J. SOKOLOV.

TIME RECORDER.

APPLICATION FILED MAR. 6, 1911.

1,074,069.

Patented Sept. 23, 1913.

4 SHEETS—SHEET 1.

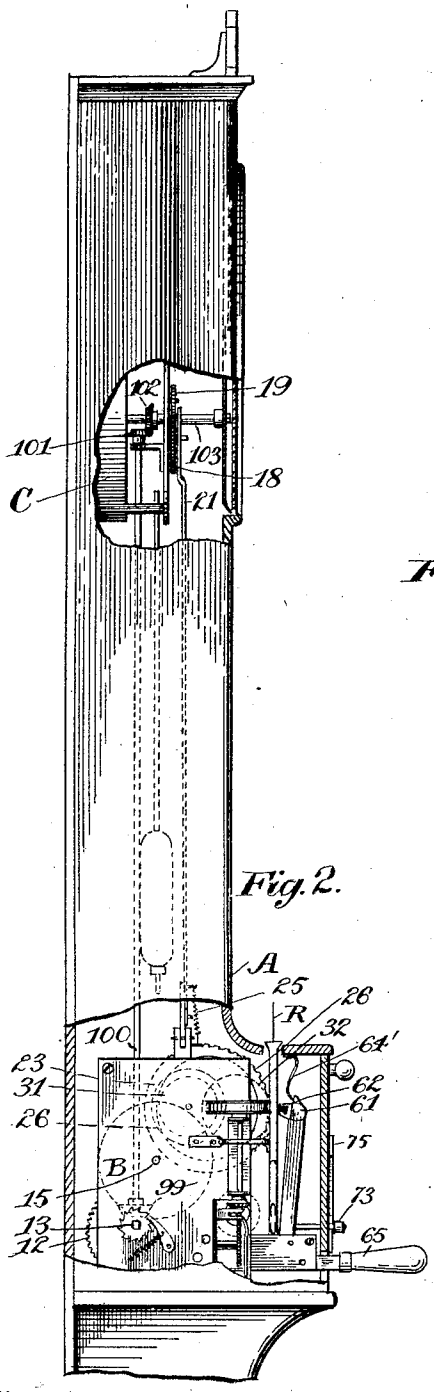


Fig. 2.

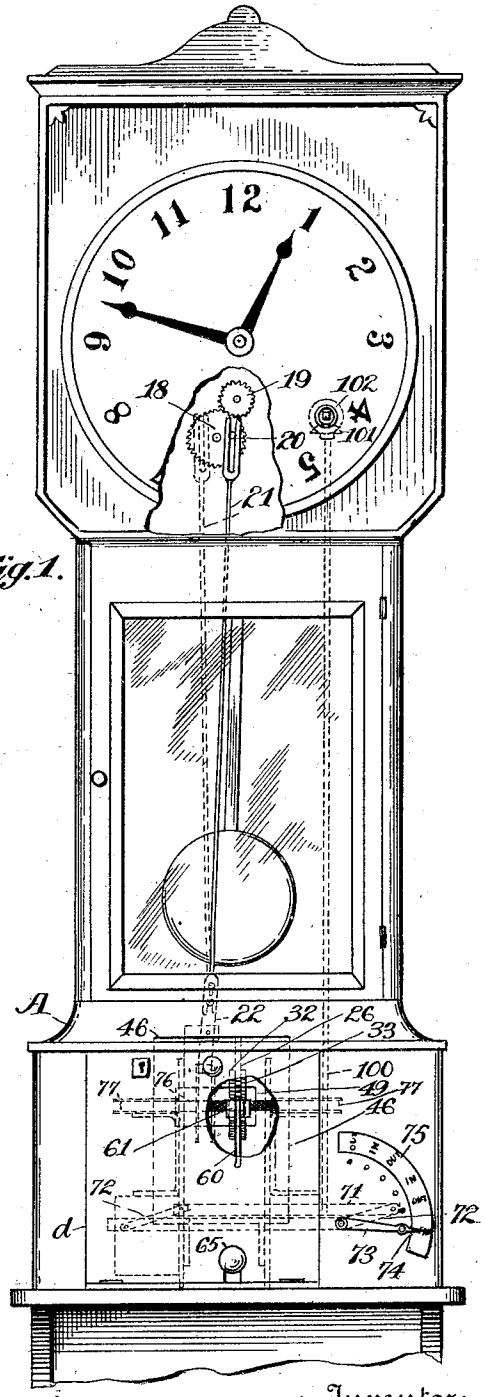


Fig. 1.

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4 SHEETS—SHEET 2.

Fig. 4.

