Jan. 21, 1941. R. A. THOMAS 2,229,397

RIBBON FEED MECHANISM FOR RECORDERS

Filed Aug. 25, 1937 2 Sheets-Sheet 1

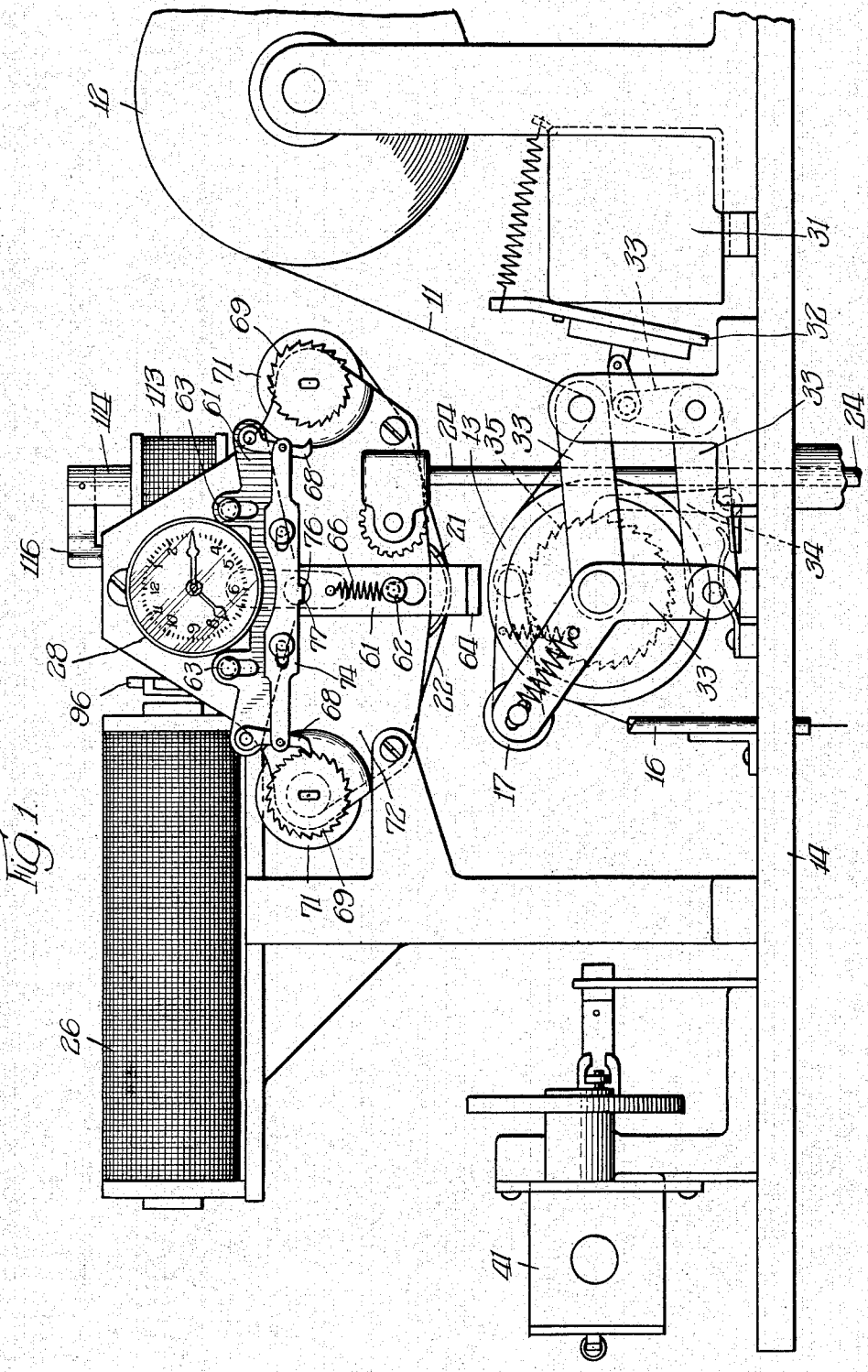


Fig. 1.

