ATTENDANCE RECORDER WITH ADJUSTABLE PROGRAMMING MEANS

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ATTORNEYS

FIG.1

<table>
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<tr>
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<th>WED</th>
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<th>FRI</th>
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<tbody>
<tr>
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<td>IN</td>
<td>IN</td>
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FIG.2

FIG.3

FIG.4

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ATTENDANCE RECORDER WITH ADJUSTABLE PROGRAMMING MEANS

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16 Claims

ABSTRACT OF THE DISCLOSURE

An inexpensive time recorder is modified to permit programming in many steps, and to locate the time record as desired on a time card. A timer operates a feed pawl engaging a ratchet sector which carries a lift arm to control the card position. A releasable lock means secures the lift arm to the ratchet sector at a desired angle, thereby determining the starting position on the card. Another releasable lock means secures the shift arm to the ratchet sector at a desired angle, thereby determining the "knock-off" position of the card. The knock-off means releases both the feed pawl and the check pawl, and additional means is provided to hold the pawls in disengaged position until the next time the feed pawl is operated by the timer.

In plants using many employees it is common to provide each employee with a weekly time card, which is inserted in an attendance recorder on entering and leaving the plant. The card records the time in and time out, before and after lunch, for each day of the week. Most employees are punctual and the bookkeeping department usually reckons "by exception," that is it makes note of an absence or lateness as an exception requiring a change from normal payroll. To facilitate rapid scanning of time cards, they may be programmed somewhat more elaborately, one example being a card which has six lines instead of four, these being used for "IN," "IN LATE," "OUT," "IN," "IN LATE," "OUT." The management decides on a degree of tardiness which is tolerated, say five or ten minutes, after which the arrival time is printed on the "IN LATE" line instead of on the "IN" line, so that it is quickly spotted by a bookkeeper while ruffling rapidly through a batch of such time cards. Heretofore, time recorders providing any such special program have been large, complex, and expensive.

One general object is to provide a modification of a compact inexpensive time recorder, to permit programming in many steps. A further object is to permit easy adjustment of the program, and also the location of the time record on a time card.

The time card has lines in one direction for the day of the week, and in a transverse direction for the time of the day. There is a relative shift of the card holder and print wheels in the first direction to change the day of the week, and this may be done manually. An automatic means shifts the position of the card in the second direction, and this means comprises a program timer of clock to operate a feed pawl engaging a ratchet sector which carries a shift arm to control the card position. A releasable lock means secures the shift arm to the ratchet sector at a desired angle, thereby determining the starting position on the card. Another releasable lock means secures a knock-off means at a desired angle to said ratchet sector, thereby determining the "knock-off" position of the card at the point where it is returned to starting position. In this way both the number of positions and their location on the card may be adjusted over a rather wide range.

In preferred form the shift for the day of the week is in horizontal direction, while the shift for time of the day is vertical, in which case the shift arm is a lift arm which determines the vertical position of the time card, and its return movement may be a gravitational downward movement. There is a check pawl engaging the teeth of the ratchet sector, and the knock-off means releases both the feed pawl and the check pawl. Additional means may be provided to hold both the feed and check pawls in disengaged position until the next time the feed pawl is operated, thereby ensuring that there will be more than adequate time for full downward movement of the lift arm, even though the knock-off means descends with the ratchet sector.

The foregoing and additional features are described in the following detailed specification, which is accompanied by drawings in which:

FIG. 1 shows one example of a time card used with the present attendance recorder;
FIG. 2 is a perspective view showing the interior of a known compact inexpensive time recorder, modified to embody the present improvement;
FIG. 3 is a front elevation of mechanism which is applied to the attendance recorder for the present purpose:
FIG. 4 is an edge view of a knock-off sector used in the mechanism of FIG. 3;
FIG. 5 shows a mounting plate and check pawl used in the mechanism of FIG. 3;
FIG. 6 is an edge view of the same;
FIG. 7 shows a feed pawl and pawl arm used in the mechanism of FIG. 3;
FIG. 8 is a bottom view of a lift arm used in the mechanism of FIG. 3;
FIG. 9 is a fragmentary section drawn to enlarged scale and taken approximately on the line 9—9 of FIG. 3;
FIG. 10 shows a ratchet sector used in the mechanism of FIG. 3;
FIG. 11 is a bottom view of the pawl arm and feed pawl of FIG. 7, but with the feed pawl extended in alignment with the pawl arm; and
FIG. 12 is a fragmentary section explanatory of the releasable lock means shown in FIG. 9.

