Aug. 28, 1923. 1,466,050

M. W. KOSKI

TIME AND SPEED RECORDING MEANS

Filed March 9, 1922 4 Sheets-Sheet 1

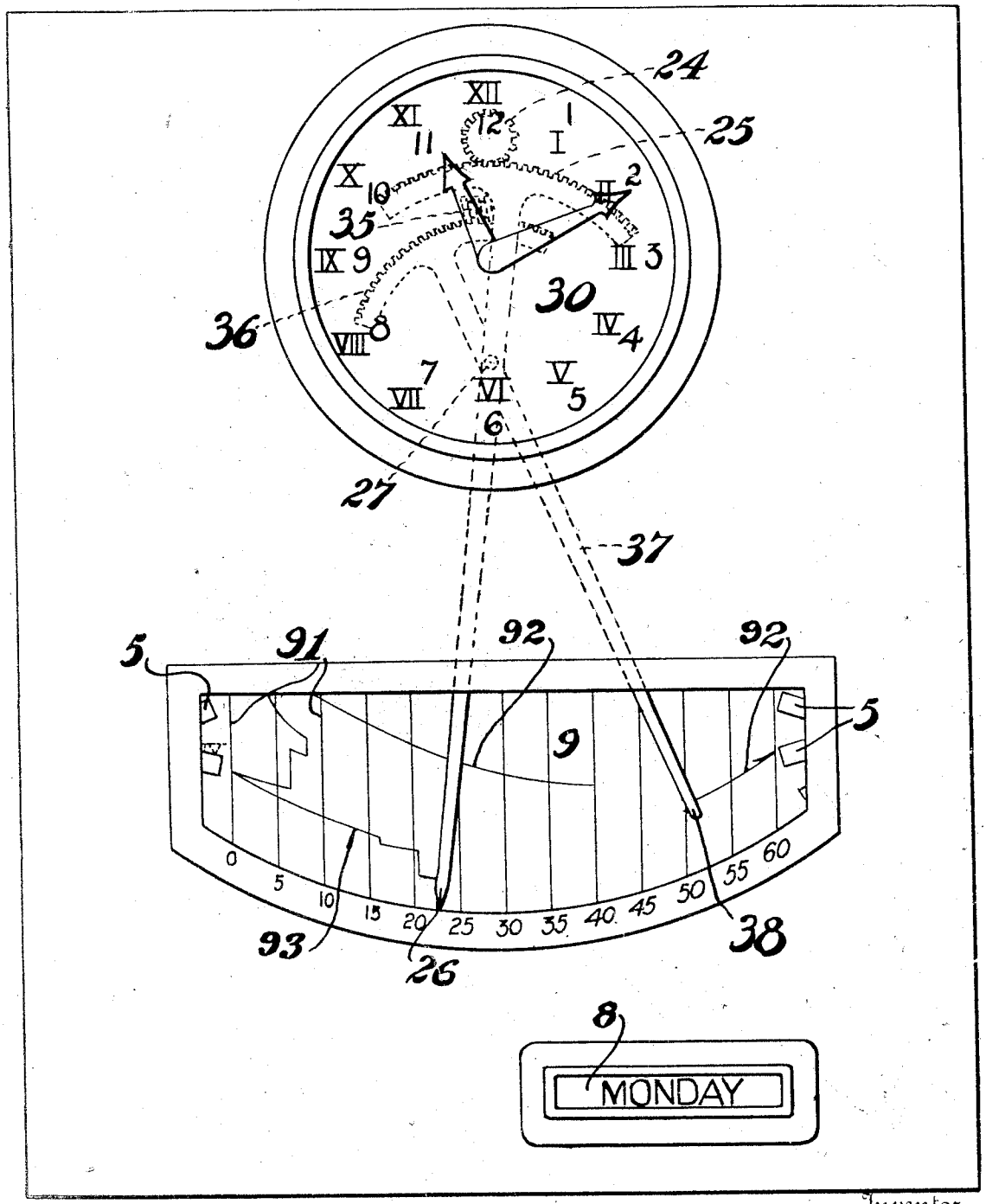


Fig. 1

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Filed March 9, 1922 4 Sheets-Sheet 2