Inventor:
Robert A. Thomas,
By Jacoman & Mueller
Atty

Jan. 21, 1941. R. A. THOMAS 2,229,397

RIBBON FEED MECHANISM FOR RECORDERS

Filed Aug. 25, 1937 2 Sheets-Sheet 2

Fig. 6

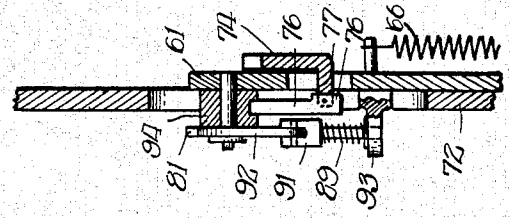


Fig. 4

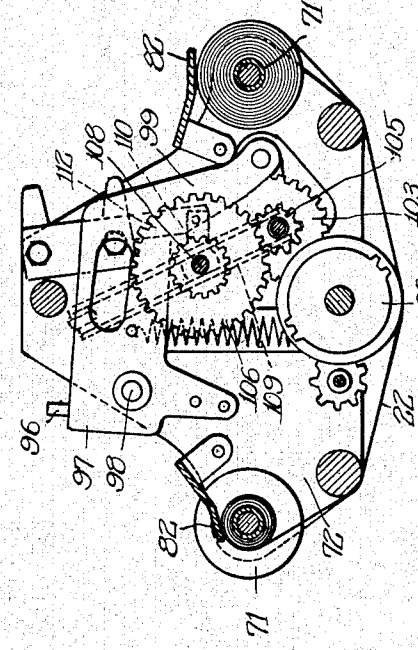


Fig. 5

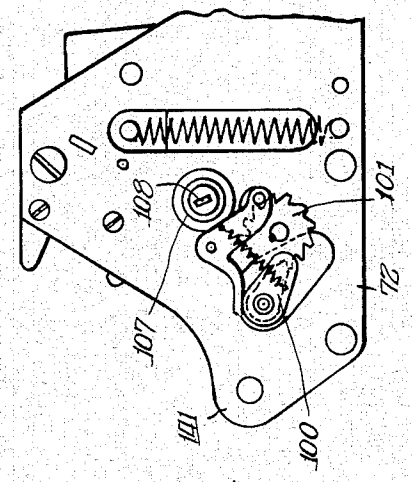


Fig. 2

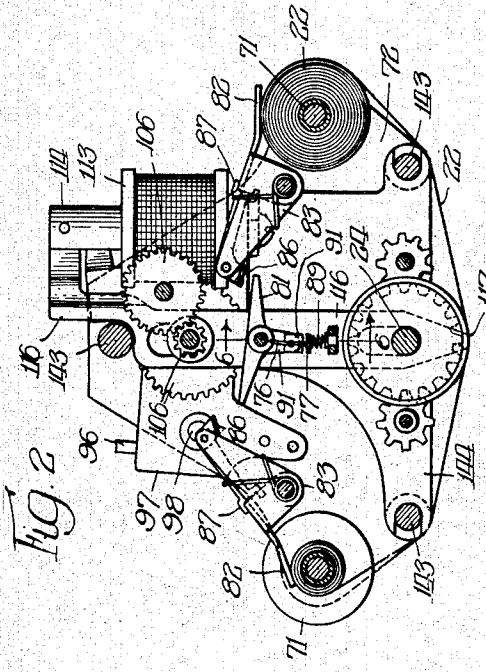
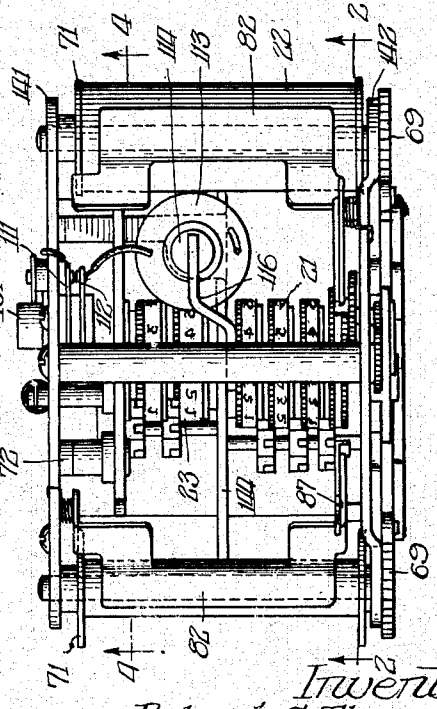


Fig. 3



Inventor:
Robert A. Thomas,
By Fooreman & Mueller
Atty.

Patented Jan. 21, 1941 2,229,397

UNITED STATES PATENT OFFICE

2,229,397

RIBBON FEED MECHANISM FOR RECORDERS

Robert A. Thomas, Lombard, Ill., assignor, by mesne assignments, to Myron D. Markley and Joseph M. Markley, Jr.

Application August 25, 1937, Serial No. 160,885

1 Claim. (Cl. 197—161)

This invention relates to vehicle recording devices and has been illustrated as embodied in a device for automatically and simultaneously printing mileage data and time data on a strip of paper to show the distance and time between stops and the length of time of stops, in order that the owner of the vehicle or the employer of its driver may be fully informed of its movements.

In the present invention a simple mechanism automatically prints the time and mileage every time the vehicle ignition system is turned on or off, in response to turning the regular ignition key. In practice, this will effectively prevent driving the vehicle without having the recording device operate. One object of the invention is to provide, in mechanism of this type, an improved ribbon feed mechanism adapted to feed automatically step-by-step in one direction and reverse for feeding in the opposite direction.

