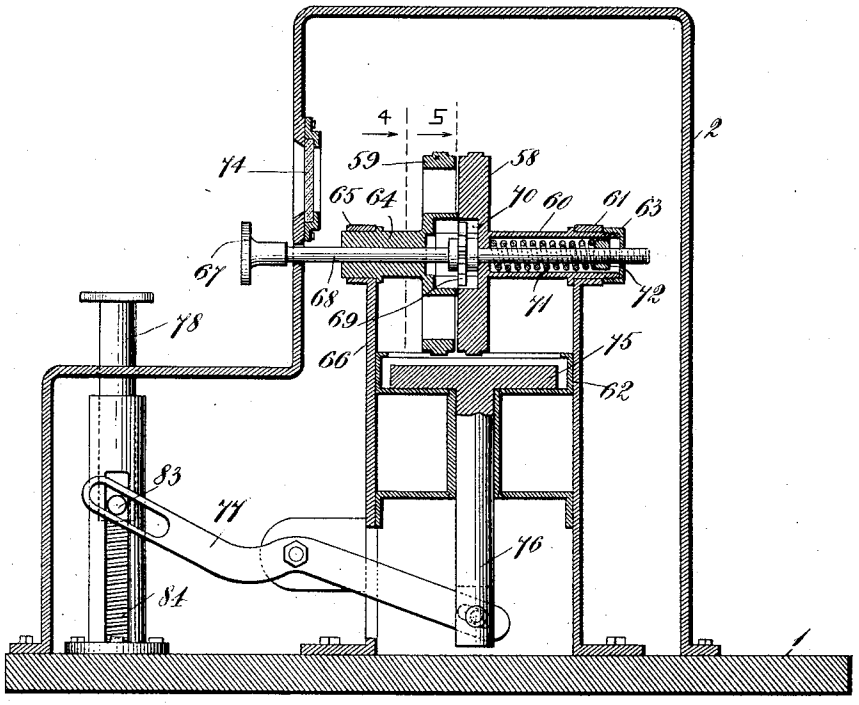

Fig. 3.

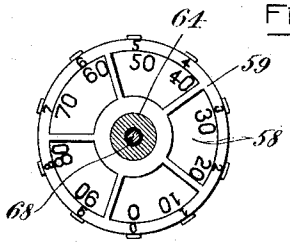

Fig. 4.

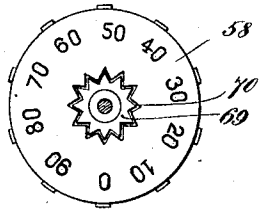

Fig. 5.

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5 SHEETS—SHEET 4.

