Feb. 16, 1960 R. A. DULL 2,925,311

LAPSED TIME RECORDER

Filed Dec. 10, 1954 2 Sheets-Sheet 1

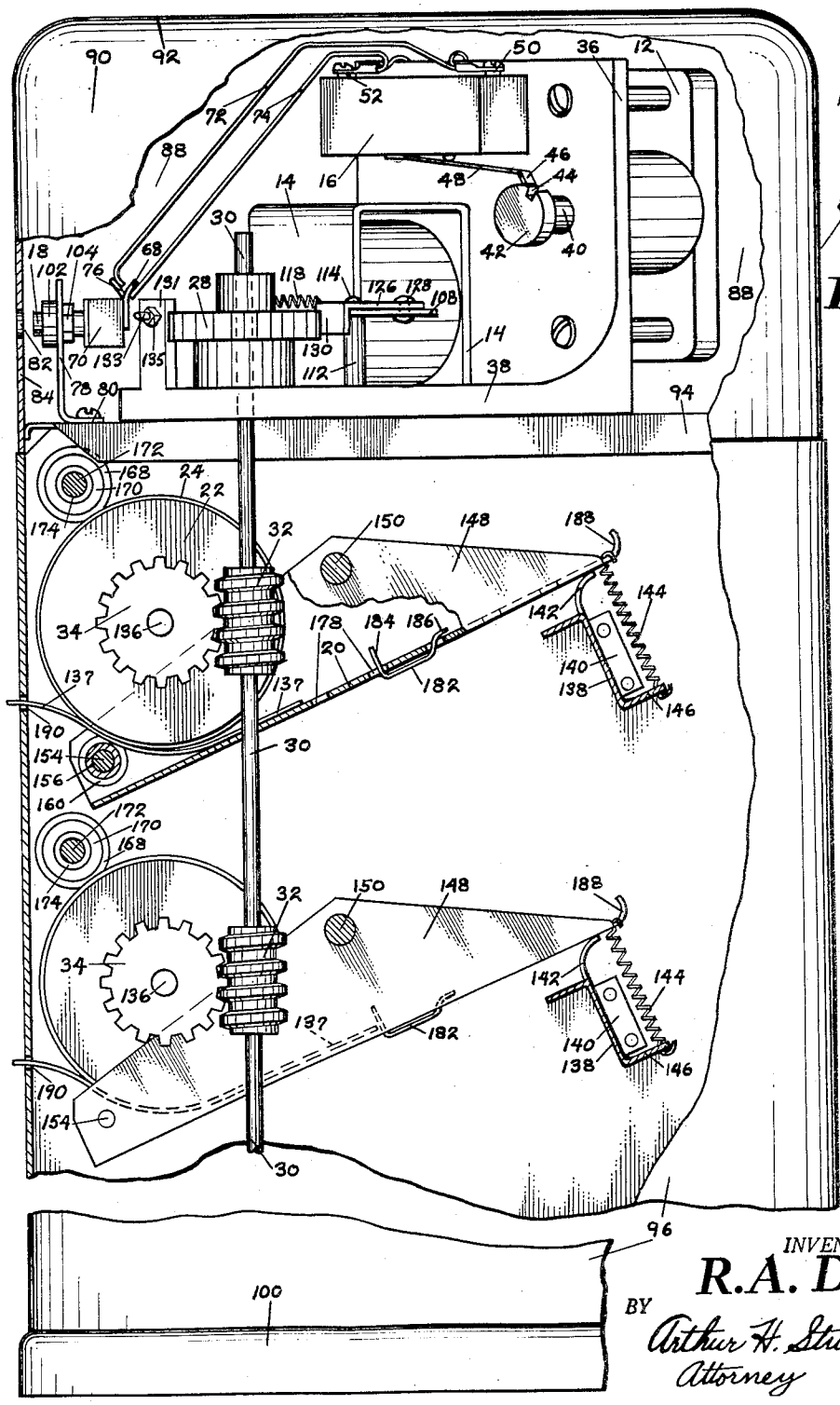


Fig. 1

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Fig. 2.