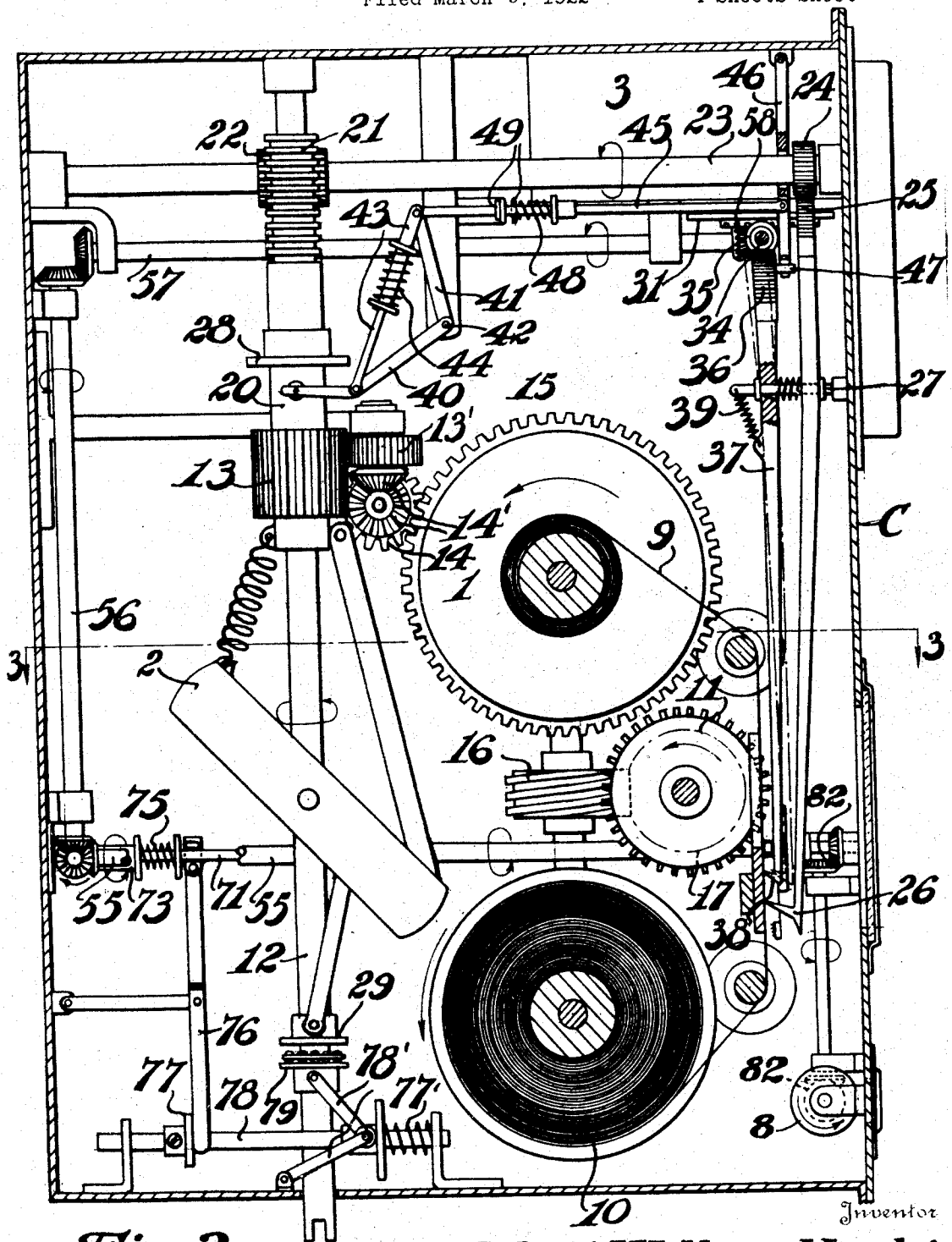


Fig. 2

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TIME AND SPEED RECORDING MEANS