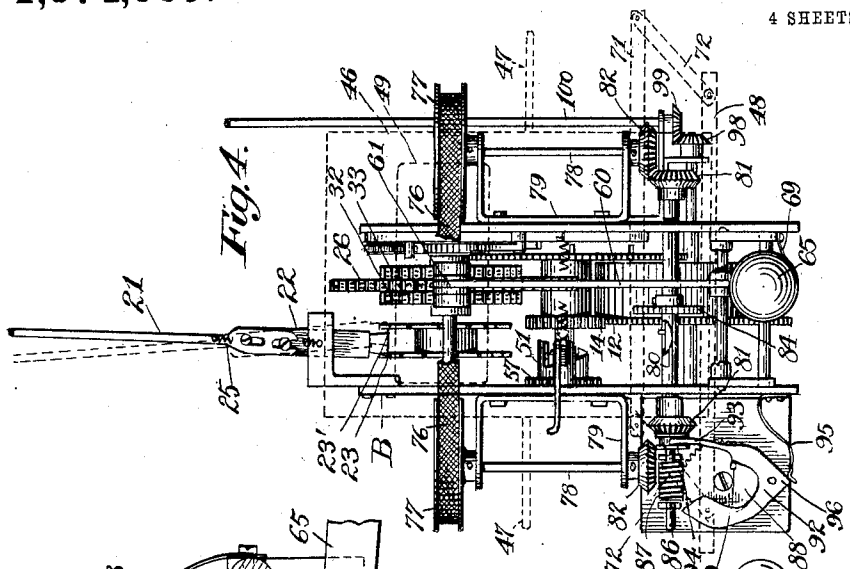


Fig. 3a

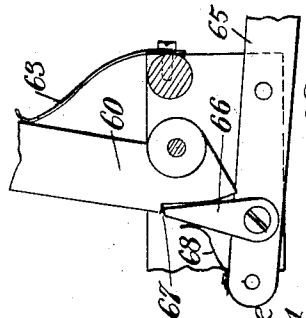
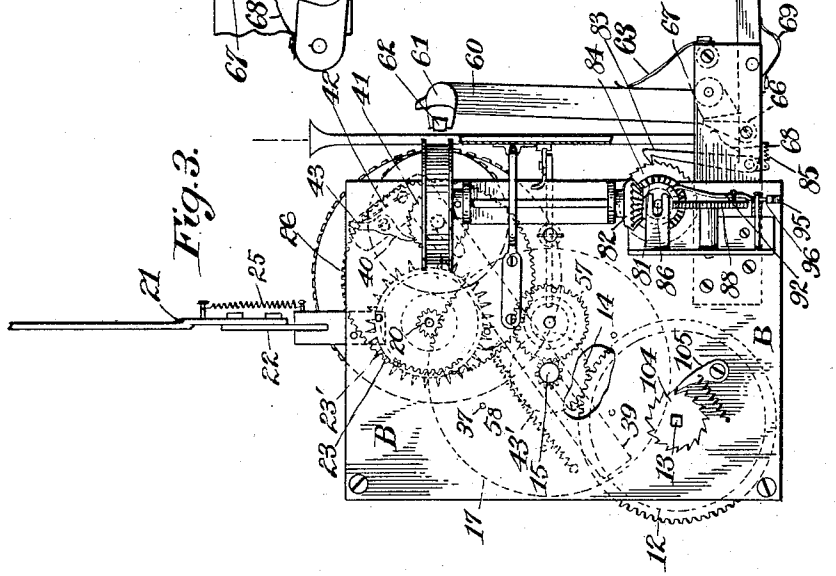


Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 5.

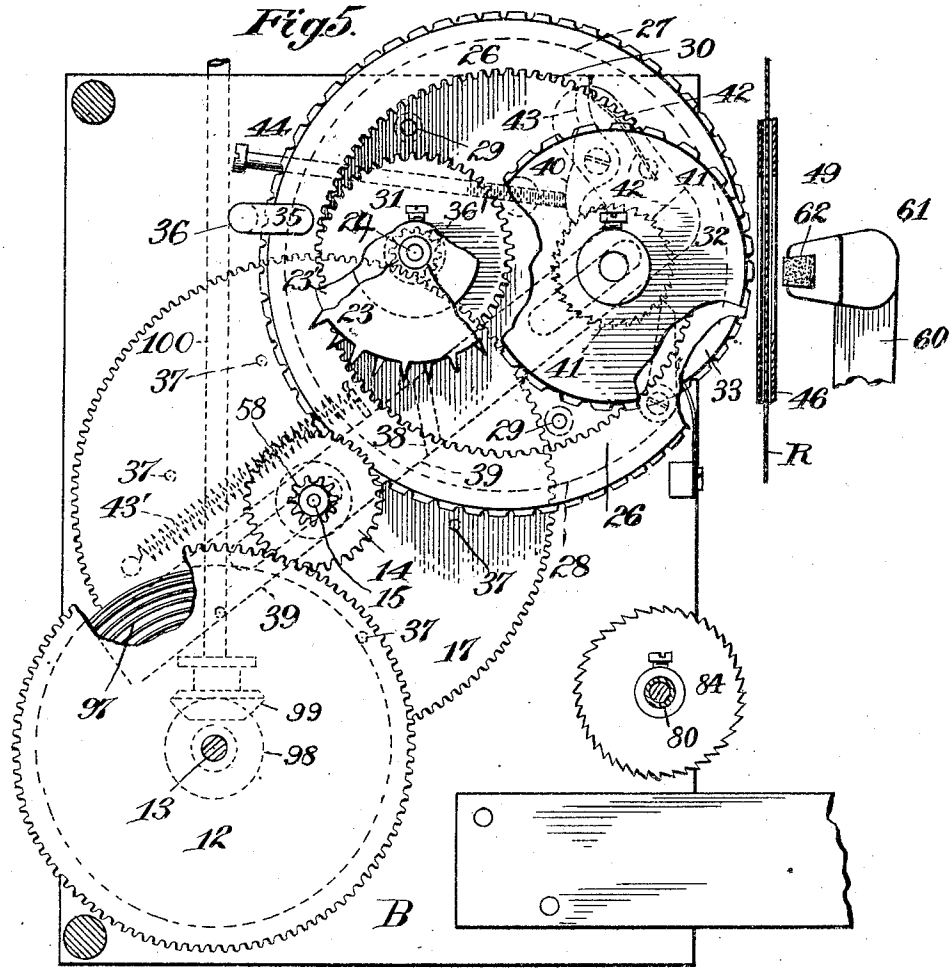
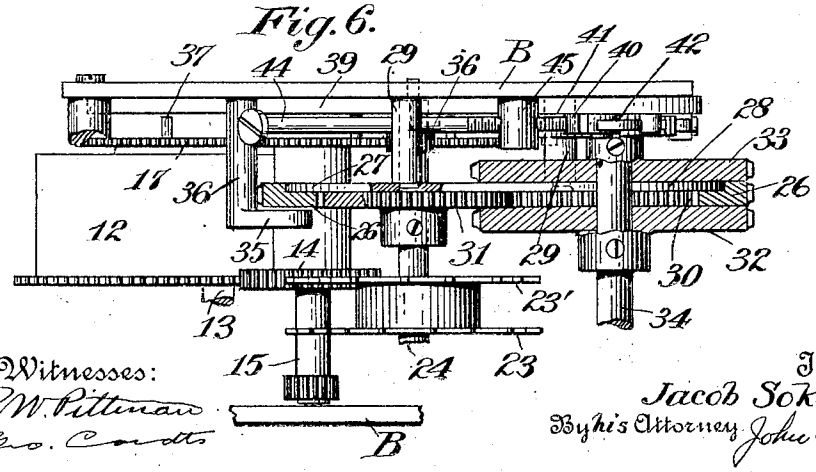