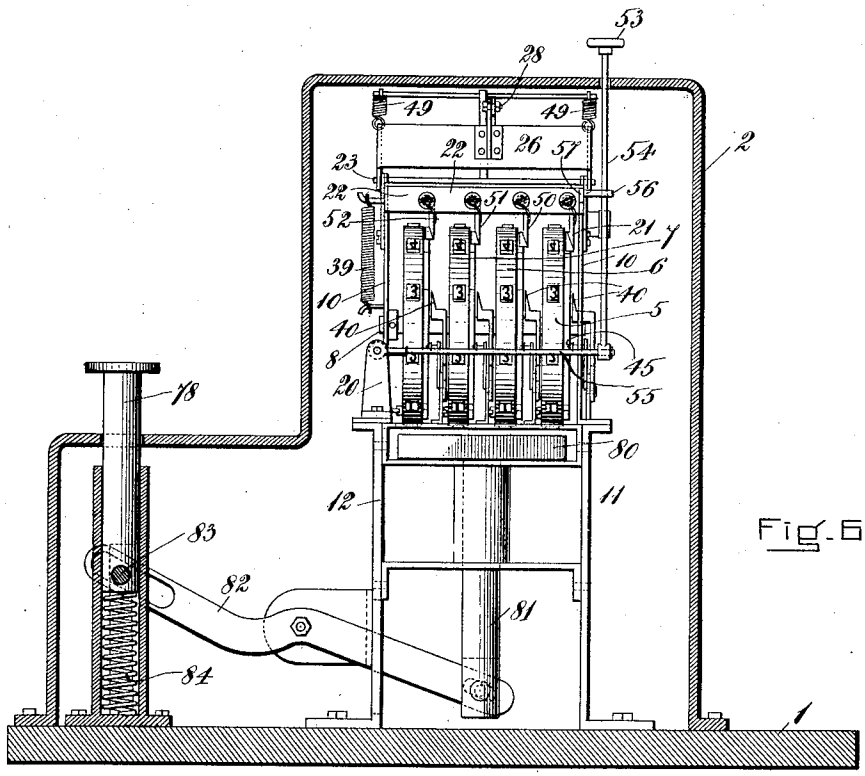

Fig. 6.

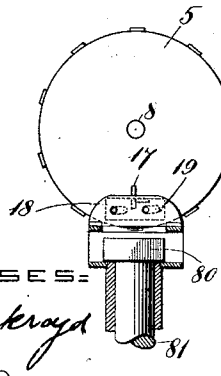

Fig. 7.

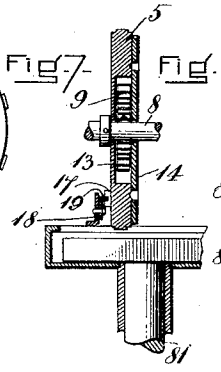

Fig. 8.

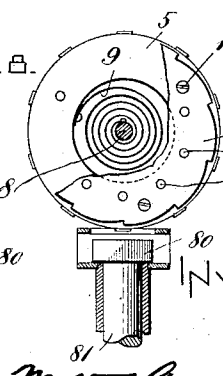

Fig. 9.

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APPLICATION FILED JAN. 10, 1910.

1,003,022.

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5 SHEETS—SHEET 5.

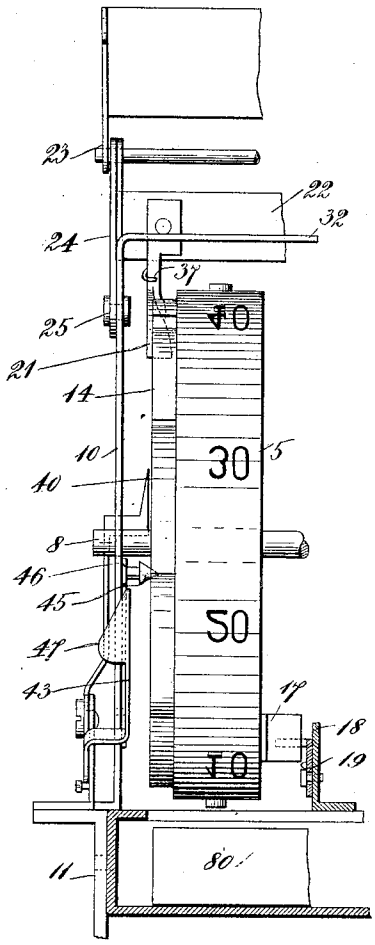

Fig. 10.

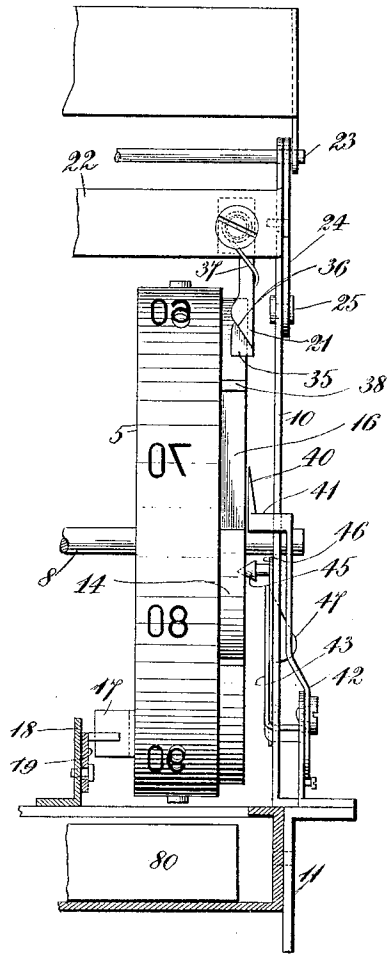

Fig. 11.