Filed March 9, 1922 4 Sheets-Sheet 3

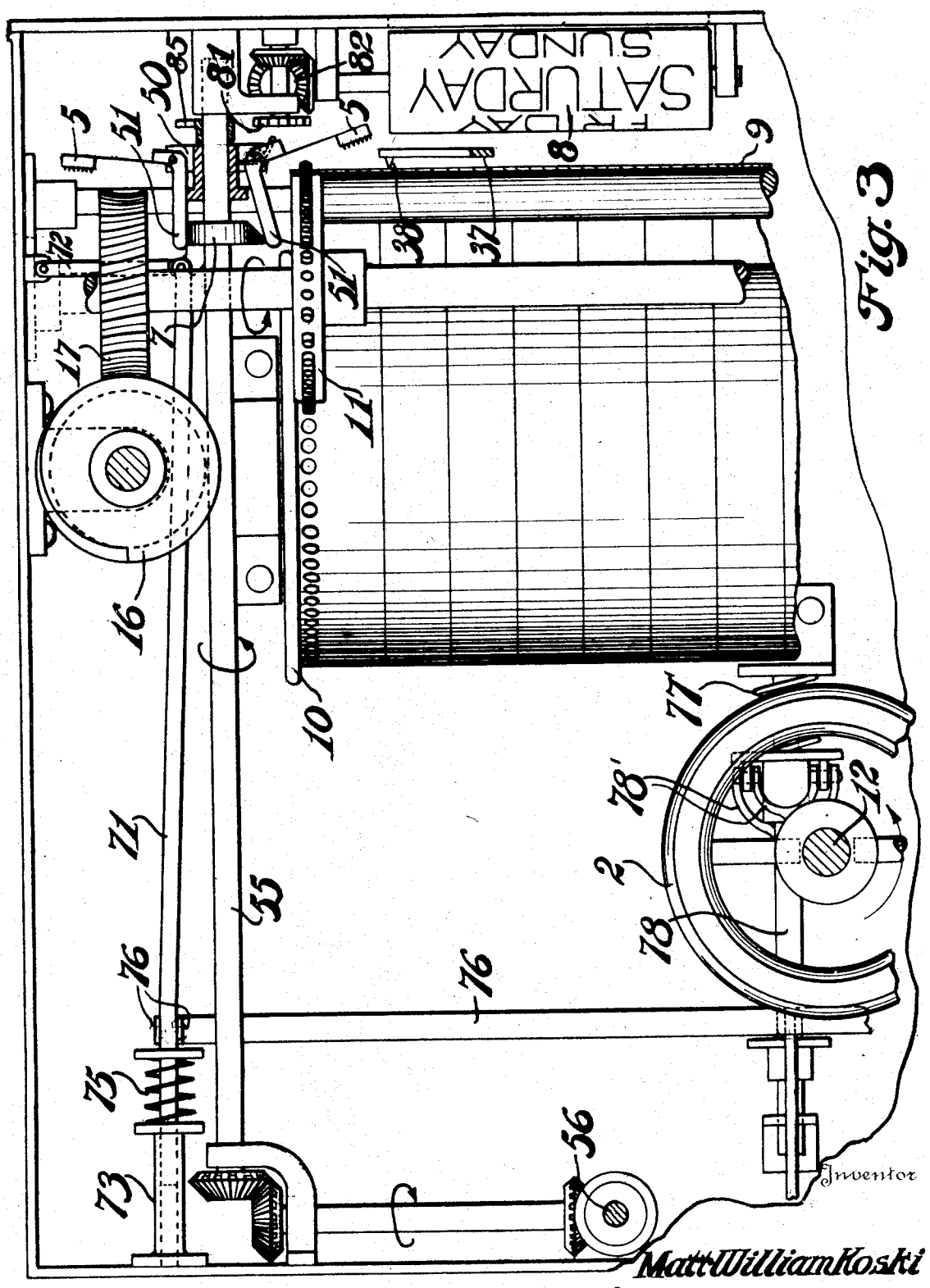


Fig. 3

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TIME AND SPEED RECORDING MEANS