Referring to FIG. 1 the time card 12 has seven vertical columns indicating the day of the week, and it has six horizontal lines to receive a printed indication of the time of the day, these lines being marked "IN," "IN LATE" and "OUT." In two such numbers there is a separate space for use before and after lunch. Only four of the six lines are actually used, there being an automatic lift or change in the card position following expiration of a tolerance period of say five or ten minutes, so that the time in then is printed on the second or fifth line, instead of on the first or fourth line. The card position is again raised at a suitable time, say 11:30 a.m. and 4:30 p.m., to next print on the time out line.

It will be noted that the card 12 is longer than needed in vertical direction, the extra space at 14 and 16 being used for desired information, such as the company name, the employee's name, the employee's pay scale, etc. The preferences or companies may differ as to the location of the time tabulation on the card, and the present invention makes it possible to readily adjust the starting position and the knock-off position on the card. The specific mechanism here shown provides a total of sixteen program steps in vertical direction, and the first or top line used may be located anywhere from line 1 to line 10, while the knock-off or bottom line can be located anywhere from line 7 to line 16, or differently expressed, anywhere from 1 to 10 lines from the bottom. As many program steps as desired may be provided, even up to sixteen, thus permitting more elaborate programming than the six steps indicated in FIG. 1.
Referring now to FIG. 2, we show an attendance recorder of compact inexpensive type, the particular one shown being manufactured by the Kromberg Products, Division of Mite Corporation located at New Haven, Conn. The cover has been removed to show the interior. The mechanism comprises a synchronous clock motor 20, which is connected by appropriate reduction gearing to the hands of a clock face 22, the latter being exposed through a large circular opening in the top of the case. The clock motor turns the first of a group of print wheels indicated at 23. An ink ribbon extends from a supply spool 24 to a take-up spool 26, the latter being very slowly advanced by appropriate mechanism.

The employee's time card is inserted in the slot 34 of a "funnel" or card holder 28, the latter movable from side to side relative to the print wheels to set the day of the week, this being indicated by appropriate abbreviations at 30, cooperating with a pointer 32. Either the print wheels or the funnel may be moved, and in the device shown they are interconnected so that both move in unison in opposite direction, about 1/4 inch for a 1/4 inch wide card. The mechanism here shown, this setting is made manually, and shifts the print wheels 23 and oppositely shifts the holder 28. The housing is not shown, but has a top slot through which the upper end of funnel 28 projects. The slot is longer than the funnel, and may be shielded by a guard plate 35 movable with the funnel.

The printing operation itself may be automatic, immediately following the insertion of the time card, as by means of a contact at the bottom which initiates the operation of a printing solenoid. However, in simpler form the printing operation may be manual, as by depression of a handle or bar 36, which causes a hammer to hit the card forward against the type wheels. The handle 36, like funnel 28, projects through the top of the housing.

In accordance with the present improvement, the vertical position of the time card depends on the position of a lift arm 40, pivoted at 42, and secured to a ratchet sector 44, which is turned upward one step or line by operation of a solenoid 46, connected by link 48 to an operating pawl 50, which engages the teeth of the ratchet sector 44.

The timing of the steps is established by means of a program timer 52 which is external, and connected by conductors 54 to the solenoid 46. The timer 52 is preferably driven electrically by a synchronous clock motor. After having driven the drive shaft 21, the gear reduction drives the wheel 56, the periphery of which has a large number of closely adjacent slits, in any of which small brass spring contacts may be inserted, as here indicated at 58. These engage a stationary contact 60, thereby pulsing the solenoid 46.

The program timer 52 requires no further description, it being commercially available from any manufacturers, for example, Zenith Electric Company of Chicago, Ill., York Time Controls of Mount Vernon, N.Y., and Federal Sign and Signal Corporation of Blue Island, Ill.