Fig. 6.



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4 SHEETS—SHEET 4.

Fig. 7.

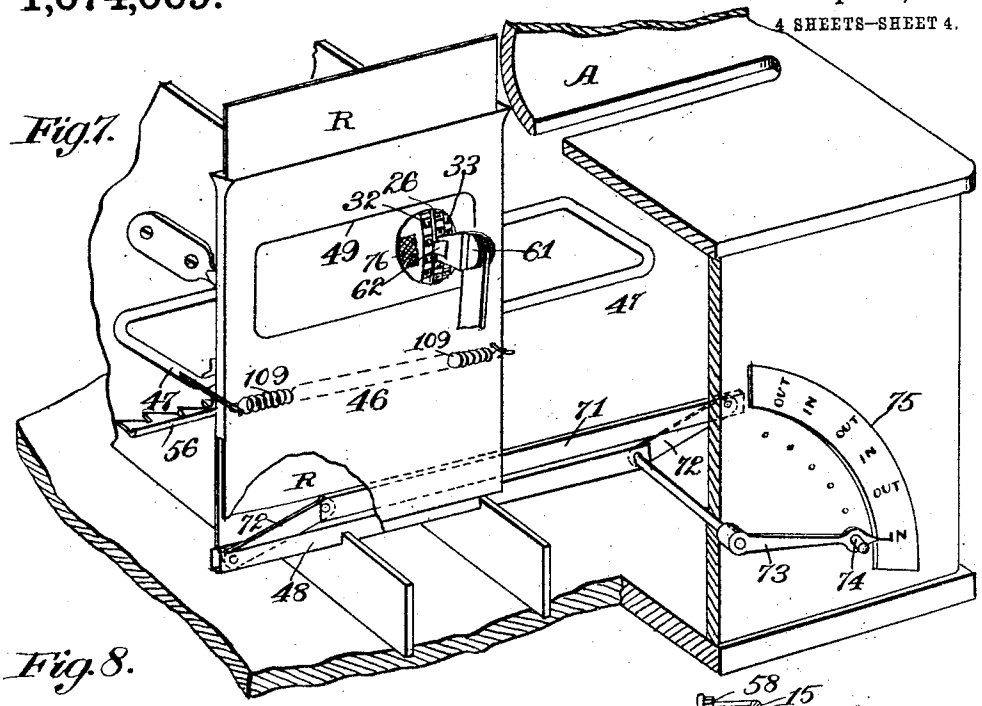


Fig. 8.

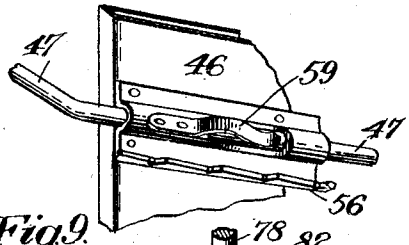


Fig. 9.

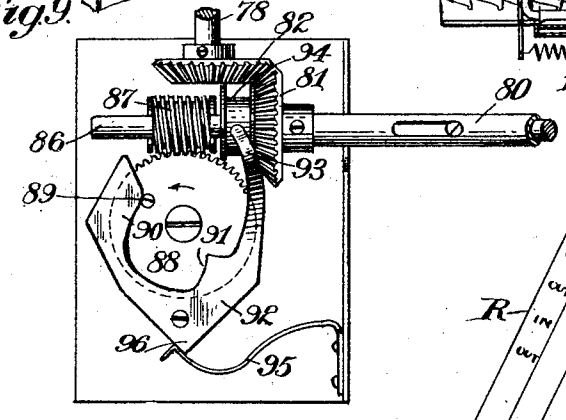


Fig. 10.