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Fig. 4

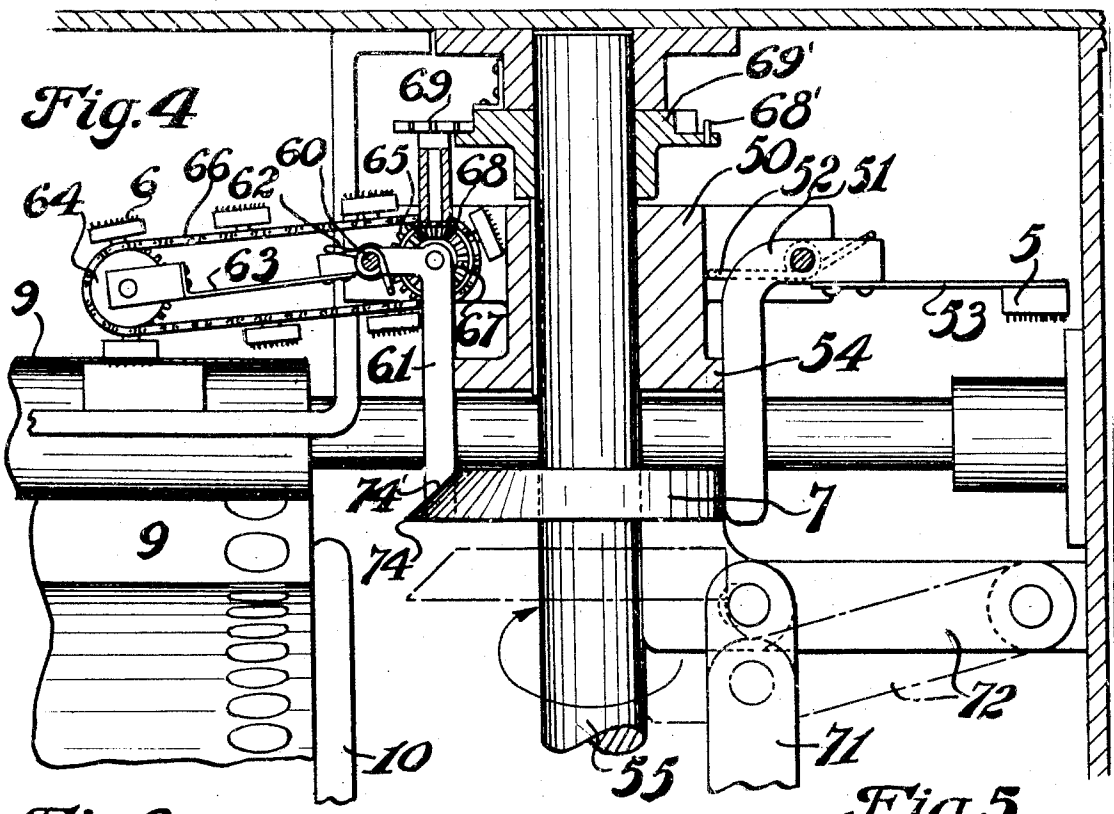


Fig. 6

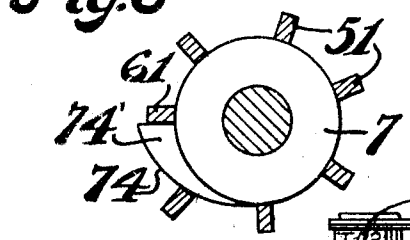
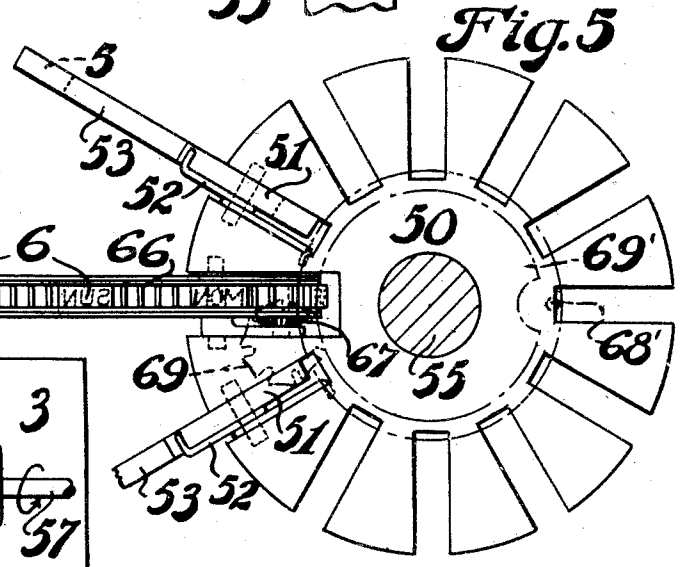


Fig. 5



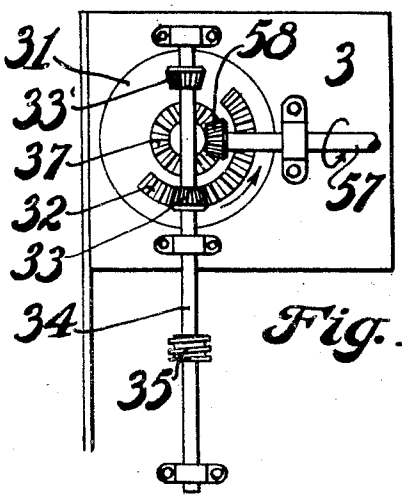


Fig. 7

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Patented Aug. 28, 1923. 1,466,050

UNITED STATES PATENT OFFICE.