Referring now to FIG. 3, the drawing, the lift arm is shown at 40, it being pivoted at 42 on a fixed mounting plate 62. The movable end of arm 40 has an arcuate support member 64 which positions the card. Arm 40 is secured to ratchet sector 44, also pivoted at 42, and this is moved by a feed pawl 50 in cooperation with a pull spring 66. The position of arm 40 and sector 44 is maintained by a check pawl 68, and these pawls are disengaged at a desired point to release ratchet sector 44 and arm 40, by means of a knock-off lug 70, the latter preferably being formed on a knock-off sector 72. The angular position of lift arm 40 relative to ratchet sector 44 is adjustable to locate the first line on the time card, and knock-off sector 72 is adjustable relative to the ratchet sector 44 to adjust or determine the location of the last line on the time card.

Referring now to FIGS. 5 and 6, the mounting plate 62 has a fixed bushing 74 at the axis or pivot point 42 previously referred to. The check pawl 68 is pivoted at 76, the pawl tooth being shown at 78, and being urged into engagement with the ratchet tooth by means of a pull spring 80. The pawl 68 also carries a knock-off stud 82 the operation of which is described later.

Reverting to FIG. 2, the mounting plate 62 is secured to a fixed plate 84 forming a part of the attendance recorder, the latter being spaced from a backboard 86 by suitable spacers 88, and the plate 62 being spaced from plate 84 by suitable spacers 90 located at the corners of the plate 62.

Reverting now to FIGS. 3, 8 and 9 of the drawing, the inner or pivoted end of the lift arm 40 is transversely bent at 92 and reversely bent at 94 to provide a short arm 96. It is the long arm 40 that carries the card support 64, and it is the short arm 96 that is secured to the ratchet sector. FIG. 9 shows how the parts 40 and 96 straddle the mounting plate 62, the pivot pin 98 passing through the fixed bushing 74 previously referred to. A screw 100 anchors pin 98 against axial movement.

The ratchet sector 44 is shown in FIG. 10, it having ratchet teeth 102 along its edge, and having a relatively long arcuate slot 104 concentric with the hole 106 about which the sector pivots. The downward or lowermost position of the sector is determined by a fixed stop 108, the location of which on mounting plate 62 is shown in FIG. 3. The knock-off sector 72 is shown in FIGS. 3 and 4. At the lower corner a lug projecting from the sector 72 is bent transversely as shown at 70 to provide the desired knock-off lug. The body of the sector has an arcuate slot 110, which is formed on the same radius as the arcuate slot 104 of the ratchet sector. The knock-off sector 72 turns on the same axis 42 as the ratchet sector 44 and the arm 40, and preferably carries a pointer 112.

As previously mentioned, there are releasable lock means to secure the lift arm 40 and the knock-off sector 72 at a desired angle tot he ratchet sector 44, in order to determine the starting and knock-off positions on the time card. For purpose of independent adjustment, it is preferred to provide two releasable lock means, one for securing the arm 40 to the ratchet sector 44, and the other for securing the knock-off sector 72 to the ratchet sector 44.

The mechanism for this may be described with reference to FIGS. 9, 10 and 12 of the drawing. A screw 114 has a head 116 at its lower end, and a screw driver slot 118 at its upper end. This screw passes freely through the arcuate slot 104 in the ratchet sector 44, and is threaded into a tapped hole in the short reversely bent arm 96 of the lift arm. FIG. 12 shows how rotation of the screw will lock arm 96 to ratchet sector 44.

The screw 114 also passes freely through the arcuate slot 110 of the knock-off sector 72 (FIG. 9) and then receives a lock nut 120. With nut 120 backed away or loose, the screw 114 may be tightened by means of the slot 118 to thereby lock the arm 96 to the ratchet sector 44. Thereafter, nut 120 may be tightened to lock the knock-off sector 72 to the ratchet sector 44. In FIG. 12 only the lower lock is shown.

