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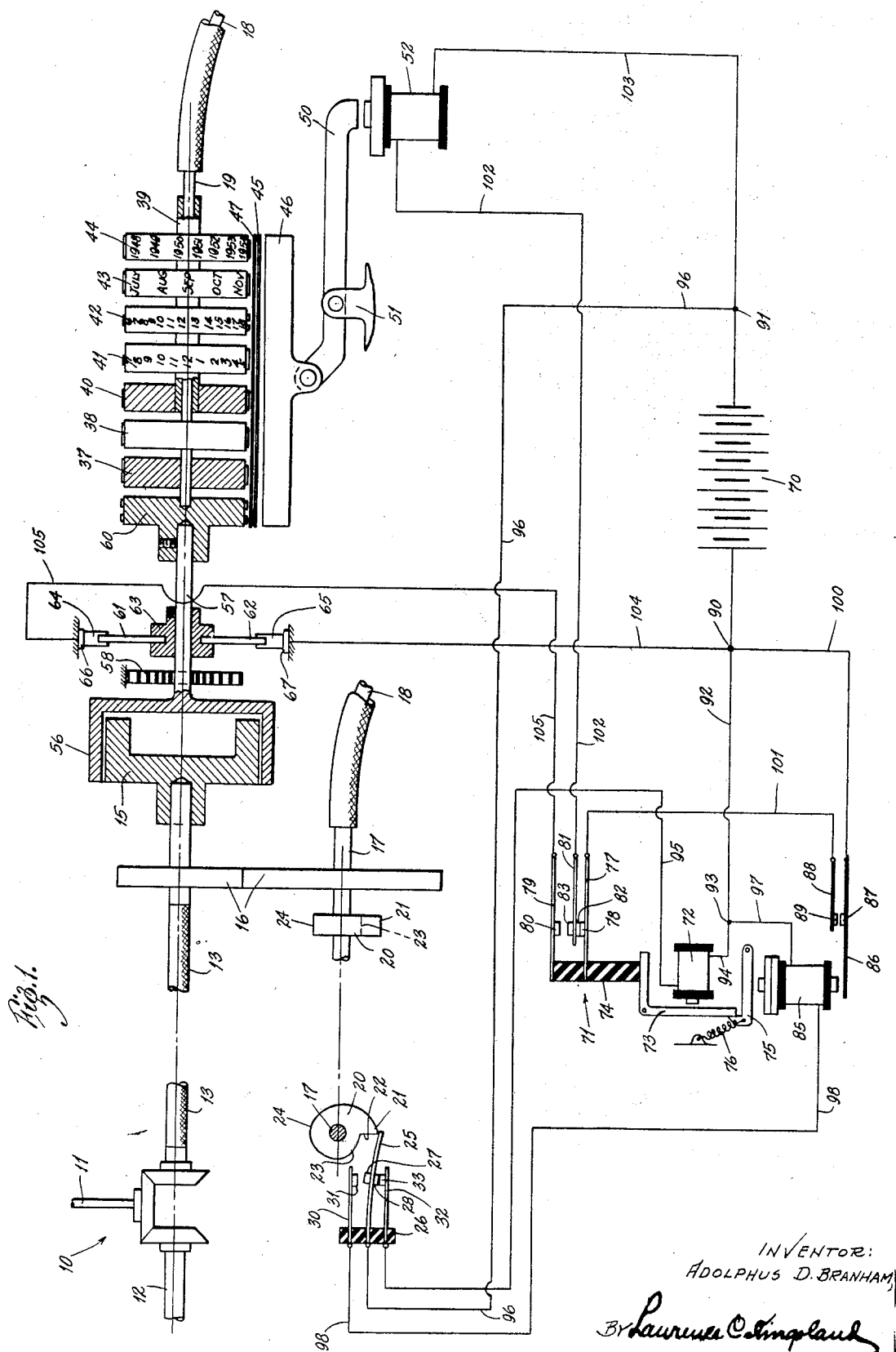
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RECORDING MECHANISM