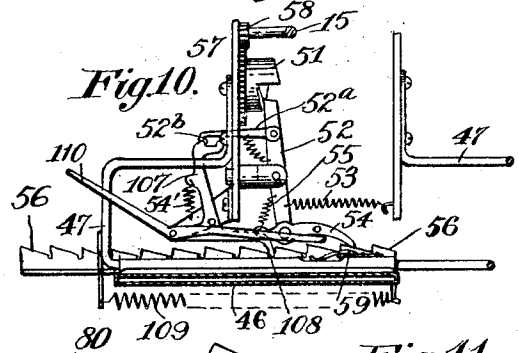
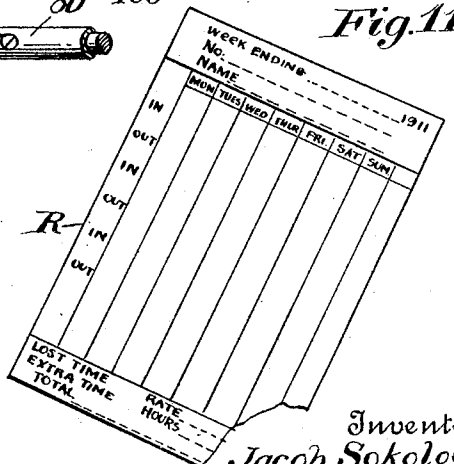


Fig. 11.



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UNITED STATES PATENT OFFICE.

JACOB SOKOLOV, OF NEW YORK, N. Y., ASSIGNOR TO THE FOLLETT TIME RECORDING COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

TIME-RECORDER.

1,074,069. Specification of Letters Patent. Patented Sept. 23, 1913.

Application filed March 6, 1911. Serial No. 612,682.

To all whom it may concern:

Be it known that I, JACOB SOKOLOV, a citizen of the United States, residing in the borough of Brooklyn, in the county of Kings, city and State of New York, have invented new and useful Improvements in Time-Recorders, of which the following is a specification.

This invention relates to time recorders in which the time of arrival and departure of employees, or the time of beginning and the finishing of work on a given job, is recorded upon a removable card or record surface, and it is the primary object of the invention to provide a time-recording mechanism of this character that is simple and durable in construction consisting of a less number of parts than in devices of this character as heretofore constructed, and which is more efficient and positive in operation.

In time recorders as heretofore constructed it has been customary to provide only hour and minute recording wheels leaving it to the act of the operator to so adjust the card as to designate thereon whether the arrival and departure, or the commencing and finishing of a job, was in the forenoon or afternoon, and it a further object of the invention to provide in addition to the minute and hour recording wheels a meridian, or a. m. and p. m., wheel to rotate synchronously with the hour wheel, the said wheels having impression devices upon the perimeters thereof.

In this class of time recorders it is also usual to operate or actuate the same by a clock movement, thus adding an extra strain upon the actuating mechanism of said movement with the consequent quick wearing out of the same, and it is a further object of the invention to provide an independently actuated or operated time-recording mechanism which is controlled by a clock movement, in which the minute recording wheel is intermittently advanced upon each revolution of the minute wheel of the clock movement, and the meridian and hour wheels are synchronously and positively advanced a predetermined distance upon each revolution of the minute recording wheel of the time recording mechanism, and a complete revolution imparted to said wheels upon twenty-four revolutions of said minute wheel.

Another object of the invention is to provide an improved card or record-surface carrier or holder which is automatically adjusted a predetermined distance in a horizontal direction relatively to and by the recording mechanism after the meridian and hour wheels have made a complete revolution and lock it in such adjusted positions, and to provide means to adjust the card or record-surface in the carrier a predetermined distance transversely to the movement of the carrier and to indicate the extent of such movement; suitable means being provided to cause the card to be impinged against the impression devices on the minute, meridian and hour wheels to make an impression thereon.

A still further object of the invention is to provide improved inking means, consisting of a ribbon to travel to and fro between the impression devices and the card carrier, the ribbon being intermittently fed from one spool to another after the operation of the means to cause the card to be impinged against the impression devices, suitable means, operable by the ribbon winding means, are provided to reverse the direction of travel of the ribbon.

Other objects and advantages will hereinafter appear.