The pawl 50 may be described with reference to FIGS. 7 and 11 of the drawing. Pawl 50 is pivoted on pawl arm 122 by means of a pivot 124. Arm 122 turns on the axis 42 previously referred to, this being the axis of the lift arm and the two sectors 44 and 72. In FIG. 11 the pawl 50 has been turned from its usual upwardly directed position shown in FIGS. 3 and 7, to a horizontal position extending from the arm 122. The tooth of pawl 50 is shown at 126, the pawl 50 being offset from the pawl arm 122 by spacer means, as indicated at 128. At its upper end pawl 50 carries a latch member 130. In FIG. 11 it will be seen that the pivot connection 124 between pawl 50 and the pawl 122 is extended at 132 to receive the solenoid link 48 previously referred to in FIG. 2. This link has been omitted in FIGS. 3 and 7. The pawl arm 122 provides guidance, while link 48 provides motion.

The pawl and pawl arm are normally pulled upward by means of a pull spring 66. When solenoid 46 (FIG. 2)
is energized, it pulls the pawl downward to engage the next tooth, and inasmuch as the solenoid is energized only momentarily, the pull spring 66 thereupon pulls the pawl arm upward to raise the outward against the light force of a pull spring 140. The stud 82 on check pawl 68 lies in the path of part 142 of the latch 130, so that the outward movement of feed pawl 50 also disengages the check pawl 68, thus freeing the ratchet sector 44 from both paws for gravitational downward movement to lowermost position, determined by stop 108.

As the paws move outward stud 82 causes tilting of latch 130 and passes the part 142 of latch 130, and then is received in a notch 144. For the necessary tilting movement the latch 130 is pivoted on the pawl 50, and is yieldably positioned by a small light pull spring 146. When stud 82 is in notch 144 and the solenoid is deenergized, and the stud and notch serve to hold both paws in disengaged position, which is desirable in order to ensure adequate time for the ratchet sector and lift arm to descend to lowermost position, even if the pulse transmitted to the solenoid 46 (FIG. 2) is very short.

The disengagement of the paws is terminated by the next operation of the solenoid, because this lowers the pawl 50 and the latch 130, so that the latch leaves the stud 82, whereupon springs 140 and 80 pull the feed and check paws respectively into engagement with the ratchet teeth.

It is believed that the construction and operation of my improved attendance recorder, with its readily adjustable programming means, as well as the advantages therefrom, will be apparent from the foregoing detailed description. The adjustment procedure is as follows. In the position shown in FIG. 3, the lift mechanism is ready to print the top line and if not changed, will print all of the lines on the card. Pilot holes may be provided, as shown at 73 in FIG. 9, to establish this starting position. To remove lines from the top of the card, that is, to provide or to increase the space shown at 14 in FIG. 1, lock nut 120 is backed away, the adjusting screw 114 is loosened, and nut 120 may be again tightened. The ratchet sector 44 is held in lowest position, and the lift arm 40 together with the knock-off sector 72 are raised until the pointer 112 has passed or counted off the number of ratchet teeth or lines to be removed, whereupon the screw 114 is tightened. To remove lines from the bottom of the card, that is, to provide or increase the space shown at 16 in FIG. 1, the lock nut 120 (FIG. 9) is loosened, leaving the lift arm and ratchet sector locked together. While holding the sector downward against the stop 108, the knock-off sector 72 and pointer 112 are raised an additional number of teeth corresponding to the number of lines to be removed from the bottom of the card, whereupon the lock nut 120 is again tightened. In the particular example shown, the full spread is sixteen lines. A lesser number of lines may be located high or low on the card, as desired.

It will be understood that while we have shown and described the invention in a preferred form, changes may be made without departing from the scope of the invention.

We claim:

1. An attendance recorder with adjustable programming means for use with a time card having lines in one direction for days of the week and in a transverse direction for time of the day, said recorder comprising clock operated print wheels and a card holder, means affording relative shift of the holder and print wheels in the first direction to change the day of the week, and automatic time controlled means to shift the position of the card in the second direction, said means comprising a timer, means responsive thereto to operate a feed pawl, a ratchet sector having ratchet teeth moved by said pawl, a shift arm to control the card position in the second direction, a knock-off means to release the feed pawl, and a releasable lock means to secure the shift arm and the knock-off means at a desired angle to the ratchet sector in order to determine the starting and knock-off positions of the card in the second direction.