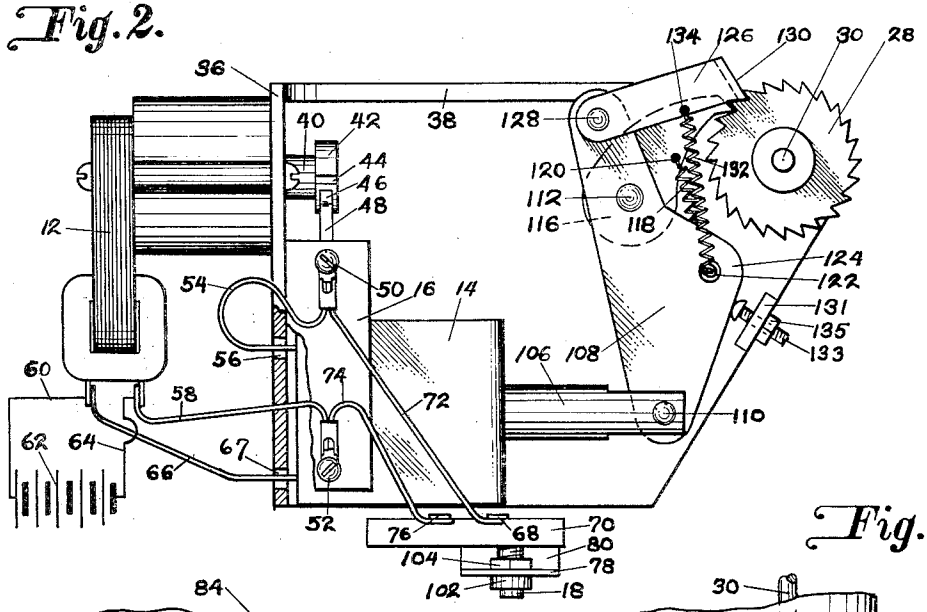
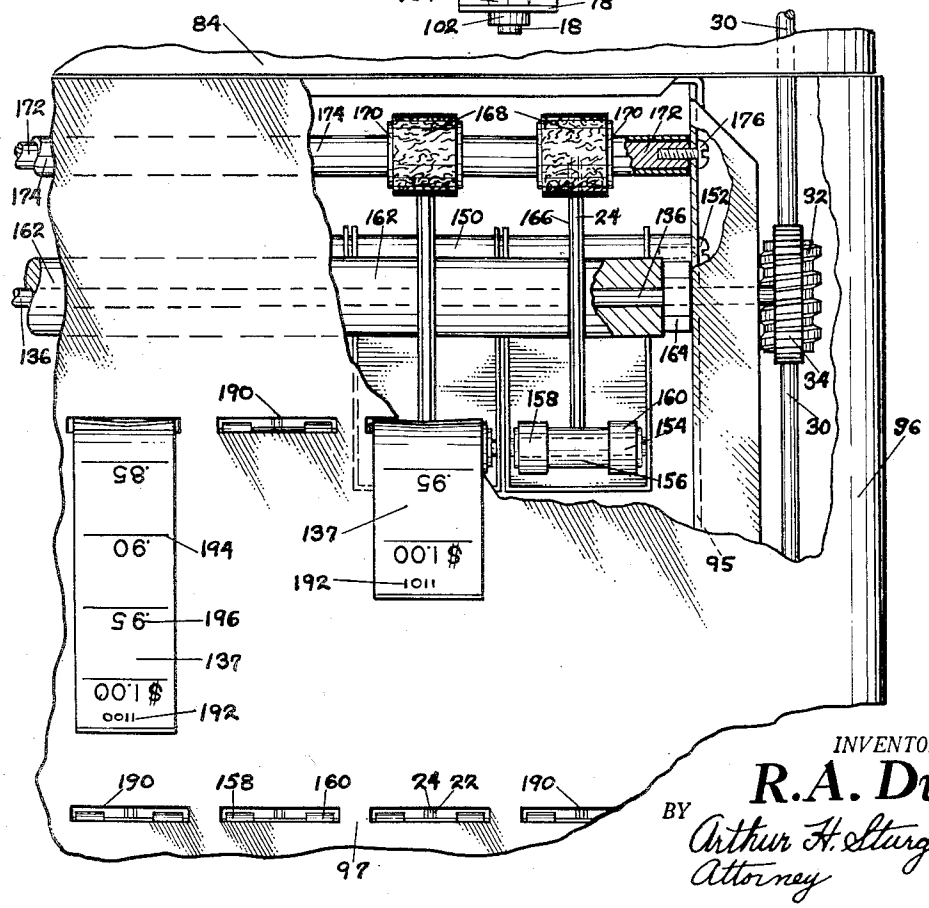