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UNITED STATES PATENT OFFICE.

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COUNTER.

1,003,022. Specification of Letters Patent. **Patented Sept. 12, 1911.**

Application filed January 10, 1910. Serial No. 537,183.

To all whom it may concern:

Be it known that I, WALTER GEORGE WOLFE, a citizen of the United States, residing at Wakefield, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Counters; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to an improvement in counters.

The object of the invention is to produce a counting mechanism which, while adapted for other uses, is especially intended for use in connection with taximeters for vehicles.

One feature of the invention relates to the construction, by virtue of which the counting wheels may be turned back to zero or starting position.

Another feature resides in the use of counting wheels, each of which, upon the completion of one rotation, is restored to zero or starting position.

Another and by no means an unimportant feature of the invention relates to the provision of means for printing upon a strip of material the amount indicated by the counter.

Other features of the invention will be referred to in the specification.

In the accompanying drawings illustrating the best form of the invention, Figure 1 is a front elevation of the machine, Fig. 2 is a plan, Fig. 3 is a sectional elevation of the machine, and Figs. 4, 5, 6, 7, 8, 9, 10 and 11 illustrate details of the construction hereinafter referred to.

The invention is shown in a form particularly adapted for use in connection with taximeters for automobiles, and for this purpose the machine is provided with counting mechanism for counting quarter miles in dimes and dollars, mechanism for indicating time spent in waiting in dollars and cents, and for printing the waiting and mileage amounts in duplicate upon two strips of paper, one of which is handed to the passenger, the other of which is wound up and preserved in the machine.

The apparatus is illustrated as on a base 1 provided with a cover 2. From the base rise standards which support the various parts of the machine. The mileage wheel 3 mounted on a shaft 4 is adapted to be connected by some means, such as a flexible shaft, with the front wheel of an automobile, suitable connections being interposed between the two to cause wheel 3 to make one rotation for each quarter mile traversed by the vehicle. The supports and the arrangement of this mileage wheel and shafting are not shown, as they form no part of the invention.

The counting mechanism is illustrated in rear elevation in Fig. 1, in plan in Fig. 2, and in front elevation in Fig. 6. Four counting wheels are shown. This would enable the machine to count up to $999.90. For use in connection with an automobile taximeter, only three wheels are necessary. The dime wheel 5 counts dimes, the dollar wheel 6 counts dollars, and the eagle wheel 7 counts eagles. These wheels are loosely mounted on a shaft 8, as seen in Fig. 8, being connected to the shaft by means of a clock spring 9. The shaft 8 is supported at its ends in the uprights 10 secured to the standards 11, 12 of the mileage printing device. The wheel illustrated in Figs. 7, 8 and 9 is the dime wheel 5, but it will be understood that the dollar and eagle wheels are identical with the dime wheel except in respect to the depth of the tripping ratchet notch hereinafter referred to. The ratchet wheel 5 consists of two parts, the one 13 provided with a cavity to receive the clock spring 9, and the other 14 secured to the part 13 by the screws 15, thereby covering the spring cavity and constituting the ratchet wheel proper. The ratchet wheel 14 is provided with ten ratchet teeth. The depth of the notches in the ratchet wheel 14 for nine of the teeth is the same, but for the tenth tooth a deep tripping ratchet notch 16 is provided for the purpose of causing a variation in the operation of the pawl mechanism, acting to throw the dollar ratchet into engagement with the dollar wheel. The rear face of the dime wheel 5 is provided with detent 17 adapted to engage a back stop 18 mounted on the back stop slide 19 carried by the releasing lever carrier 20. The ratchet mechanism operates to advance the dime wheel, tooth by tooth, until it has completed one rotation, when it is released. When propelled by the spring 9 it rotates backwardly until the detent 17 strikes the back stop 18.