In the drawings accompanying and forming a part of this specification, Figure 1 is a front elevation of the clock or clock movement with my improved time-recording mechanism applied thereto, portions being broken away to illustrate the means to control the recording mechanism by the clock movement and the manner of causing an impression to be made upon a card or record-surface. Fig. 2 is a side elevation of Fig. 1, partly broken away to illustrate the manner of mounting the recording mechanism, also to show the means to control the recording mechanism from the clock movement, and to show the manner of winding the recording mechanism simultaneously with the winding of the clock movement. Fig. 3 is a side elevation of the time-recording mechanism, partly in section. Fig. 4 is a front elevation of the time-recording mechanism, the time or record-surface carrier being removed and the framework and card-support shown in dotted lines. Fig. 5 is an enlarged side elevation of the minute, meridian and hour wheels and their actuating mechanism,

with a portion of the card-carrier and card in section and the means to impinge the card against the impression devices of the minute, meridian and hour wheels to cause an impression to be made thereon. Fig. 6 is a plan view of the minute, meridian and hour wheels and their actuating mechanism, said wheels being shown in section to illustrate the construction and mounting of the same. Fig. 7 is a fragmentary perspective view to illustrate the mounting of the card-carrier and the means to adjust the card transversely to said carrier and the means to indicate the extent of such adjustment. Fig. 8 is a detail view of a fragment of the card-carrier and its support to show the manner of mounting the same. Fig. 9 is a detail front elevation of the means to reverse the direction of travel of the inking ribbon. Fig. 10 is a plan view of a detail of the card adjusting mechanism, and the means to lock it in its adjusted positions; and Fig. 11 is a view of one form of card adapted to be used in my improved time recorder.

Similar characters of reference designate like parts throughout the different views of the drawings.

In the embodiment of my invention illustrated in the drawings the time-recording mechanism is carried and inclosed in the lower portion of the casing A of a clock movement, (designated in a general way by C) preferably of the eight day type. The time-recording mechanism is controlled by a spring drum or barrel 12 on a shaft 13 pivotally carried by the framework (designated in a general way by B), the said drum being provided with teeth on the perimeter thereof, which may be a gear wheel fixed to the drum, to mesh with a pinion 14 fixed to the shaft 15, a pinion 16 on said shaft meshing with a gear 17, which I will term as the main drive gear and through which the different mechanisms of the time-recording mechanism are driven.

The time-recording mechanism is controlled by a toothed wheel 18 driven by a toothed wheel 19 of the clock movement, which is preferably near the spring of the clock movement, the wheel being so timed that it will make one revolution in two minutes. The wheel 18 has a pin 30 projecting from the face thereof which engages in the forked end of a lever 21 adjustably connected at the other end to a pivoted pawl 22 to control the movement of an escapement and through such escapement the time-recording mechanism. The escapement consists of a pair of toothed wheels 23, 23′ fixed to a shaft 24, the teeth of one of which wheels are staggered relatively to the teeth of the other wheel. As the wheel 18 is rotated by the wheel 19 of the clock movement the pin 20 will act as a cam to oscillate or rock the lever 21, and through said lever the escapement pawl 22 to alternately engage with the teeth of the escapement wheels 23, 23′ the escapement advancing one tooth space upon each revolution of the wheel 19. As the pawl 22 is thrown by the lever 21 out of engagement with a tooth of one of the escapement wheels it will be thrown into the path of the other wheel and engaged by one of its teeth.

Through the movements of the escapement a minute wheel 26 of the time-recording mechanism is caused to intermittently advance a predetermined distance or one space upon one revolution of the wheel 19 of the clock movement, the said wheel 26 consisting of an annular member having impression devices in the form of characters on the perimeter thereof comprising in the present instance the numerals 1 to 60, inclusive, representing sixty minutes or one hour, and having an angular annular recessed portion 27 whereby it is mounted to revolve or rotate upon the periphery of a fixed disk 28 secured to the framework of the recording mechanism by studs 29. The said wheel 26 is also provided with internal gear teeth 30 which mesh with a pinion 31 on the escapement shaft 24 to rotate with the escapement. The ratio of the gearing to the minute wheel is two to one; that is, upon two revolutions of the pinion 31 one revolution will be imparted to the minute wheel 26. Upon each revolution of the minute wheel 26 a meridian wheel 32 and an hour wheel 33 are synchronously advanced a predetermined distance or one space, a complete revolution being imparted to said wheels upon twenty-four revolutions of the minute wheel 26. The wheel 33 is provided on the perimeter thereof with impression devices or characters consisting of two successive series of reverse consecutive numerals 1 to 12, inclusive, representing the twenty-four hours of a day. The meridian wheel 32 also has impression devices or characters on the perimeter thereof consisting of twelve "A. M." and twelve letters "P. M." to indicate the time before and after noon, or night and day. The wheels 32 and 33 are fixed to a shaft 34 pivotally supported in the framework B and at opposite sides of and in juxtaposition to the minute wheel 26, the said wheels and a finger 35 on a stud 36 secured to the framework maintaining the minute wheel 26 in position on the disk 28.

Movement is imparted to the meridian and hour wheels 32, 33 by means of a pinion 36′ on the escapement shaft 24 to mesh with the wheel 17 and rotate with the escapement, the ratio between the pinion 36 and gear 17 being twelve to one. The gear 17 is provided with six equidistantly spaced pins 37 in one face thereof, which are adapted to engage with a cam 38 on an arm 39 slid-

ably carried by the framework B by means of the shafts 15 and 34 passing through slots in such arm. At its upper end the arm 39 pivotally carries a pawl 40 which is caused to engage with a ratchet wheel 41 fixed to shaft 34 of the wheels 32, 33 by a spring 42 engaging with a pallet 43 on said pawl. As a pin 37 engages with the arm cam 38 and the arm is raised the pawl will ride over the ratchet wheel, and as soon as the pin rides over the cam face a spring 43 will return the arm to normal position and cause the pawl to advance the ratchet wheel 40 and meridian and hour wheels 32, 33. The movement of the arm 39 and pawl 40 is regulated by an adjustment or set screw 44 having screw threaded engagement with a stud 45 secured to the framework B; the set screw serves as an adjustable abutment or stop for the pawl 40. The timing of the pinion 36 and the gear 17 is such that upon one revolution of the minute wheel 26 or two revolutions of the escapement the wheel 17 will be rotated one-sixth of a turn, causing a pin 37 to engage with the cam 38 and raise arm 39 and through the pawl 40 advance the ratchet wheel 41 and meridian one hour wheels one space. The ratchet wheel and the meridian and hour wheels are locked in the advanced positions by a spring pawl 70 engaging with the ratchet wheel.