MATT WILLIAM KOSKI, OF RAYMOND, WASHINGTON.

TIME AND SPEED RECORDING MEANS.

Application filed March 9, 1922. Serial No. 542,247.

To all whom it may concern:

Be it known that I, MATT WILLIAM KOSKI, a citizen of the United States of America, and resident of the city of Raymond, in the county of Pacific and State of Washington, have invented certain new and useful Improvements in Time and Speed Recording Means, of which the following is a specification.

My invention relates to recording speedometers such, for instance, as are shown in my copending application Serial No. 492,313.

In my previous application I provided a traveling record sheet and a marker therefor controlled in its movement by the vehicle's motion, through a governor. According to my present invention I employ like devices but I also include with them recording mechanism which is controlled in its movement independently of the motion of the vehicle, as, for instance, by clock mechanism and which is operable to record upon the sheet data relating to time. I also provide mechanism which is controlled in its action by the motion or non-motion of the vehicle to suspend the recording function of the time registering mechanism but which operates without interfering with the clock controlled advance thereof. This results in the formation of a record upon the sheet showing the rate of speed at which the vehicle has traveled; the time during which such travel took place; the period of time the vehicle has been or had at any time been standing still; and the exact time the vehicle ceased to advance, or resumed the advance. I may also provide an indicator which is controlled by the clock mechanism to indicate the day during which the vehicle is being used.

It is my general object to provide a machine which will accomplish the above results. Other more special objects may be determined by an inspection of the following specification and the drawings attached hereto.

My invention comprises those novel parts and combinations thereof which are shown in the accompanying drawings, described in the specification and particularly defined by the claims terminating the same.

In the accompanying drawings I have shown my invention in a form which is illustrative of an embodiment of my invention, which form however, may be greatly modified or changed within the scope of my invention as described in the appended claims.

Figure 1 is a face view of the invention as it would appear to the driver of the vehicle.

Figure 2 is a transverse vertical section through my device, the point of view being at right angles to Figure 1.

Figure 3 is a transverse horizontal section through my device approximately on the line 3—3 of Figure 2.

Figure 4 is a detail section of a portion of the time recording mechanism.

Figure 5 is a plan view of portions of the same mechanism, certain parts thereof being omitted.

Figure 6 is a plan view of the cam for controlling this mechanism.

Figure 7 is a bottom plan view of the clock mechanism and the drive connection therefrom.

As in my application referred to above, I provide a wind-on reel 1, a wind-off or supply reel 10, sprocket feed rollers 11 which engage in suitable perforations on the edge of the record sheet 9 and suitable means, as a shaft 12, which is adapted to be connected to a moving part of the vehicle and which is suitably connected to advance the parts mentioned. The advance of the sheet 9 is not necessarily secured through the motion of the vehicle, though this is my preferred construction.

As shown herein a sliding spur gear 13 upon the shaft 12 meshes with a spur gear 13′, this motion being communicated through bevel gears 14′ to the pinion 14. This latter pinion meshes with a gear 15 which is connected through a frictional drive connection (not shown) to the reel 1. Motion is imparted through the shaft carrying the gear 15 to a spiral gear 16 which in turn drives a spiral gear 17 to advance the sprocket 11 which is secured upon the same shaft. A frictional drag is placed upon the reel 10. All this is old in the art, and I have therefore not shown it in detail.

Also as shown in my previous application a governor ball 2 is secured to rotate with the shaft 12 and is suitably connected to a sleeve 20 which is slidable axially of the shaft and which rotates therewith. The lower portion of the sleeve 20 may carry the gear 13. The upper portion 21 of this sleeve is provided with circular rack teeth which mesh with a pinion 22 to rotate or oscillate

the shaft 23 upon which the pinion 22 is secured, and thus through a pinion 24 which meshes with a segment 25, to control the movement of the speed marker 26. The latter is secured upon one arm of a lever pivoted at 27 in the casing, the other arm of which carries the segment 25. The position of the governor ring 2, as determined by the speed of rotation of the shaft 12, controls the position of the marker 26 transversely of the record sheet 9.

According to my present invention I secure a clock mechanism, which is designated by the numeral 3, within the casing C. This may well be provided with a dial 30 which is visible to the vehicle's driver. There is also a disk 31, best seen in Figure 7, which is rotatable by the clock mechanism, it requiring two hours to complete one rotation of this disk. A half-segment gear 32 forms a part of the disk 31 and this segment is arranged to mesh alternately with the oppositely positioned bevel pinions 33 and 33′ both secured upon the shaft 34. Thus as the segment gear 32 passes from mesh with the pinion 33 it will immediately engage the pinion 33′ and the direction of rotation of the shaft 34 will thereby be reversed. However, I do not desire to limit myself to this particular automatic reversing means, as any other suitable means may be employed.