Filed April 10, 1940

2 Sheets-Sheet 1



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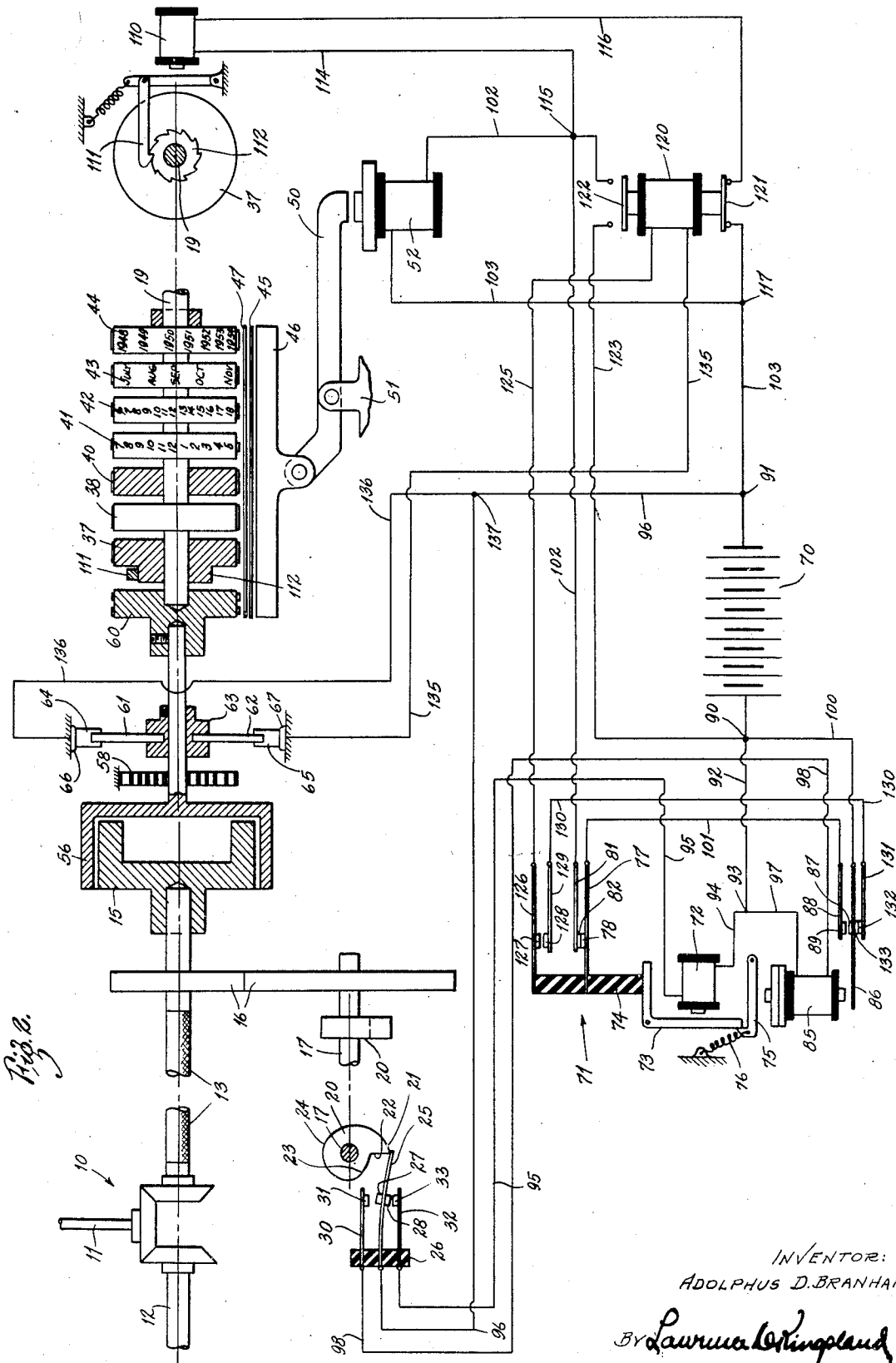
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RECORDING MECHANISM

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10 Claims. (Cl. 234-1.5)

The present invention relates to a recording mechanism, and more particularly to a mechanism for making periodic registrations and records of speeds, mileages, dates, and times on moving vehicles.

It is an object of the invention to provide such a recording mechanism in which the possibility of draining the battery is prevented.

A further object of the invention is to provide such a mechanism wherein periodical registrations are made at given intervals.

A further object of the invention is to provide such a mechanism wherein part of the transmission means includes a switch responsive to changes in a mileage device, together with remotely disposed registers of such mileage changes.

Further objects include a provision of a mechanism to cause registration at any time a predetermined speed is exceeded.

In the drawings:

Fig. 1 is a diagrammatical view of one type of mechanism; and,

Fig. 2 is a diagrammatical view of a similar mechanism, but with a different means for transmitting movement of the mileage indicator to the register.