Fig. 3.



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United States Patent Office 2,925,311 Patented Feb. 16, 1960

2,925,311

LAPSED TIME RECORDER

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Application December 10, 1954, Serial No. 474,486

6 Claims. (Cl. 346—82)

This invention relates to business machines for use in indicating and recording periods of time used in performing operations on a piece of work, or periods of time objects remain at certain points, such as boats at docks, or vehicles on parking lots, and in particular an instrument wherein periods of time are printed on a tape or ticket by the operation of a single synchronous motor that delivers a repetitious fixed time impulse which is conveyed mechanically to time accumulating units in which the number of cycles, the length of time sequence, rates, or other characteristics of each unit can be adjusted independently or in groups of units, and, as in a parking garage, a line indicating the lapsed time, rate, and charge, may be printed on a ticket.

The purpose of this invention is to provide a lapsed time indicating and recording machine adapted to show time intervals individuals work, such as in an office or manufacturing plant, or time required for operations of a machine, or the time objects remain in certain positions, such as vehicles in a parking garage, whereby the time intervals are adapted to be determined by repetitious fixed time impulses of a single synchronous motor timer on one or a plurality of units and in which the units are independently adjustable.

It is difficult, by conventional means, to determine instantly the charge for parking a vehicle on a lot or in a garage, and it is also difficult for an operator with a stop watch to record the time intervals worked by employees or the time required for different operations on a piece of work or on a machine, particularly when the operators are aware of the fact that they are being timed.

With these thoughts in mind this invention contemplates a lapsed time indicating and recording machine that is adapted to be operated continuously with a single synchronous motor timer whereby time intervals are recorded in a plurality of units and different time intervals may be recorded in each unit.

The object of this invention is, therefore, to provide a lapsed time indicator that includes a single synchronous motor timer that delivers a repetitious fixed time impulse which is conveyed mechanically to time accumulating devices in which the number of cycles, the length of time sequence, and the number of cards that can be printed are unlimited.

Another object of this invention is to provide a lapsed time recorder which permits the adjustments of time cycles, rates, or other characteristics of each unit independently, or in which any multiple of this impulse can be accumulated for the desired time interval, and wherein the accumulated interval can be recorded on one, several, or on all units or cards of the units simultaneously, and furthermore, wherein any accumulated record can be removed without affecting the sequence of the other units.

Another important object of the invention is to provide an improved lapsed time recorder that will produce an accurate record of the time a vehicle remains on a parking lot or in a garage and also indicate the charge, in dollars and cents, in accordance with the rate charged by the parking lot or garage.

It it yet another object of the invention to provide a machine that will make a daily record of time periods worked by individual employees and compute the compensation therefor whereby at the end of a pay period the time worked and the wages therefor are indicated on the card of the employee.

A further object of the invention is to provide an improved lapsed time recorder in which records are indicated on individual units and in which the number of units that may be added to the machine is unlimited.