Upon the shaft 34 is secured a worm pinion 35 which meshes with a worm quadrant 36 forming the upper end of a lever 37 pivoted at 27. The opposite end of the lever 37 is formed as a marker 38 normally bearing upon the record sheet 9. The pivot of the lever 37 is adapted to permit slight rocking of the lever in a plane normal to the plane of swing of the lever only, but the marker 38 is held in its normal position against the record sheet 9 by means of a light spring 39, as shown in Figure 2.

As the disk 31 rotates in a single direction under the influence of the clock mechanism 3, the direction of rotation of the shaft 34 will be reversed periodically. The amount of rotation of this shaft is so designed that it will cause the marker 38 to sweep against the record sheet 9 a predetermined distance. The sheet is shown as provided with lines 91 extending in the direction of its travel, the space between these lines representing the distance covered by the marker 38 during five minutes. Each of the lines 91 may also correspond to the distance traveled by the marker 26 in recording an increment or decrement of five miles per hour in the speed of the vehicle. If it is desired to indicate more than sixty miles per hour the additional space may be equally divided and added to the two sides of the 0 and 60-minute lines.

I provide means which are controlled by the vehicle's movement and which will suspend the action of the time marker 38 during periods when the vehicle is motionless. This mechanism includes a lever 40 which is arranged to be contacted by a flange 28 upon the sleeve 20 when the sleeve reaches its rest position. A second lever 41 is pivoted upon the same pivot 42 as is the lever 40. Telescoping members 43, one each of which is secured to the levers 40 and 41, respectively, are normally drawn together up to a set limit by a tension spring 44. Motion of the compound bell-crank lever 40—41 initiated by the flange 28 is communicated through a link 45 to a lever 46. This lever 46 is pivoted by one end upon the casing C and at its other end carries a contact roller 47 which bears against the face of the segment 36. A spring 48 normally tends to hold the roller 47 away from the segment 36 to enable the lever 37 which carries the segment to remain in its normal position with the marker 38 against the record sheet. The spring 48, however, is ovecome by the action of the flange 28 against the lever 40. Stops 49 limit the movement of the link 45 in either direction and if the tendency of the flange 28 is to move the link 40 downward farther than the appropriate stop 49 would permit, movement of the telescoping members 43 in opposition to the spring 44 will permit such overtravel.

It should be noted that movement of the lever 46 to raise the marker 38 from the record sheet is not sufficient to disengage the worm pinion 35 from the segment 36. This is shown in dot-and-dash lines in Figure 2. Consequently, while the clock mechanism 3 continues to operate the marker 38 will sweep from side to side across the sheet 9 irrespective of whether or not it is in contact with the sheet. Thus the time record will only be made during the time the vehicle is in motion, inasmuch as the movement of the lever 46 is controlled through the movement of the vehicle.

It may be found desirable to mark upon the record sheet an indication of the hour and of the day. I have shown mechanism in Figures 3, 4, and 5 for accomplishing this result. The markers 5 will perforate in the edge of the sheet 9 the hour of the day, night time and day time being distinguished in some manner, as by marking the day time hours in Arabic numerals and the night time hours in Roman numerals, and the dial 30 being figured correspondingly. The markers 6 will perforate likewise upon the sheet the day of the week or they may be arranged to perforate the date of the month. These are shown as arranged to mark at the change from one day to another, at midnight, instead of the numeral 12.

Two sets of markers 5 are provided for convenience, one set marking the odd hours

at one side of the sheet and the other set marking the even hours at the opposite side thereof: Preferably the marking is done at the side of the sheet opposite that occupied by the marker 38, although this is not essential. Each set of markers is carried by a rotatable carrier 50 in the periphery of which is pivoted a lever 51. Springs 52 are interposed between the carrier 50 and the various levers 51, tending to move the levers downward as shown in Figures 3 and 4. The marker 5 is carried upon the outer end of a spring arm 53 supported upon one arm of the lever 51. A flange 54 carried by the carrier 50 limits the downward throw of the lever 51 under the influence of the spring 52 in such way that the markers 5 are normally supported in a common plane just above the plane of the record sheet 9.