As already stated, my improved time recorder is of the type in which a record is made upon a removable card or record-surface R of the time of the arrival and departure of employees, or the time of the commencement and finishing of a given job, an example of one of which cards is shown in Fig. 11. Preferably this card R is arranged with seven vertical columns representing different days and the days for a complete week, and with a vertical column of indications, such as the alternate words "In" and "Out" or "Begun" and "Finished" and thus indicating in the vertical day columns whether it is a record of the arrival or departure of an employee, or the commencing or finishing of a job. The card may be provided with a suitable heading to indicate the period of time for which the card is to be a record of, the number of the job, and the name of the employee; and at the bottom with indications of the rate of wages, the hours worked, time lost, extra time, and the total. The card or record-surface is adapted to have a movement both horizontally and vertically of the time-recording mechanism, and for this purpose I provide a carrier or holder 46 for the card or record-surface to extend in front of and have horizontal movement relatively to or axially of the minute, meridian and hour wheels. The said carrier consists of a rectangular box-like structure open at the time and supported for rocking movement substantially midway thereof upon a bracket 47 secured to the framework B, and slidably supported at the bottom upon a bar or track 48. The carrier is also provided with an opening 49 to permit of the card R being impinged against the impression devices on the minute, meridian and hour wheels, to be hereinafter described.

The card and its carrier is automatically adjusted by the recording mechanism horizontally, or from left to right, of the recording mechanism a predetermined distance or for a space equal the width of one of the vertical columns on the card, at predetermined times or upon each revolution of the meridian and hour wheels, that is, once every twenty-four hours. This means comprises a helical or spiral cam 51 rotatably supported upon a stud in the framework B, a two-arm lever 52 is pivotally supported so that one of its arms is caused to engage with the cam 51 by a spring 53, a pawl 54 being pivotally carried by the other arm and caused to engage by means of a spring 55 with a rack 56 fixed to the back of the card carrier and by means of which the carrier is also supported upon the bracket 47. The cam 51 has a gear 57 meshing with a pinion 58 on the shaft 15 of the main drive gear 17. The cam 51 is so controlled by the escapement through the pinion 36, gear 17, pinion 58 and cam gear 57 that it will be given a complete revolution upon twenty-four revolutions of the minute or one complete revolution of the meridian and hour wheels. As the cam rotates the one arm of the pawl lever will ride up the cam face causing the pawl 54 to travel to the left over one of the teeth in the rack 56, and when the said arm is at the highest point on the cam the pawl will drop in back of one of the teeth of the rack, and when the arm has ridden over the high point on the cam the spring 53 will cause the pawl to advance the carrier one tooth space, a spring detent 59 fixed to the carrier and engaging with the carrier support bracket 47 through a slot in the carrier support preventing any overthrow of the carrier as it is advanced. Means, to be hereinafter described, are provided to lock the carrier in its adjusted positions to prevent the accidental or intentional horizontal to and fro movement of the carrier.

I provide means (Fig. 7) to adjust the card in the carrier in a vertical direction or transversely to the adjustment of the carrier predetermined distances and to indicate the extent of such movement, whereby to make an impression in the vertical columns on the card to indicate different divisions of the day, or the time of arrival and departure of an employee, or the time of commencement and finishing of a job, comprising a movable support 71 upon which the

bottom of the card rests, the said support being parallel with and having a pivoted link connection 72 with the support 48 for the card carrier. The supports 48 and 71 are preferably made of channel section, and the links connected thereto within the channel portion, as shown. Movement is imparted to the support 71 by a manually operative crank 73 connected to a pivot of one of the links 72. When the employee arrives in the morning the card is placed in the carrier with the face toward the impression devices on the minute, meridian and hour wheels, and the card impinged against said impression devices, (the means to impinge the card against the impression devices will be hereinafter described,) a point on the card in a horizontal plane with an indication "In" on the card registering with the printing on said wheels, and this position indicated by a pointer 74 forming a part of the crank on a dial 75 on the front of the casing A. On the departure of the employee, which we will assume will be at noon, the operator places the card in the carrier and swings the crank 73 in the direction of the arrow until the pointer registers with the first indication "Out" on the dial, this movement of the crank raising the card support 71, the crank and card support being maintained in such position by a spring detent fixed to the back of the crank having a teat to engage in one of a series of recesses in the front of the casing or the dial. This operation of the crank will cause a blank space on the card to be presented to the impression devices opposite the first indication "Out" thereon, when the card is again caused to be impinged against said impression devices. When the employee returns the crank is again moved in the direction of the arrow until the pointer registers with the second indication "In" on the dial when the operations are repeated.