Referring to Fig. 1, there is shown a speedometer coupling 10 having a cable 11 by means of which it is driven from a suitable part of the vehicle (not shown), a connection 12 into the usual speedometer head, and a connection 13 that leads to the present instrument.

On the remote end of the connection 13 is secured a magnet 15 which is rotated. Adjacent the magnet there is a gear train 16 with the proper number and size of gears to drive a shaft 17 at one revolution for every mile, or other desirable distance. A flexible shaft 18 leads to the register shaft 19.

Secured to the shaft 17 adjacent the gear train is a cam 20 of nonconducting material. This cam has a peak 21 thereon followed by a precipitate drop portion 22 leading to a surface 23 radially inward from the normal cam edge 24. A flexible blade 25 is normally urged at its free end toward the shaft 17. The other end is secured in an insulating block 26. The blade 25 is a conductor and intermediate the two ends has contacts 27 and 28 on opposite sides thereof.

Also secured to the insulating block 26 is a switch blade 30 having a contact 31. There is, further, a lower switch blade 32 secured to the block 26, which lower blade has a contact 33. During a major part of a revolution of the cam

20, the blade 25 rides on the normal edge 24 of the cam 20, in which position it is between the contacts 31 and 33. The peak 21 on the cam displaces the blade 25 so that the contact 28 touches the contact 33. After passage of this peak 21 from the blade, it drops until it may contact inward edge 23, in which position the contacts 27 and 31 are together.

On the register shaft 19, there is mounted a drum 37 indicating distances. A second drum 38 likewise indicates distances that are proportional to those indicated by the drum 37, the connection being any one of those familiar in odometer practice, and hence not shown. There is also a hollow time shaft 39 driving a minute drum 40 and directly or indirectly therefrom an hour drum 41, a day drum 42, a month drum 43, and a year drum 44. The particular details by means of which these several drums are driven form no part of the present invention other than as described. There are many familiar ways of producing proper operation of them.

The several drums have indicia upon their surfaces for printing purposes. Beneath the drums, there is a printing sheet 45 fed along by suitable mechanism which, again, forms no part of the present invention. Such a driving mechanism is shown in copending application Serial No. 101,200, filed September 17, 1936. A platen 46 moves upwardly to force the paper against the drums, a printing ribbon 47 being between the paper and the drums.

The platen is driven by a lever 50 pivoted to a suitable base 51 and actuated by a relatively slow magnet 52.

Returning to the speedometer mechanism, around the magnet 15 there is a cup 56 attached to a shaft 57 supported in any suitable type of bearings (not shown). The speed of the magnet 15 is proportional to the speed of the vehicle. The cup 56 will be urged to follow the magnet 15, the force of the pull being proportional to the speed of rotation of the magnet. This force is exerted against a hair spring 58 biasing the cup toward a starting or zero position, as is familiar in speedometer practice.

To the outer end of the shaft 57 is secured a speed-indicating drum 60 that is superposed over the platen 46. The proper speed will be shown on the indicia at the bottom of the drum 60.

Also on the shaft are two arms 61 and 62 extending from a hub 63 secured to the shaft, and having spring contact brushes 64 and 65 at their respective ends. These arms rotate with the shaft and at a suitable point make contact between two

switch contact members 86 and 87 attached to a suitable base. This contact is normally made at a speed slightly above a given desired maximum speed, and is broken at a speed slightly further. Thus, if 50 M. P. H. is the maximum, the contacts may close at 52 and break again at 54. At subsequent reduction of speed, they may make at 53 and break at 51.

There is provided a battery 70. A lock-up switch 71 normally urged downward is actuated by a magnet 72 acting on a bell crank lever 73 that lifts an insulating member 74 of the switch upon energization of the magnet. A latching lever 75 is urged upwardly by a spring 76 so that it engages the lever 73 with the switch 71 in upper position to hold the switch 71 in upper or locked position.

The switch 71 includes a spring blade 77 having a contact 78. It also includes a spring blade 79 having a contact 80. Between the blades 77 and 79 is an intermediate spring blade 81 having opposite contacts 82 and 83 selectively engageable with the contacts 78 and 80, respectively.

The latching lever 75 is under control of a magnet 85 having a delayed action at the top thereof upon the latching lever. It has a rapid action at the bottom on a spring switch lever 86 having a contact 87 and cooperating with a corresponding switch blade 88 having a contact 89.

The battery 70 has terminals 90 and 91. From the terminal 90 a lead 92 extends to a point 93, whence it branches at 94 through the magnet 72. From the magnet 72 a lead 95 extends to the switch blade 32 on the speedometer switch. From the middle blade 25 of the speedometer switch a lead 96 returns to the other terminal 91 of the battery.