A cam 7 surrounds the shaft 55 upon which the carrier 50 is secured but is not rotatable. Normally it is supported in position to engage the lower ends of the levers 51 by suitable means, such as the link 71 guided by the link 72 and the guide 73. The cam 7 is provided with a gradual rise at 74 which terminates abruptly. As the levers 51 ride up the rise 74, the markers 5 are raised considerably above their normal plane, and the tension upon the spring 52 is increased. As the lever drops at the termination of the rise 74, the spring 52 throws the lever 51 downward and the spring 53 permits sufficient overtravel of the marker 5 to cause it to perforate the sheet 9. The spring arm 53 then reacts and raises the marker 5 to its normal position above the sheet.

The cam 7 is adapted to be disengaged from the levers 51 by movement axially of the shaft 55, when the vehicle ceases its advance. The link 71 which controls the position of the cam 7 is normally held in position so that the cam 7 engages the levers 51 by means of the compression spring 75. A lever 76, one arm of which forms a yoke engaging a collar upon the link 71 at each side of the casing, is engaged by a collar 77 upon the sliding shaft 78. The position of this shaft 78 is controlled through links 78′ by a flange 79 loosely mounted upon the shaft 12 and engageable by a flange 29 when the governor 2 nearly reaches its rest position. A spring 77′ maintains the flange 79 normally raised when not opposed by the governor-controlled flange 29. The shaft 55 is driven at a constant rate of speed from the clock mechanism 3 through the shafts 56 and 57, the latter carrying a bevel gear 58 which meshes with a bevel gear 37 carried by the rotating disk 31. Inasmuch as the cam 7 must be shifted axially of the shaft 55 to engage it with the levers 51, the upper surface 74′ of the rise 74 is inclined as shown in Figure 4.

The day marker is supported by one of the carriers 50 similarly to the hour markers 5. A lever 61 is pivoted at 60 upon the carrier. A spring 62 corresponding to the spring 52 is employed to accentuate the marking movement of the marker 6. A spring arm 63 supports the outer end of the marking mechanism, in this case comprising a sprocket wheel 64 over which and a sprocket 65 journaled in the lever 61, a chain 66 passes, this chain carrying the individual markers 6. A bevel gear 67 meshes with a second bevel gear 68 which is supported independently of the lever 61, as from the carrier 50. Upon the same shaft as the gear 68 is secured a star wheel 69 of a Geneva stop mechanism. The cooperating member 69′ is non-rotatively secured about the shaft 55. The pin 68′ is in position to be contacted by the star wheel 69 as the latter rotates bodily about the fixed wheel 69′. As the shaft 55 completes one revolution in twenty-four hours the wheel 69 will contact with the pin 68′ once in that period and the movement imparted to the wheel 69 will be sufficient to advance the next day marker 6 into position to be recorded upon the sheet 9. This action takes place sometime in advance of the actual marking. The marking action is controlled by the action of the lever 61 and cam 74, as has been described for the hour markings.

As the vehicle commences its advance the speed marker 26 moves from the zero line to the right, as shown in Figure 1, and marks upon the sheet 9 a graph indicating the rate of speed at which the vehicle travels. The forward motion of the vehicle is communicated to the cam 7 causing it to be raised to contact with the levers 51 and 61, this result being achieved through the rising of the flange 29 from the flange 79 and the consequent reaction of springs 77′ and 75, which have been compressed. This positioning of the cam in operative position causes the various markers 5, which rotate continuously under the influence of clock 3, to be actuated as their carrying levers 51 drop from the rise 74 to perforate the edge of the sheet 9, as has been described.

The beginning of the forward motion of the vehicle has likewise raised the flange 28 from the compound bell crank lever 40—41 and this has permitted movement of the lever 46 under the influence of the spring 48, whereby the time marking lever 37 is moved into a vertical plane and the marker 38 again contacts with the record sheet 9. This marker 38, during the inaction of the car, has been regularly swept across, but raised from, the face of the record sheet, the sheet however not having been moved. In consequence a break will appear in the time graph 92, the extent of the break indicating the time during which the vehicle

was idle if this was of short duration. If the period of idleness was of considerable duration it will be necessary to refer to the last figure stamped upon the edge of the sheet to determine how long it had been idle. By reference to the stamped figures, however, and to the time graph, it will be readily apparent how long the vehicle has stood still.