A still further object of the invention is to provide an improved lapsed time recorder that provides individual records, and indicates time intervals and computes charges therefor in which the machine is of a simple and economical construction.

With these and other objects and advantages in view the invention embodies a single synchronous motor timer, a plurality of card holding printing units, and a solenoid and ratchet assembly for actuating the printing units by the timer.

Other features and advantages of the invention will appear from the following description taken in connection with the drawings, wherein:

Figure 1 is a side elevational view of the lapsed time recording machine with parts of upper and lower sections of a side wall on the near side of the machine broken away to illustrate the operating instrumentalities therein and also with the lower part of the machine broken away.

Figure 2 is a plan view of the machine showing the synchronous motor, micro switch, solenoid and ratchet assembly, the casing being omitted.

Figure 3 is a front elevational view showing a portion of the machine with parts broken away, illustrating the recording units.

While one embodiment of the invention is illustrated in the above referred to drawings, it is to be understood that they are merely for the purpose of illustration and that various changes in construction may be resorted to in the course of manufacture in order that the invention may be utilized to the best advantage according to circumstances which may arise, without in any manner departing from the spirit and intention of the device, which is to be limited only in accordance with the appended claims. And while there is stated the primary field of utility of the invention, it remains obvious that it may be employed in any other capacity wherein it may be found applicable.

In the accompanying drawings, and in the following specification, the same reference characters are used to designate the same parts and elements throughout, and in which the numeral **10** refers to the invention in its entirety, numeral **12** indicating a synchronous motor for operating the machine, numeral **14** a solenoid for actuating a pawl and a dog of a ratchet assembly, numeral **16** a micro switch actuated by the motor and adapted to energize the solenoid, numeral **18** a button of a manually actuated switch for advancing the time indicating elements in case of current interruptions, numeral **20** card holding trays pivotally mounted in the housing, numeral **22** discs having a continuous peripheral marking surface **24** thereon, and numeral **28** a ratchet wheel actuated by the solenoid **14** and adapted to operate the discs **22** through a vertically disposed shaft **30**, worms **32**, and worm gears **34**.

The motor **12** is mounted on a vertically disposed panel **36** of an L-shaped bracket having a base **38** and, as shown in Figure 1, the shaft **40** of the motor extends through the panel **36** and the extended end of the shaft is provided with a cylindrical knob forming a cam **42** and in which a slot **44** is provided. The slot is positioned to receive a flange **46** of a spring arm **48** extended from the

micro switch 16 and each time the cam makes one complete revolution the flange drops into the slot and the micro switch is actuated. The micro switch 16 is provided with terminals 50 and 52 and, as shown in Figure 2, the terminal 50 is connected by a wire 54 which extends through an opening 56 in the panel 36, to one terminal of the solenoid 14. The terminal 52 is connected by a wire 58 to one terminal of the synchronous motor 12, and the other terminal of the motor is connected by a wire 60 to one side of a battery or other source of electric current, as indicated by the numeral 62. The other terminal of the battery is connected by a wire 64 to the motor terminal to which the wire 58 is connected, and the other terminal of the motor connected by a wire 66 which extends through an opening 67 in the panel 36, to the other terminal of the solenoid 14.

The terminal 50 of the micro switch 16 is also connected to a terminal 68 of a switch 70 with a wire 72 and the terminal 52 is connected by a wire 74 to the opposite terminal of the switch, which is indicated by the numeral 76. The switch 70, which is actuated by the button 18, is mounted on a vertically disposed leg 78 of a bracket 80 and, as shown in Figure 1, the button is positioned to be actuated by a finger or rod inserted through an opening 82 in a front wall 84 of an enclosing cover having a rear wall 86, side walls 88 and 90, and a top 92.

The cover is frictionally held on a horizontally disposed platform 94 of the lower portion of the housing and, also as shown in Figure 1, the base 38 of the L-shaped bracket is mounted on the platform. The lower portion of the housing is provided with a transversely disposed partition 95, side walls 96, a front wall 97, and a rear wall 98, and the housing is supported on a pedestal base, as indicated by the numeral 100.