Returning to the junction point 93, the other branch 97 extends to the magnet 85; thence a lead 98 passes to the upper blade 30 of the odometer switch.

Also from the terminal 90 of the battery, a lead 100 extends to the blade 88. From the blade 88 a lead 101 extends on the blade 77 of the switch 71. From the blade 81 of the switch 71, a lead 102 extends to the printing magnet 52 from which the lead 103 returns to the battery terminal 91.

Further, from the terminal 90 of the battery a lead 104 extends to the switch contact 87. From the other switch contact 86 the lead 105 extends to the upper blade 79 of the switch 71.

In the operation of Fig. 1, the mechanism is installed upon a vehicle so that the speedometer connection 11 rotates in proportion to the forward motion of the vehicle. The speed of the connection 11 and the connection 13 is also proportional to the speed of the vehicle. This rotation of the connection 13 causes the magnet 15 to displace the cup 56 against force of the spring 58, and with it the drum 66, a distance corresponding to that speed. It also causes rotation of the countershaft 17 and with it the flexible shaft 18 and the mileage drums 37 and 38 on the register. The time and date drums are also operated by a suitable mechanism, so that the proper minute, hour, day, month and year will appear at the bottom of these several drums alongside the distance indications on the bottom of the drums 37 and 38, and the speed indication on the bottom of the drum 66.

Just before completing the passage of a given distance, such as a mile, the cam peak 21 will

displace the blade 25 and close contacts 28 and 33. (Preferably the cam actions require much smaller angular movements of the cam than are, for clarity, shown.) This will cause a circuit from the terminal 90 as follows: lead 92, junction 93, lead 94, coil 72, lead 95, blade 32, contact 33, contact 28, blade 25, lead 96 to the terminal 91. This energization of the coil 72 draws the bell crank lever 73, lifts the switch 71, and in so doing opens contacts 80 and 83 and closes contacts 78 and 82. The latching lever 75 then engages the lever 73 to hold the switch 71 up.

A short time later the blade 25 will drop down the precipitous edge 22 of the cam 20, parting the contacts 28 and 33 and closing the contacts 27 and 31. This breaks the circuit of the magnet 72, but the switch 71 is held closed by the latching lever 75. A circuit is then formed from the terminal 90 of the battery as follows: lead 92, junction 93, lead 97, magnet 85, lead 98, blade 30, contact 31, contact 27, blade 25, lead 96 to the terminal 91. This action quickly closes the contacts 87 and 89, and slowly withdraws the latching lever 75. Prior to withdrawal of the latching lever, therefore, a circuit is closed from the terminal 90 as follows: lead 100, blade 88, contact 87, contact 89, blade 88, lead 101, blade 77, contact 78, contact 82, blade 81, line 102, coil 52 and lead 103 to the terminal 91. The coil 52, being thus energized, will lift the platen 46 to cause a record to be made prior to the time its circuit is broken by lowering of the switch 71.

In the event the speed of the vehicle reaches a certain critical rate, such as the aforesaid fifty-two miles per hour, the arms 61 and 62 will close with the spring switch contacts 66 and 67. This will close the circuit, provided the normal printing operation is not in progress, as follows: battery terminal 90, lead 104, contact 87, arm 62, hub 63, arm 61, contact 66, lead 105, switch blade 79, contact 86, contact 83, blade 81, lead 102, coil 52 and lead 103 to the terminal 91. Since the switch 71 is in its upper position at all times during the normal printing operation, the emergency excess speed record cannot be made except when the speed is exceeded between the normal printing operations. The speed is always recorded during the normal recording so that it is unnecessary to have the emergency speed recording mechanism operate at the time the normal recording operation takes place.

If the vehicle continues to accelerate, the speed switch will reopen, releasing the platen, having recorded the time and distance the excessive speed began. Upon subsequent deceleration, passing the critical range, an additional recording will take place of that event. Should a normal print occur after acceleration to excess speed, and prior to deceleration to normal, a record will be made, showing the actual speed at that time.

If the vehicle should stop when either the coil 85 or the coil 72 is being energized, only a very small amount of power would be drained from the battery because of the high resistance of these coils. The printing coil 51 is a high powered coil, but it cannot remain in circuit because it is only in circuit during the interval between the energization of the coil 85 and the release of the latching member 75.