Additional objects will be apparent from the following description and from the drawings, in which:

Fig. 1 is a fragmentary elevational view of the embodiment of the invention chosen for illustration, the cover being removed for the sake of clarity.

Fig. 2 is a vertical sectional view taken approximately on the line 2—2 of Fig. 3 to illustrate especially details of the ribbon reversal mechanism hidden in Fig. 1.

Fig. 3 is a plan view of the printing unit shown in Fig. 2 and also included in Fig. 1, some parts being omitted for clarity.

Fig. 4 is a view taken approximately on the line 4—4 of Fig. 3.

Fig. 5 is a fragmentary view of the far side of the unit shown in Figs. 2 and 4.

Fig. 6 is a fragmentary sectional view on an enlarged scale taken approximately on the line 6—6 of Fig. 2.

This invention may take numerous forms, although only one has been chosen for illustration. A general view of this form is seen in Fig. 1, and a brief description of this figure will give a general understanding of the apparatus in which the invention is utilized. A strip of paper 11 is drawn off of a suitably supported roll 12 by a platen roller 13 which is actuated in a manner step-by-step and is fed through an opening in the bottom plate 14 where strips may be torn off from it as often as desired, to be preserved as a record. A guideway 16 through which the paper passes and a spring urged pressure roll 17 are desirable to insure proper feeding of the paper. A retaining cage will usually be provided to receive the paper as it is ejected and the cage may be constructed to cause the paper to roll up so that a considerable length may be accommodated.

Whenever a record is to be made on this strip of paper, the platen roll 13 is urged upwardly to press the paper against type wheels 21 or rather against the ink ribbon 22, which is in contact with the type wheels. The type wheels include both mileage wheels, to which the number 21 is applied, and the time wheels 23 behind the mileage wheels 21 in Fig. 1 but seen in Fig. 3. The mileage wheels 21 are driven by a shaft 24 which may be driven by any suitable rotating portion of the vehicle as is the shaft of an ordinary speedometer. The time wheels are driven by a magnet 26 which is energized momentarily each minute under control of a suitable clock 27, preferably so arranged that its dial is exposed to view. The mechanism for driving the time wheels and the mileage wheels is already well known in the art and need not be explained in detail except in so far as it relates to the improvements of the present invention. In printing units including time wheels it is common to provide a clock indicator 28 geared to the time wheels for indicating the time which the time wheels are set to print, the clock of course being geared to the time wheels.

The platen 13 is operated by a relatively powerful magnet 31 which actuates the armature 32 which through the linkage system 33 raises the platen roller 13 substantially without rotating it. As the platen roller subsequently drops down (when the energization of magnet 31 has ended), a pawl 34 engages ratchet wheel 35 mounted on the platen roll 13 to rotate the platen roll 13 to feed the paper 11. Thus, it is seen that the paper is fed after each recording impression.

In the present disclosure, the magnet 31 is energized and de-energized each time the ignition key is turned on or off, because recording the time and mileage at such times will in most instances give adequate record, the unit being connected directly to the ignition system of the automobile so that current cannot be supplied to said ignition without supplying it to the recorder.

To cause the relay to operate, both when the ignition is turned on and when it is turned off, I provide a control relay 41 which is in its energized position whenever the ignition circuit is turned on. This control relay 41 controls a circuit for the magnet 31 but not in any customary manner for it keeps the circuit open both when it is energized and when it is de-energized, merely closing it momentarily when it passes from one position to another, the relay moving slowly enough from one position to the other to keep the circuit closed long enough for the magnet 31 to operate.

The ribbon feed mechanism includes a generally T-shaped member 61 which is carried by and vertically slidable on pins 62 and 63. It is actuated by being struck by the platen roller 13 on its upward movement and may be provided

with a foot flange 64 for engaging this roller. The member 61, which may be called a feed plate, is drawn downwardly to its position of rest, as limited by the pins 62, 63, by a spring 66 stretched between pins 62 and a pin on the feed plate 61, as seen clearly in Fig. 1. The slot for the pin 62 is enlarged at its lower end so as to facilitate removing the feed plate 61 from this pin, but the enlargement is positioned low enough so that in normal use it will never be concentric with the pin.

Pivoted at each end of the feed plate 61 are pawls 68 one or the other of which engages a corresponding ratchet wheel 69. As seen in Fig. 1, the left-hand pawl 68 is engaging the left-hand ratchet wheel 69, and the ratchet wheel 69 turns a spool 71, both being keyed to a common shaft. A friction washer, not shown, is provided between the frame 72 of the printing unit and each ratchet wheel 69 for preventing backward movement of these members by the slight frictional force exerted by the pawl 68 in its upward movement.