It is to be observed that the back stop 18

is mounted on the back stop slide because otherwise the dime wheel 5 could not make a complete rotation. The dime pawl 21, shown in front elevation in Fig. 11 and in rear elevation in Fig. 10 and in side elevation in Fig. 1, is pivotally mounted upon the pawl carrier 22. The pawl carrier 22 in turn is provided at its ends with ears pivoted at 23 to the arms 24 which in turn are pivoted at 25 to the uprights 10. A cross bar 26, also pivoted at 23 to the arms 24, is provided with an ear 27 to which at 28 is pivoted the pawl actuating lever 29 in turn pivoted at 30 on a post 31 erected on the cross bar 32 which unites the upper ends of the post 10. The rear end 33 of the pawl actuating lever 29 is adapted to be engaged by the pin 34 in the mileage wheel 3.

The above described arrangement is such that with each rotation of the mileage wheel 3 the pin 34 causes an oscillation of the pawl actuating lever 29 which causes the pawl carrying bar 22 to be moved in a direction to cause the pawl to advance the dime wheel one tooth. The pawl 21 is provided with a tooth-engaging portion 35 which is adapted to engage the several teeth of the ratchet wheel 14. This pawl is also provided with an incline 36 which is adapted to engage a tripping lever hereinafter described, by which it is withdrawn from engagement with the ratchet wheel 14. The pawl 21 is pivoted on the pawl carrier 22 in such wise as to permit it to be moved laterally out of engagement with the ratchet wheel 14, a spring 37 normally acting to hold the pawl in operative engagement with the ratchet wheel 14. With each oscillation of the pawl actuating lever 29 the dime wheel 5 is advanced one tenth of a rotation. The dime wheel 5 starts from the position indicated in Fig. 1 with the pawl above the tooth 38. With each successive oscillation of the pawl actuating lever 29 the dime wheel is advanced one tenth of a rotation until 9 teeth have been racked by, then with the return of the pawl to its upper position, it finds itself in the tripping ratchet notch 16, and upon its next advancing movement the pawl follows down into this tripping ratchet notch, the spring 39 attached to the pawl carrying bar pulling the pawl in a direction to cause it to enter said notch 16. This downward movement of the pawl 21 brings the inclined surface 36 of the pawl into engagement with the outer inclined side of the tripping prong 40 which swings the pawl laterally against the pressure of its spring 37 out of engagement with the ratchet wheel 14, thereby, so far as the pawl is concerned, releasing the ratchet wheel. The end of the pawl now strikes the surface 41 of the releasing lever 42 and swings the left-hand end of that lever, as illustrated in Fig. 1, downward, thereby causing the right-hand end 43 to rise. The ratchet wheel 14 is provided with ten retaining holes 44 adapted to be engaged by a detent 45 mounted on the end of a stationary spring arm 46. The right-hand end 43 of the releasing lever 42 is provided with a wedge head 47 which, when the releasing lever 42 is oscillated in the manner above described, slides under the detent carrying arm 46 and lifts it so as to withdraw the detent 45 from engagement with the retaining holes 44 in the ratchet disk 15. The downward motion of the pawl, therefore, at the time when it enters the tripping ratchet notch 16, operates to cause the pawl to be withdrawn from engagement with the ratchet wheel in the manner above described, and, at the same time, to withdraw the detent 45 from engagement with the ratchet wheel, so that the ratchet wheel is entirely released from control by either the retaining means or the pawl, and it rotates backward under the influence of the clock spring 9 to its original position, thereby bringing the figures on it indicating zero back to the bottom of the roll, the dime wheel then occupying the position illustrated in Fig. 1 and being ready to count another series of ten quarter miles. A spring 48 normally tends to hold the releasing lever 42 in the position illustrated in Fig. 1. A spring 49 is provided to lift the pawl actuating lever into the position illustrated in Fig. 1.