As illustrated in Figures 1 and 2, the button 18 is freely slidable in a bushing 102 that is secured in the vertically disposed leg 78 of the bracket 80 with a lock nut 104.

The solenoid 14 is provided with a spring actuated core 106, in which the spring is positioned to urge the core outwardly, and, as shown in Figure 2, the extended end of the core is pivotally connected to a lever 108 with a pin 110, and the lever is pivotally mounted on a post 112, extended from the base 38, with a pin 114. A pawl 116, also pivotally mounted on the post 112, is positioned to engage teeth of the ratchet wheel 28 and the tooth of the pawl is urged into engagement with the teeth of the ratchet wheel by a spring 118. The pawl, being mounted on a stationary post, prevents accidental rotation of the ratchet wheel in a counter-clockwise direction. One end of the spring 118 is secured in an opening 120 in the pawl and the other in an opening 122 in an extension 124 on one side of the lever 108.

The lever 108 is also provided with a latch 126 which is pivotally connected to the lever with a pin 128 and a tooth 130 on the extended end of the latch is urged into engagement with the teeth of the ratchet wheel 28 by a spring 132, one end of which is secured in an opening 134 in the latch and the other in the opening 122 in the extension 124 of the lever 108. Each time the solenoid is energized by the micro switch 16 the lever 108 is moved in a clockwise direction about its pivot 112 and the ratchet wheel 28 is advanced in a clockwise direction by the latch 126.

The movement of the lever 108 is limited by a stop formed with a screw 133 threaded in a lug 131 extended upwardly from the base 38 and the screw is secured in adjusted positions by a lock nut 135.

The ratchet wheel 28 is mounted on the upper end of the vertically disposed shaft 30, and the shaft 30 rotates a plurality of shafts 136 on which the marking discs 22 are positioned through the worms 32 and worm gears 34. The time, or marking discs 22 are adapted to be continuously rotated, and with the peripheral surfaces 24, on which means for marking lines on the strips are provided, bearing against strip tickets 137 inserted in the holding trays 20, the said strip tickets will bear lines to numerals indicating lapsed time in minutes and charges in dollars and cents whereby the said strip tickets, being advanced by the marking discs will serve as a record of the lapsed time and charge therefor.

The upper or rearward ends of the trays 20 are supported by vertically spaced horizontally disposed bars 138, Z-shaped in cross section, and the bars are secured to the partitions 95 with rivets extended through flanges 140 on the ends of the bars. Each of the horizontal bars is also provided with a row of upwardly disposed arcuate flanges 142 against which the rear ends of the ticket strip holders or trays are held by springs 144, the lower ends of which are secured in the edges of lower flanges 146 of the bars 138, and the upper ends of which are attached to the rear ends of the trays.

The trays are U-shaped in cross section, having side walls 148 extended upwardly from base sections, and the trays, which are positioned side by side are pivotally suspended on a shaft 150 wihch extends through the side walls of the trays of each set. As shown in Figure 3, the shafts 150 are secured in position between the partitions 95 by screws 152 which extend through the partitions and are threaded into the ends of the shafts.

Also as shown in Figure 3, each card holder or tray is provided with a transversely disposed pin 154 which extends through the tray and the side walls 148 thereof, and the pins 154 are positioned in tubes 156 on the outer surfaces of which spaced rubber bands 158 and 160 are provided. The bands are positioned so that the peripheral surfaces 24 of the marking discs 22 extend between the bands. The marking discs 22 are retained in position on the shaft 136 with cylindrical spacers 162 and the parts are secured in position by nuts 164 that are provided between the ends of end spacers and the partitions 95.

The marking discs 22 on the peripheral surfaces of which the marking surfaces 24 are positioned are mounted between circular plates 166, the diameters of which are less than that of the discs 22 whereby the surfaces of the discs extend beyond the edges of the plates 166.