The time graph 92 should be of a different color than the speed graph 93. The speed graph is apparently continuous, for each new trip is recorded immediately following the preceding trip record, inasmuch as the sheet does not move while the vehicle is motionless. No space is wasted, therefore. The time graph, however, will appear broken due to the reasons mentioned above. In Figure 1 the graphs should be read to indicate that prior to 9 o'clock the vehicle made a sustained run, this ending about 8:40. The vehicle was then motionless for a short time and began to advance at about two minutes of nine, and gained speed rapidly until at 9:10 it was running at a sustained speed of twenty three miles per hour. In some degree the steepness of the time graph 92 can indicate the rate of speed at which the vehicle traveled, for if the sheet 9 is caused to move more rapidly owing to a more rapid movement of the vehicle, the time graph will more nearly approach a vertical line. This, however, is an uncertain indication and this information is best determined by an inspection of the speed graph 93.

It may be desirable at times to provide an indicator 8 carrying the names of the days of the week, and operated from the clock mechanism. A striker 85 on shaft 55 strikes a star wheel 81 once each revolution, which takes twenty-four hours. The motion of this star wheel 81 is communicated through suitable gearing 82 to the rotatable indicator cylinder 8. By comparing the day indicated upon the cylinder 8 with the day last stamped upon the edge of the sheet, it can be seen how long the vehicle was idle, if within the period of a week. Obviously, the striker 85 might be controlled as is the cam 7, and the indication upon the cylinder 8 would then not change while the vehicle is idle.

What I claim as my invention is:

1. In a recording speedometer, in combination, a movable record sheet controlled in its movement by motion of the vehicle, clock mechanism, a marker for tracing a line upon said sheet and controlled by said clock mechanism, and means operable to raise said marker from the sheet while the vehicle is at rest.

2. In a recording speedometer, in combination, a movable record sheet controlled in its movement by motion of the vehicle, clock mechanism, a marker for tracing a line upon said sheet and movable continuously thereacross by said clock mechanism, and means controlled by movement of the vehicle for raising said marker from the sheet while the vehicle is motionless, without interfering with the clock-controlled advance thereof.

3. In a recording speedometer, the combination with a governor, of mechanism movable thereby to advance a record sheet, of clock mechanism, a marker controlled by the clock mechanism for drawing a time graph upon the record sheet, and means operable to suspend the recording of such time graph during the inaction of the vehicle.

4. In a recording speedometer, a clock-controlled registering mechanism including a rotatable carrier, individual time-indicators angularly spaced thereupon, and a non-rotative cam engageable with said indicators to cause them to register upon a record sheet.

5. In a recording speedometer, a clock-controlled registering mechanism including a rotatable carrier, individual markers pivotally supported and angularly spaced thereupon in a common plane, a non-rotative cam engageable with said markers, and operable to raise them successively from the common plane and to release them, and yieldable means permitting their movement thereupon below the common plane and reacting to support the markers in the said plane.

6. In a recording speedometer, a clock-controlled registering mechanism including a rotatable carrier, individual markers angularly spaced thereupon, a non-rotative cam engageable with said markers to cause them to register upon a record sheet, and means for axially withdrawing said cam from engagement with the markers.

7. In a recording speedometer, a clock-controlled registering mechanism including a rotatable carrier, individual levers pivotally supported and angularly spaced upon said carrier, a marker resiliently supported from one end of each lever, a spring urging the end of each lever which carries a marker downward, means limiting the downward movement of the marker, and means for raising and releasing the marker to its spring to move it downward beyond its normal position.

8. In a recording speedometer, a clock-controlled registering mechanism including a rotatable carrier, an arm supported thereon, a plurality of markers supported on said arm, an intermittent motion device operable by the rotation of said carrier to successively advance said markers into marking position, and means for actuating said markers.

9. In a recording speedometer, a clock-controlled registering mechanism including a rotatable carrier, a lever supported therein, a pair of sprocket wheels spaced upon said lever and a chain passing thereover, a plurality of markers carried by said chain, an intermittent motion device operable by the rotation of said carrier to successively advance said chain and sprockets to bring the next marker into marking position, and timing means for actuating said markers.

10. In a recording speedometer, in combination with a movable record sheet and with clock mechanism, a pivoted marker for marking time data upon said sheet, the pivot thereof allowing oscillation of the marker in the plane of the pivot, a lever engaging the marker, a member controlled by the motion of the vehicle, and a yieldable connection between said member and said lever.

Signed at Raymond, Pacific County, Washington this 2nd day of March 1922.

MATT WILLIAM KOSKI.