To impinge the card or record-surface against the impression devices on the minute, meridian and hour wheels to cause an impression to be made thereon, I provide manually operated means (Fig. 3) comprising a pivotally supported trip-arm 60 having a platen or head 61 at the upper end to have radial swinging movement toward and away from the impression devices, said head carrying some suitable flexible facing material 62, such as leather or the like, so that a blow of the trip-arm will not deface or injure the impression devices. The platen is caused to impinge against the card by means of a spring 63, and is normally maintained in position away from the card by a spring 64, the tension of which latter spring is such as to overcome the tension of the spring 63 when the trip-arm is in normal position. To trip the said arm I provide a hand-lever 65 to which is pivotally connected a pawl 66 which is caused to engage with a notch or jog 67 in the trip-arm 60 by a spring 68. By rocking the hand-lever 65 upon its pivot, or pushing it downward, the pawl 66 engaging in the jog in the trip-arm will force the said arm back against the tension of the spring 63. After the lever 65 has been rocked a certain distance and the trip-arm reaches a certain angular position, the pawl will slide out of engagement with the jog and the spring 63 will swing the arm and impinge the face of the platen against the card and impression devices. After the impression is made the spring 64 will return the arm and maintain it in normal position, the pawl thrown into engagement with the jog and maintained therein by the spring 68, and the lever 65 returned to normal position in any suitable manner, as by a spring 69.

An inking ribbon 76 is interposed between the card-carrier and the impression devices on the minute, meridian and hour wheels to make the impression upon the card, and is carried by a pair of spools 77 to be alternately wound from one spool to the other, so that the ribbon will be fed or travel to and fro. The spools are connected to shafts 78 rotatably carried by brackets 79 secured to the framework B. Ribbon is alternately wound from one spool to the other by means of a hollow shaft 80 journaled in the framework to have axial movement, said shaft having a pair of bevel pinions 81 to mesh with bevel pinions 82 on the spool-shafts 78. When one of the pinions 81 is in mesh with one of the spool-shaft pinions 82, the other pinion 81 will be out of mesh with the other spool-shaft pinion 82. Intermittent rotary motion is imparted to the shaft 80, and thereby the ribbon intermittently fed, by the return movement of the lever 65 after an impression has been made upon the card. For this purpose I pivotally secure to the lever 65 a pawl 83 which is caused to engage with a ratchet wheel 84 fixed to the shaft 80 by a spring 85. As the lever 65 is pushed down to trip the arm 60 the pawl 83 will ride over the teeth of the ratchet wheel 84, and as the lever 65 is returned to normal position by its spring the pawl pulling down on the teeth of the ratchet wheel will rotate the shaft 80.

In Fig. 4 the parts are shown in position to wind the ribbon on the spool at the right. Should it be desired to reverse the direction of travel of the ribbon the shaft 80 is slid axially so that the pinion 81 at the left will mesh with its companion pinion 82. While this may be done by hand I provide means whereby the direction of travel of the ribbon is automatically reversed. For this purpose I mount a shaft 86 within the hollow shaft 80 to rotate therewith, a worm 87 on said shaft meshing with a worm-wheel 88. The said worm-wheel has a pin 89 project-

ing from the face thereof to alternately engage with cam faces 90, 91 on a pair of arms of a pivoted cam 92, one of the cam arms having a finger 93 to engage in an annular recess in a collar 94 secured to the hollow shaft 80. In Fig. 4 the pin has just ridden over the face 91 and rocked the cam so that the finger 93 has thrown the shaft 80 to the right and the pinion 81 at the right into mesh with its companion pinion 82 to wind the ribbon on the spool at the right and locked in such position by a spring detent 95 engaging at one side of a projection 96 on the cam. As the shafts 80, 86 are rotated the worm 87 will impart rotary motion to the worm-wheel 88 in the direction of the arrow, and when the pin 89 engages with the cam-face 90 the cam will again be rocked and the shaft 80 slid to the left so that the pinion on the left end of said shaft will engage with its companion pinion 82 and wind the ribbon on the spool at the left, the shaft 80 being locked in such position by the detent 95 engaging at the opposite side of the cam-projection 96, as shown in Fig. 9.

The spring 97 of the drum or barrel 12 is connected at one end to the shaft 13 and is wound simultaneously with the winding of the clock movement, and for this purpose I fix to said shaft 13 a bevel pinion 98 to mesh with a bevel pinion 99 on a vertical shaft 100, said latter shaft having a second bevel pinion 101 to mesh with a bevel pinion 102 on the spring-winding shaft 103 of the clock movement, said shaft having a squared end for the application of a suitable winding key. The ratio of the gearing 98, 99, 101 and 102 is such that the motion of the spring-winding shaft 13 of the time-recording mechanism will be synchronous with that of the spring-winding shaft 103 of the clock movement. Return movement of the shaft 13 is prevented by a ratchet wheel 104 fixed to the shaft and a spring influenced pawl or detent 105 engaging with said ratchet wheel. The shaft 13 may be provided with a squared end for the application of a suitable winding key to wind the clock movement and time-recording mechanism through the latter, or the time-recording mechanism may be wound independently by omitting the shaft 100 and the pinions 98, 99, 101 and 102.