The modification of Fig. 2 is the same as that of Fig. 1, save for changes occasioned by the substitution of a magnet relay advance for the distance shaft 18 of the register. In this type of mechanism, the lock-up switch 71 is operated in the same manner by a coil 72 energized from the

cam 20. The release coil 85 is operated in the same manner also. However, there is provided a coil 110 operating a ratchet dog 111 shifting the ratchet wheel 112 that is part of or attached to the drum 37. The coil 110 is connected in parallel with the printing magnet coil 52. It has a lead 114 that joins the lead 102 at a junction 115 and a lead 116 that joins the lead 103 at a junction 117. Thus, every time the odometer mechanism moves a predetermined distance, the coil 110 will be energized to advance the drum 37 a distance to register the proper distance the vehicle has traveled.

This operation, however, requires some change in the emergency speed record mechanism, because otherwise the intermediate speed recordings requiring energization of the printing coil 52 would also cause energization of the coil 110 connected in parallel therewith, with improper advancement of the distance drums 37 and 38. Therefore, mechanism is provided to maintain out of circuit the coil 110 whenever the coil 52 is energized by the emergency speed recording mechanism.

To this end a relay 120 operates a switch 121 which, in one position, closes the line 116 and the coil 110 and, in the other position, opens the same. The coil 120 also operates the switch 122 which, upon energization of the coil, closes a line 123 extending from the terminal 90 to the junction 115.

The coil 120 itself is connected by a lead 125 to an upper blade 126 of the switch 71, which blade has a contact 127 adapted to cooperate with a contact 128 on another blade 129 on the same switch 71. From the blade 129 extends a lead 130 to a lower blade 131 having a contact 132 adapted to engage with the contact 133 opposite the contact 87 on the blade 86.

The coil 120 also has a lead 135 extending to the contact 87 on the emergency excess speed switch. A lead 136 extends from the contact 84 to the junction 137 of the line 96.

The operation of the mechanism of Fig. 2 is as follows:

The speedometer cam 80 causes the locking coil 72 to be energized to lift the switch 71 in the same manner as in the previous type. Likewise, the cam later causes the coil 85 to effect printing by a circuit from the terminal 90, lead 100, blade 86, contact 87, contact 88, blade 88, lead 101, blade 77, contact 78, contact 82, blade 81, line 102, coil 52 and line 103 to terminal 91. It will be seen that the junctions 115 and 117 are directly across the leads to the magnet 52. Therefore, upon energization of the magnet 52, the magnet 110 is energized as follows: junction 115, lead 114, magnet 110, lead 116, switch 121 and terminal 117. Each normal printing cycle will thus register speed, distance, time and date and, in so doing, will advance the distance register one unit of distance. The coil 110 acts to advance the mileage indicator prior to the time the slower coil 52 can lift the platen to print, thus presenting the proper mileage indication in the printing position on the drums 37 and 38.

Upon occurrence of excess speed at a time when the normal recording mechanism is not at work, the circuit will be closed as follows: terminal 90, lead 100, blade 86, which is in its lower position, contact 133, contact 132, blade 131, lead 130, blade 129, contact 128, contact 127, which is down because the switch 71 is down, blade 126, lead 125, coil 120, lead 135, contact 87, arm 82, hub 83, arm 61, contact 86, lead 136, junction 137,

lead 96 and terminal 91. This energizes the coil 120 and opens the switch 121, breaking the circuit to the coil 110. It simultaneously closes the switch 122 and establishes a circuit from the terminal 90, lead 123, switch 122, junction 115, lead 102, coil 52, lead 103, terminal 117 and the balance of lead 103 to the terminal 91, thus energizing the printing coil and causing printing of this excess speed together with the time at which it occurred.

It will be observed that this emergency speed recording cannot occur when the normal recording is taking place, since the circuit is broken at the blade 86 and at the switch 71.

This modification also records accelerations to speeds in excess of a given rate, and registers subsequent decelerations to the normal rate. The modification has the added advantage that the speedometer switch carries only a low current, since it is not in series with the printing magnet.

In the mechanism, the speedometer mechanism 15, 56, which constitutes a magnetic motor, can be made as powerful as necessary for the operations desired.

What is claimed is:

1. In a mechanism of the kind described, a distance registering device and a speed registering device, a recording means cooperable therewith to make a record of the registrations thereof, means to actuate the recording means, means to operate the actuating means at predetermined intervals of distance, emergency means to operate the actuating means upon occurrence of excess speed, and means rendering the emergency operating means inoperative during operation of the normal operating means.