The pawls 68 are selectively engaged with the ratchet wheels 69 by a control bar 74 slidably carried by the feed plate 61 for movement endwise or laterally. When the bar 74 is urged to the left (as viewed in Fig. 1), the ribbon 22 will feed from right to left; and when the bar 74 is urged to the right, the ribbon will feed from the left to right. In either case it is urged in one direction or the other resiliently by a leaf spring 76 which is straddled by a bifurcated lug 77 bent over from the control bar 74. These parts are shown in detail in Fig. 6.

Ribbon reversal

The reversing of the ribbon is accomplished primarily through the engagement of a pivoted beam 81, seen best in Fig. 2, with a pivoted gauge assembly including the gauge arms 82 running on the ribbon as it feeds from one spool 71 to the other spool. Each gauge arm 82 is carried by a plate 83 pivoted to the frame 72 and urged against the ribbon by a spring as seen in Fig. 2.

The pivoted beam 81 is carried by the vertically reciprocating feed plate 61 as seen in Fig. 6 so that it is raised by this plate on each feeding movement corresponding to each printing movement of the platen roll 13. Normally the beam 81 will reciprocate up and down with no effect but as the ribbon 22 fills one spool or the other, say the right-hand spool of Fig. 2, the plate 83 will be pivoted by the gauge arm 82 until a pivoted dog 86 carried by the plate 83 moves into the vertical path of beam 81. The end of the beam thus obstructed by the dog 86 will of course be restricted as the remainder of the beam is raised by the feed plate 61, and therefore the beam will be pivoted to the position shown in Fig. 2 with its right end lower than its left end. In case the dog 86 should ever catch underneath the beam 81, the lower edge of the beam 81 is bevelled and the dog 86 is sufficiently free to pivot so that it will easily slip out from under the beam 81. Pivotal movement of the dog 86 may be limited by its forked arm 87. The portion of dog 86 engaging beam 81 is shaped to prevent the dog from pivoting when it strikes the upper side of the beam, and the pivot point for the dog is positioned to cause the dog to pivot out from under the beam but not to pivot otherwise.

The pivoted beam 81 is held in the position to which it is moved by a compressed spring 89 (see Figs. 2 and 6) guided by a link 91 operating between downwardly extending arm 92 on the pivoted beam 81 and a slotted bracket 93 carried by the feed plate 61. The pivoted beam 81 is provided with a hub 94 which turns with the beam 81 and a leaf spring 76 in a slot at the bottom of the hub. Thus, the leaf spring 76 is urged in one direction or the other depending upon the direction to which the beam 81 is tilted and the leaf spring 76 correspondingly urges the control bar 74 in one direction or the other.

Operation of the ribbon reversal mechanism

The control bar 74 continues to be urged toward a given spool winding up the ribbon on that spool until the accumulation of ribbon on the spool raises the gauge arm 82 and pivots the plate 83 until the dog 86 is moved into the path of the pivoted beam 81 which pivots as a result of vertical movement of the feed plate 61 by which it is carried, the leaf spring 76 pivoting with it to shift the control bar 74 in the opposite direction toward the other spool to cause the ribbon to wind thereon and unwind from the first spool.

The two side plates 141 and 142 of the frame 72 are secured together by three solid spacer posts 143, the two lower of which also carry the center plate 144. As seen in Fig. 2, the center plate 144 is slotted at its ends to receive the rods 143 which are correspondingly slotted annularly after which the end plates 141 and 142 may be applied to the ends of the rods 143, the three plates thus being accurately positioned. The upper end of the center plate 144 may be bent over to form a support for the magnet 113 and continued over to the end plate 141, at which point it may be secured by a screw, thus bracing the top of the center plate 144. Prior printing units have been much more complicated requiring, for example, securing rods and in addition spacing bushings thereon. The center plate is necessary to support some of the gearing or other driving mechanism for the printing wheels.

The support means for magnet 26 and the printing unit may be considered as purely diagrammatic, since any suitable support structure may be provided.

I claim:

Printing mechanism including type wheels, a pair of ribbon holders adapted to hold an ink ribbon across said type wheels, a platen adapted to press paper against said ribbon and said type wheels, and means for advancing said ribbon including a ratchet wheel connected with each ribbon holder, a reciprocating plate actuated by said platen, a pair of pawls on said plate, a bar mounted on said plate to move laterally in opposite directions for simultaneous moving said pawls and arranged when moved in either direction to position one of said pawls in operative relation to the adjacent ratchet wheel and the other pawl in inoperative relation to the adjacent ratchet wheel, resilient means for biasing said bar in each direction, and means for reversing the bias of said resilient means comprising a beam pivoted to said reciprocating plate and operatively connected to said bar and gauge means arranged to move into the path of movement of the beam to swing it about its pivot to move said bar from one position to its other position, whereby the ribbon feed is reversed.

ROBERT A. THOMAS.