The peripheral marking surfaces 24 of the discs 22 are provided with a supply of ink by felt sleeves 168 positioned on spools 170 on shafts 172 and the spools are retained so that the sleeves are in registering relation with the marking surfaces of the discs 22 with tubular spacers 174 positioned between the spools. The ends of the shafts 172 are secured in the partitions 95 with screws 176 which extend through the partitions and are threaded into the ends of the shafts. The sleeves 168 are supplied with a light quantity of ink periodically and the marking surfaces 24 lightly engage the sleeves whereby only sufficient ink is provided on the surfaces 24 of the marking discs 22 to print lines on the strips or cards.

The base of each card holder or tray 20 is provided with spaced slots 178 in which stop clips 180 are positioned, and each clip is provided with a body portion 182 that is positioned against the lower surface of the base of the tray, a flange 184 on the forward end that extends upwardly through one of said slots, and a holding clip 186 on the opposite end that extends through one of the slots and that is positioned to rest upon the inner surface of the base of the tray to support the stop clip in operative position, as shown in Figure 1. The rear ends of the bases of the trays are provided with arcuate clips 188 which provide final stops in cases where the clips 180 are not used.

The front wall 97 is provided with spaced slots 190, as shown in Figure 3, and these slots, which are positioned to register with the marking discs 22, are of sufficient width to permit the cards or strip tickets to be inserted therethrough.

The strip tickets 137 form one part of a card having two additional sections, and all three sections bear a serial number, such as indicated by the numeral 192, in Figure 3. The serial number provides a common identification

whereby a patron entering a garage will be provided with one section, another section will be attached to the vehicle, and the third section, such as the strip **137**, will be inserted in one of the slots **190** with the inner portion in engagement with the surface **24** of the marking disc **22**, positioned to register with the slot, and also with the inner portions between the bands **158** and **160**. The strips **137** are provided with spaced transversely disposed marks **194** and numerals **196** in dollars and cents are provided between the marks.

In operation electrical impulses provided by the micro switch operated by the synchronous motor and intermittently timed by the cam **42** actuate the solenoid **14** to advance the ratchet wheel through the lever, pawl and latch, whereby the shaft **30** continues to rotate intermittently, and by means of the worms and worm gears, the shafts **136**, upon which the marking discs **22** are mounted, are rotated whereby strip tickets **137** passed between the discs and bases of the trays **20** will be marked directly in the spaces between the lines with longitudinally disposed lines indicating the lapsed time and amount to be charged therefor.

The strips **137** are held firmly between the discs **22** and bases of the trays by the springs **144**, and upon the return of a patron who presents a section of a card with a certain serial number the operator of the garage withdraws the strip **137** having the same serial number and charges the patron the amount printed thereon and indicated at the end of a line marked on a strip by the tape **24**.

The spring stop clips **180** are provided so that an operator of a parking lot or garage who charges a certain rate per hour for, such as the first four hours, of parking and a lower rate for periods of time thereafter, may position the stop clips **180** in the card holders or trays **20** so that when the strip ticket **137** abuts thereagainst further passage of said strip beneath the disc will be stopped denoting that a change of rate has occurred at that time.

Although the specific example for the use of this machine has been illustrated as it would be used in a garage or parking lot it will be understood that many other uses will be of equal importance, such as in a manufacturing plant where the cost accounting systems require that separate machining or stamping operations be timed independently. For such use a batch of parts to be marked would carry a card similar to one used in a parking lot and at the beginning of a certain operation a ticket would be inserted in one of the trays of the machine and removed at the end of the manufacturing operation. Similar tickets would be used and marked for each operation performed on the parts and carried with the parts to each step or stage of the operations throughout the plant whereby complete cost accounting may readily be computed by adding the time spent on the different operations.