Each rotation of the dime wheel and its restoration to its original position must be accompanied by the advancement of the dollar wheel one notch, so that the advancement of the dime wheel ten notches and its return to its original position secures the advancement of the dollar wheel one notch. This is accomplished as follows:—When the pawl 21 falls into the tripping ratchet notch 16 the pawl carrying bar 22 is permitted to swing downward farther than it does when it engages the other teeth of the ratchet wheel 14, and this added movement of the pawl carrying bar 22 suffices to bring the dollar pawl 50 into engagement with the first tooth of the ratchet wheel of the dollar wheel 6, and then with the completion of the forward movement of the pawl carrying bar 22, the dollar wheel is advanced one tooth from a zero reading to a reading of 1, and the dime wheel is released and restored to its zero position. Only when the ratchet wheel 21 enters the tripping ratchet notch 16 of the dime wheel does the dollar pawl 50 engage the teeth of the ratchet wheel on the dollar wheel. Similarly, only when the pawls 21 and 50 engage the tripping ratchet notches of both the dime and the dollar wheels does the eagle pawl 51 of the eagle wheel engage the teeth of the ratchet wheel on the eagle wheel 7. The depth of the notches in the ratchet

wheel 14 is so slight that except when the pawl 21 enters the tripping ratchet notch 16 the pawl 50 does not descend low enough to engage the teeth of the ratchet wheel on the dollar wheel. So also with the other wheels, that is, the depth of the notches in the ratchet wheel of the dollar wheel is such as to hold the pawl carrying bar 22 so high that the pawl 51 cannot engage the teeth of the ratchet wheel of the eagle wheel except when the pawls 21 and 50 enter the tripping ratchet notches of both the dime and dollar wheels. The wheel 52, and more wheels, too, if desired, may be used, the wheel 52 being more appropriately designated as the thousands wheel because it is the fourth figure of the number.

In use as an automobile mileage counter, it is desirable at the end of the journey to restore the wheels to their starting or zero position. This is accomplished by means of the set-back device comprising the set back push 53 by which the rod 54 is depressed, thereby forcing down the rod 55 which is located over the ends of the four releasing levers corresponding to 42. The rod 54 of the set back push engages a pin 56 in a projection 57 secured to the pawl carrying bar 22. So, therefore, when the set back push 53 is pushed downward and moved to the left, as viewed in Fig. 1, it raises the detents from off all of the wheels, and at the same time lifts all of the pawls out of engagement with the ratchet wheels of the several counting wheels, thereby permitting them all to be restored to their zero position by their respective clock springs 9. Before setting the counter back to zero, however, the amount indicated by the counter is to be printed on the strips of paper already referred to. Before proceeding to a description of this printing apparatus, however, it is convenient to refer to the time indicating devices.

Mounted alongside the mileage counter are the dime and dollar time wheels 58 and 59 respectively. These wheels are shown in section in Fig. 3; in Fig. 4 a view taken on the line 4—4 of Fig. 3 is had showing the openings in the dollar wheel through which the figures on the wheel 58 are to be seen; and in Fig. 5, which is a view taken on the line 5—5 of Fig. 3, is seen the side of the dime wheel 58. The time dime wheel 58 is provided with a sleeve 60 which projects into a bearing 61 supported from the standard 62, a collar 63 holding it in place. The dollar time wheel 59 is provided with a hub 64 which is supported in a bearing 65 in the upper end of the support 66, said supports 62 and 66 rising from the base 1. A single device is provided for moving the time wheels to the desired positions. This comprises a hand wheel 67 projecting through the side of the casing as indicated in Fig. 3, having a stem 68 which projects axially into the shaft 64 of the dollar time wheel 59. At 69 the shaft 68 is provided with a star wheel which is adapted to engage a correspondingly shaped recess 70 in the dime time wheel 58 when it occupies the position indicated in Fig. 3. This star wheel 59 is normally supported in the position indicated in Fig. 3, being held in that position by the spring 71 which presses at one end against the dime time wheel 58 and at the other end against a collar 72 on the rod 68. When the hand wheel 67 is turned, it brings one of the figures on the time wheel 58 into position to be seen through the window 74. The operator can therefore bring to view whatever figure is desired from zero to 90. If the elapsed time has been such as to demand the use of a dollar wheel as well as the dime wheel, he can then pull upon the hand wheel 67, thereby pulling the star wheel 69 out of the recess in the dime time wheel 58 and pulling it into the recess in the dollar time wheel 59, whereupon the dime time wheel standing fast, the dollar wheel may be rotated to bring the desired dollar indication on the dollar time wheel within view through the window 74. The numbers on the dime and dollar time wheels are not located adjacent to the figures on the peripheries of these wheels corresponding thereto, but are located diametrically opposite thereto, so that, for instance, when the reading of the two wheels is as indicated in Fig. 4, the figures on their peripheries at the bottom would be 5 and 50, thereby indicating a charge for time of $5.50.