2. An attendance recorder as defined in claim 1, in which said releasable lock means includes a first releasable lock means to secure the shift arm to the ratchet sector at a desired angle in order to determine the starting position on the card in the second direction, and a second releasable lock means to secure the knock-off means at a desired angle to the ratchet sector in order to determine the knock-off position of the card in the second direction, whereby the number of positions and their location on the card may be adjusted.

3. An attendance recorder as defined in claim 2, in which the first direction of shift for the day of the week is horizontal, and the second direction of shift for time of the day is vertical.

4. An attendance recorder as defined in claim 3, in vertical position of the time card, and in which the return movement when the knock-off means releases the feed pawl is a gravitational movement in downward direction, and in which there is a bottom stop to limit the downward movement of the ratchet sector.

5. An attendance recorder as defined in claim 4, in which there is a check pawl to engage the teeth of the ratchet sector to retain its position, and in which the knock-off means for releasing the feed pawl also releases the check pawl.

6. An attendance recorder as defined in claim 5, in which the feed pawl has means to so engage the check pawl as to disengage the feed pawl when the feed pawl is disengaged, thereby releasing the ratchet sector.

7. An attendance recorder as defined in claim 6, in which there is additional means to hold the feed and check paws in disengaged position until the next time the feed pawl is operated by the timer.

8. An attendance recorder as defined in claim 7, in which the ratchet sector has arcuate slot of substantial length, and in which the knock-off means includes a sector concentric with the ratchet sector and having an arcuate slot concentric with and having the same radius as the slot of the ratchet sector, and in which the releasable means comprises a screw carried by the lift arm and passing through the arcuate slot of the ratchet sector, one of said parts being threaded to provide a locking action to secure the lift arm to the ratchet sector, and a lock nut on said screw serving to secure the knock-off sector to the ratchet sector, whereby the two adjustments may be independent of one another.

9. An attendance recorder as defined in claim 1, in which the first direction of shift for the day of the week is horizontal, and the second direction of shift for time of the day is vertical.

10. An attendance recorder as defined in claim 9, in which the shift arm is a lift arm which determines the vertical position of the time card, and in which the return movement when the knock-off means releases the feed pawl is a gravitational movement in downward direction, and in which there is a bottom stop to limit the downward movement of the ratchet sector.

11. An attendance recorder as defined in claim 10, in which there is a check pawl to engage the teeth of the ratchet sector to retain its position, and in which the knock-off means for releasing the feed pawl also releases the check pawl.

12. An attendance recorder as defined in claim 10, in which the feed pawl has means to so engage the check pawl as to disengage the check pawl from the ratchet sector when the feed pawl is disengaged thereby releasing the ratchet sector.

13. An attendance recorder as defined in claim 11, in
which there is additional means to hold the feed and check pawls in disengaged position until the next time the feed pawl is operated by the timer.

14. An attendance recorder as defined in claim 2, in which the ratchet sector has arcuate slot of substantial length, and in which the knock-off means includes a sector concentric with the ratchet sector and having an arcuate slot concentric with and having the same radius as the slot of the ratchet sector, and in which the first releasable means comprises a screw carried by the shift arm and passing through the arcuate slot of the ratchet sector, one of said parts being threaded to provide a locking action to secure the shift arm to the ratchet sector, and a lock nut on said screw serving to secure the knock-off sector to the ratchet sector, whereby the two adjustments may be independent of one another.

15. An attendance recorder with adjustable programming means for use with a time card having lines in one direction for days of the week and in a transverse direction for time of the day, said recorder comprising a time clock, print wheels, and a card holder, said time clock turning said print wheels, means affording relative shift of the holder and print wheels in the first direction to change the day of the week, means including a pawl and ratchet to shift the position of the card in the second direction, a solenoid for operating the pawl, and an additional program clock independent of the aforesaid time clock which operates the print wheels, said program clock having electrical contacts operated thereby to supply a pulse of electrical energy to the solenoid to shift the card holder one step in the second direction, the times of operation of said contacts and therefore of said solenoid being readily adjustable in the program clock.

16. An attendance recorder as defined in claim 15, in which the program clock is a conventional and commercially available 24 hour electrically operated timing device.

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