2. In a mechanism of the kind described for use on vehicles, a recording means, means including an electrical device for actuating the recording means, a circuit for said electrical device, a first and a second control for the circuit, means actuating the controls successively at predetermined intervals of distance traveled by the vehicle, the first control being adapted to preset the circuit in part for actuation of the electrical device, and the second control adapted to complete the circuit for actuation of the electrical device and thereafter to open the circuit, whereby the circuit is energized for only a limited interval, regardless of the positions of the controls.

3. In a mechanism of the kind described for use on a vehicle, a registration means including means adapted to be moved to register distance traveled of the vehicle, electrically operated means to make a record of the registrations, means operated in accordance with distance traveled by the vehicle, electrical means to translate the movement thereof into movement of the registration means, said translating electrical means being energized upon energization of the electrically operated recording means, and the electrically operated means to make a record being of a type operating with a time delay after energization relative to operation of the movement-translating electrical means, whereby the latter will complete its operation on the registration means prior to the recording.

4. In a mechanism of the kind described for use on a vehicle, means movable at a speed proportional to the speed of the vehicle and also movable proportionally to the distance traveled by the vehicle, including a member cyclically movable in said manner, a pair of switches adapted to be closed successively by the said member during its cycle, the first being opened

upon closure of the second, and both being opened during a major part of the cycle of operation of said member, a recording means, electrical means for operating the recording means, a circuit for the electrical means, a third switch, means to close the third switch, energized upon closing of the first switch, to preset the circuit for operation, a fourth switch, means adapted subsequently to close the fourth switch, energized upon closure of the second switch, and adapted to complete the circuit, and said means actuated upon closure of the second switch being adapted to release the third switch at a predetermined interval after closing of the fourth, whereby the circuit to the electrical means cannot remain closed to drain power from the source of energy in the circuit.

5. In a mechanism of the kind described for use on a vehicle, means movable at a speed proportional to the speed of the vehicle and also movable proportionally to the distance travelled by the vehicle, including a member cyclically movable in said manner, a first switch adapted to be closed by said member once each cycle, a second switch adapted to be closed once each cycle, after closure of the first, a registration means operated by said movable means, recording means associated with the registration means, electrically operated means for operating the recording means, a circuit for the electrically operated means, a first relay including a first relay switch in said circuit and said relay being actuated upon closing of the first switch, latch means holding said first relay switch closed, a second relay including a second relay switch in the circuit and energized upon closure of the second switch, said second relay releasing the latch means after the second relay switch has been closed an interval, the electrically operated means being in a completed circuit by closure of the two relay switches during such interval.

6. In a mechanism of the kind described, a normally open first switch, a relay coil for closing the first switch, a second switch, a coil for closing the second switch, means to energize and deenergize the two coils in the order named, means to hold the first switch closed after its coil is deenergized, and said second coil being adapted to close its switch and at a later time to release the holding means for the first switch, and a circuit including both switches closed.

7. In a mechanism of the kind described, a

recording means, electrical means to operate the same to make a record, means to energize the electrical means at predetermined intervals to make routine records, means responsive to abnormal conditions to energize the electrical means to make a record at times between the intervals, and means rendering the abnormal means inoperative to interfere with operation of the routine means.

8. In a mechanism of the kind described, a register, electrical means to operate the same to produce the proper registration, recording means, electrical means to operate the recording means to record the registration on the register, a control to cause energization of the register operating means and the operating means for the recording means at intervals of normal change for the register, and means to render the register inoperative and to operate the recording operating means to obtain a record between such normal intervals.

9. In a mechanism of the kind described, a moving means, a member operated thereby in a cycle, a first switch adapted to be closed thereby once each cycle, a second switch adapted to be closed once each cycle after closure of the first, a device to be operated by the moving means, recording means associated with said device, electrical means for operating the recording means, a circuit for the electrical means, a first relay having a relay switch in said circuit and said relay being actuated upon closing of the first switch, latch means holding said first relay switch closed, a second relay having a relay switch in the circuit and said second relay energized upon closure of the second switch, said second relay being adapted to cause releasing of the latch means after the second relay switch has been closed an interval, the electrical means being in a completed circuit by closure of the two relay switches during such interval.

10. In a mechanism of the kind described for use on a vehicle, a registering device, a recording means cooperable with the registering device, electrical means for operating the recording means, means to actuate said electrical means at intervals of distance travelled by the vehicle, and means to deenergize the electrical means automatically after its operation regardless of the position of the means to actuate the same.

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