The printing apparatus for both the time and mileage wheels are duplicates and correspond generally to an ordinary ticket stamp. A platen 75 mounted on a platen bar 76 and actuated through a lever 77 by a plunger 78 operates, when the plunger 78 is depressed, to cause the platen 75 to be thrust percussively against the time wheels and the time indicated by the figures on the periphery opposite the platen are impressed upon the paper strips between the two. The printing apparatus for the mileage counter is identical in construction with that of the time indicator, a platen 80 being mounted upon a platen bar 81 and operated through a lever 82 by the plunger 78. The plunger 78 carries a pin 83 which engages slots in the levers 77 and 82, and a spring 84 normally acts to restore the plunger 78 to its highest position.

The paper strips upon which the amounts indicated by the time and mileage indicating mechanisms are printed, runs off a supply spool 85 in a double strip, that is, there are two strips of paper with a strip of carbon paper between, wound up together on such spool. These strips indicated at 86 pass first to a wringer feeding device 87

which consists of two rubber covered rolls geared together, between which the paper strips 86 are led. These paper strips then pass between the platen 75 and the time wheels 58 and 59, and thence between the platen 80 and the mileage wheels 5, 6, 7 and 52. Thence one strip, indicated at 88, emerges through a slot in the cover, and the other strip, indicated at 89, is wound up on the second wind up spool 90, and arranged by some suitable clutch device to not turn backward. A crank 91, connected to the shaft of the lower feed roll of the feeding device 87 is used to operate the wringer feed and the spools 85 and 90, sprocket wheels and chains being provided for this purpose. The connection between the crank and the shaft is such that it operates to turn the shaft when turned to the right but is disconnected therefrom when turned to the left. It is to be understood that in the construction shown suitable friction devices are provided between the several sprocket wheels and the parts with which they are connected, so that the proper relative peripheral speeds may be had. Provision is made for the convenient removal and replacement of the spools 85 and 90.

While in the foregoing description of the specific embodiment of the invention illustrated in the accompanying drawings dime, dollar and eagle wheels have been referred to, it is to be understood that the mechanism is equally adapted, by such obvious mechanical changes as may be necessary, to count pence, shillings and pounds, or other money, or units, tens, hundreds, thousands, etc.

In ordinary taximeter work it is the practice to make a minimum charge for any use of the machine, equivalent to a distance of a half mile, irrespective of whether such distance is actually traveled or not. Any well known or convenient contrivance may be used in connection with the present apparatus for securing such minimum indication.

It is to be understood that the invention is not limited to the construction illustrated in the accompanying drawings, as any construction within the purview of the following claims is within the contemplation of the invention. The patentee believes that he is the first to produce counting mechanism employing wheel and actuating devices therefor operating to cause the wheel to oscillate; that he is the first to use wheel counting devices in which the wheels may be restored to their starting position, by their release and backward rotation; and that he is the first to produce a counting mechanism in which each successive wheel counts the oscillations of the next preceding wheel.

The particular value and importance of this invention, so far as the patentee is informed, resides in the employment of a counting mechanism which has two features, namely, simple restoration to starting position and the preservation of the record for the benefit of the machine owner. The simplicity of the mechanism commends it to the taxicab owner; the fact that the passenger receives a ticket bearing a permanent record of the charge collected by the chauffeur recommends it to the passenger. But perhaps more important than either of these is the fact that the machine retains within its locked case a complete record of all moneys received by the chauffeur while absent from the garage.

It is within the contemplation of the invention to use a clock in connection with the time wheels, so that the clock will actuate the time wheels and cause them to be moved to the proper position to indicate, when the printing mechanism is employed, the duration of the time which the passenger kept the vehicle waiting.

It is within the contemplation of the invention to use two strips of paper, of which the back of the upper one is inked or blackened so that when the number is stamped on the upper paper strip it will set off on to the lower paper strip; in fact, it is within the contemplation of the invention to use any desired method of duplicating the printing, as by the use of ink or ribbons, or otherwise.