From the foregoing specification, it will become apparent that the invention disclosed will adequately accomplish the functions for which it has been designed and in an economical manner, and that its simplicity, accuracy, and ease of operation are such as to provide a relatively inexpensive device, considering what it will accomplish, and that it will find an important place in the art to which it appertains when once placed on the market.

It is thought that persons skilled in the art to which the invention relates will be able to obtain a clear understanding of the invention after considering the description in connection with the drawings. Therefore, a more lengthy description is regarded as unnecessary.

Changes in shape, size, and rearrangement of details and parts, such as come within the purview of the invention claimed may be resorted to, in actual practice, if desired.

Having now described the invention that which is claimed to be new and desired to be procured by Letters Patent is:

1. In combination, a lapsed time recorder comprising a synchronous motor timer, a plurality of ticket marking units, each comprising a ticket holding tray, a marking disc, and resilient means for urging the tray with a ticket therein against the disc, and operating instrumentalities including a cam having a slot therein carried by the synchronous motor timer, a micro switch actuated by the cam, a solenoid actuated by the micro switch, and a ratchet and pawl assembly actuated by the solenoid for intermittently actuating the marking discs by the synchronous motor timer for printing a line indicating a period of time on a ticket in said ticket holding tray.

2. In a lapsed time recorder, the combination which comprises a housing, a plurality of ticket holding trays pivotally mounted in the housing, stops adjustably mounted on said trays, resilient ticket positioning rollers carried by the trays, marking discs rotatably mounted in the housing and positioned to impress tickets in the trays, inking rollers positioned to ink the surfaces of the marking discs, resilient means for urging the trays toward the marking discs, said housing having openings therein positioned to register with the trays to facilitate inserting and withdrawing the tickets, a synchronous motor mounted in the housing, said motor having a cam with a slot therein carried by a shaft extended therefrom, a micro switch having a contact operating arm positioned to be actuated by the slot of said cam, a solenoid adapted to be energized intermittently by said micro switch, a ratchet and pawl assembly operatively connected to the solenoid, and means for operatively connecting said ratchet and pawl assembly to said marking discs.

3. In a lapsed time ticket marking machine, the combination which comprises a housing having front, rear, and end walls, the front wall of the housing have spaced horizontally disposed slots therein, a plurality of ticket holding trays, U-shaped in cross section, pivotally mounted in the housing and positioned in registering relation with the horizontally disposed slots in the front wall thereof whereby tickets inserted through the slots in the front wall of the housing slide into the trays, transversely disposed shafts rotatably mounted in the housing, marking discs carried by the transversely disposed shafts, said shafts being positioned whereby the discs extend into the trays and wherein the discs are positioned to mark tickets in the trays, resilient means for urging the ends of the trays in which the tickets are positioned upwardly against the marking discs, worm gears mounted on the transversely disposed shafts, a synchronous motor mounted in the housing, said motor having a cam with a slot therein carried by a shaft extended therefrom, a micro switch having a contact operating arm positioned to be actuated by the slot of the cam, a solenoid, means whereby the solenoid is actuated intermittently by said micro switch, a ratchet and pawl assembly operatively connected to the solenoid, means for operatively connecting said ratchet and pawl assembly to said marking discs, and holding means for preventing accidental return movements of the ratchet wheel of the ratchet and pawl assembly.

4. A lapsed time ticket marker as described in claim 3, wherein the means for operatively connecting said ratchet and pawl assembly to the marking discs includes a vertically disposed shaft having worms thereon and on which the ratchet wheel is mounted, said vertically disposed shaft being positioned whereby the worms thereon mesh with the worm gears of the transversely disposed shafts on which the marking discs are positioned.

5. A lapsed time ticket marker as described in claim 3, wherein stops are adjustably mounted in the trays for limiting movements of tickets in the trays.

6. A lapsed time ticket marker as described in claim 3, in which inking rollers are positioned to contact the marking discs and feed rollers are positioned in entrance ends of the trays.

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