Having thus described the invention, what is claimed is:—

1. A counter, having, in combination, a shaft, a plurality of counting wheels loosely mounted thereon, a coiled spring for each wheel connected at one end to its wheel and at the other to the shaft, a ratchet wheel for each counting wheel, said ratchet wheel having a number of regular ratchet teeth and a tripping ratchet notch, an oscillating frame, actuating pawls pivoted on the frame one for each ratchet wheel, a holding means for each ratchet wheel, and means operating when an actuating pawl enters the tripping notch of its ratchet wheel to disengage the holding means and release the wheel.

2. A counter, having, in combination, a shaft, a plurality of counting wheels loosely mounted thereon, a coiled spring for each wheel connected at one end to its wheel and at the other to the shaft, a ratchet wheel for each counting wheel, said ratchet wheel having a number of regular ratchet teeth and a tripping ratchet notch, an oscillating frame, actuating pawls pivoted on the frame one for each ratchet wheel, said pawls being so pivoted as to swing axially and laterally of its ratchet wheel, a holding means for each ratchet wheel, and means operating when an actuating pawl enters the tripping notch of its ratchet wheel to swing the pawl laterally to disengage it, and means operated

by the further movement of the pawl to disengage the holding means.

3. A counter, having, in combination, a shaft, a plurality of counting wheels loosely mounted thereon, a coiled spring for each wheel connected at one end to its wheel and at the other to the shaft, a ratchet wheel for each counting wheel, said ratchet wheel having a number of regular ratchet teeth and a tripping ratchet notch, an oscillating frame, actuating pawls pivoted on the frame one for each ratchet wheel, holding means adapted to engage the side of each wheel, and means operating when the actuating pawl enters the tripping notch of its ratchet wheel to disengage the pawl and cause the pawl by its further movement to effect the disengagement of the holding means from the ratchet wheel.

4. A counter, having, in combination, a shaft, a plurality of counting wheels loosely mounted thereon, a coiled spring for each wheel connected at one end to its wheel and at the other to the shaft, a ratchet wheel for each counting wheel, said ratchet wheel having a number of regular ratchet teeth and a tripping ratchet notch, an oscillating frame, actuating pawls pivoted on the frame one for each ratchet wheel, said pawls being so pivoted as to swing axially and laterally of its ratchet wheel, a holding means for each ratchet wheel adapted to engage the side of the wheel, a cam adapted to engage an actuating pawl when it enters the tripping notch of its ratchet wheel to swing the pawl laterally to disengage it, and means operated by the further movement of the pawl to disengage the holding means.

5. A counter, having, in combination, a shaft, a plurality of counting wheels loosely mounted thereon, a coiled spring for each wheel connected at one end to its wheel and at the other to the shaft, a ratchet wheel for each counting wheel, said ratchet wheel having a number of regular ratchet teeth and a tripping ratchet notch, an oscillating frame, actuating pawls pivoted on the frame one for each ratchet wheel, said pawls being so pivoted as to swing axially and radially of its ratchet wheel, a holding means comprising a pin carried on the end of a spring arm, means operating when an actuating pawl enters the tripping notch of its ratchet wheel to swing the pawl laterally to disengage it, and a wheel head operated by the further movement of the pawl to engage the spring arm and release the holding means.

6. A counter, comprising, in combination, a counting wheel having a ratchet wheel associated therewith, said ratchet wheel having a number of regular ratchet teeth and a tripping ratchet notch, an axially and laterally pivoted pawl, a spring for rotating the wheel backward, holding mechanism for the wheel, and releasing mechanism operated by the pawl when it enters the tripping ratchet notch to withdraw the holding means and the pawl from engagement with the wheel, substantially as described.

7. A counter, having, in combination, a counting wheel, a ratchet wheel associated therewith, an advancing device comprising an axially and laterally pivoted pawl, means for actuating the pawl, wheel returning means, holding means, and a releasing device acting upon the completion of a predetermined number of advancing movements of the ratchet wheel to release the wheel and to return it to starting position, and a setback device acting to release the pawl and the holding means when the wheel is in any position and to return the same to starting position, substantially as described.

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Witnesses:
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