The means to lock the card-carrier in its advanced positions, comprises a bell-crank lever 107, one arm of which has a finger 108 to engage in one of a series of notches or recesses formed in the bases of the teeth of the rack 56, and maintained therein by a spring influenced pawl 52^a, pivotally connected to the arm of the lever 52 which engages with the cam 51, engaging with the other arm of the bell-crank lever 107. A spring 54′ normally tends to throw the finger 108 out of engagement with the notches in the rack 56, but is prevented from doing so by the engagement of the pawl or lever 52^a with the other arm of the lever 107. However, when the arm 52 rides over the high point on the cam 51 and advances the card-carrier, a nose on the pawl 52^a will engage in a recess 52^b in the one arm of the bell-crank lever 107, the spring 54′ momentarily throwing the finger 108 out of engagement with the rack-teeth notches, and as the carrier is advanced by the pawl 54 the finger 108 will ride over a tooth of the rack and engage in the succeeding tooth notch and lock the carrier in advanced position. A spring 109 connected to the carrier tends to draw the carrier backward so a tooth of the rack will bear against the finger 108.

The casing in which the mechanism is inclosed is provided with a slot 106 through which the upper open end of the carrier may project, or the carrier may be below but registering with said opening. The opening in the carrier may be in the form of a flaring mouth or funnel shaped to permit of the ready insertion of the card. The casing may also be provided with a door *d* provided with a lock whereby to get access to the recording mechanism to inspect or set the same.

While I have shown the minute, meridian and hour wheels as provided with type on the perimeters thereof and an impression made upon the card or record-surface carrier by means of an ink ribbon, I do not limit myself to this manner of making an impression upon the card, as the impression devices may be in the form of pin-type, or punches, to perforate the card as it is forced against said devices by the trip arm and connected platen. Furthermore, while I have shown the time recorder in connection with and controlled by a clock movement independent of the recording mechanism, it will be obvious that the time-recorder may be so constructed that the escapement pawl is controlled by mechanism actuated by the spring drum of the recording mechanism; that is, so that the pawl will be caused to engage alternately with the teeth of the wheels of the escapement to permit the intermittent advance of the minute, meridian and hour wheels.

The operation of my improved time recorder is substantially as follows: At the beginning of the week the person having the time recorder in charge, usually the time keeper, will set the card-carrier to its extreme left-hand position by throwing the pawl 54 and finger 108 out of engagement with the carrier rack by means of a hand piece 110 connected to the bell-crank lever 107, the said hand piece having an extension to engage with a pin on the pawl 54. It is now ascertained if the recording mechanism coincides with the time of the clock move-

ment. If not, the lever 21 is raised, which is permissible owing to the manner of its connection to the escapement pawl 22, comprising a pin or screw passing through a slot in said lever, and the end of the lever being forked to engage with a second pin or stud on said pawl 22. The minute and hour wheels are now adjusted to coincide with the time indicated on the clock, when the lever 21 is released and the spring 25 will cause the forked portion to engage with the stud on the escapement, and the pawl controlled or operated by the clock movement.

The employee as he arrives in the morning places his card in the carrier so that the surface having time indications thereon will face toward the impression devices on the minute, meridian and hour wheels. He now presses down on the lever 65 which will trip the arm 60 and cause the head or platen to impinge the card against the impression devices and impressing the time of the arrival of said employee thereon. When the employee leaves at noon the card is again placed in the carrier and is adjusted therein by the crank 73 by swinging said crank upward until the pointer 74 registers with the word "Out" on the dial 75, when the arm 60 is again tripped by means of the lever 65. On the return of the employee at noon the operation is repeated with the exception that the card is again adjusted in the carrier by swinging the crank so that the pointer will register with the second word "In" on the dial.

Instead of registering the time of arrival and departure of an employee on the card, the time of commencement and finishing of a job may be indicated thereon, in which case two cards are employed, one to indicate the time of arrivel and departure of the employee, and the other to indicate the commencement and finishing of a job. However, when the recorder is used in offices it is only necessary to have one card.

Variations may be resorted to within the scope of my invention, and portions thereof may be used without others.

Having thus described my invention, I claim:

1. In a time recorder, the combination with a clock movement, of a time-recording mechanism including meridian, minute and hour wheels having impression devices on the perimeters thereof; a spring drum to actuate said mechanism; an escapement controlled by the clock movement to control the movement of said mechanism; a platen movable independently toward the recording mechanism; a carrier for a card or record-surface interposed between the recording mechanism and the platen; means controlled by the escapement and actuated by the spring drum to move the carrier predetermined distances at predetermined times in a direction horizontal of the recording mechanism; means to move the card in a vertical direction in the carrier and indicate the extent of such movement; and independently operable means to cause the platen to move toward the recording mechanism and force the card against the impression devices on the meridian, minute and hour wheels to make an impression thereon.

2. In a time recorder, the combination with a clock movement, of a time recording mechanism including minute, meridian and hour wheels having impression devices on the perimeters thereof; a rotary escapement to intermittently advance the minute wheel, comprising a pair of toothed wheels, the teeth of one of which wheels are staggered relatively to the teeth of the other wheel; an escapement pawl; a pinion having a pin in the face thereof and driven by the minute wheel of the clock movement; a link connected to said pawl and having a forked portion in which the pin of the minute-wheel driven gear engages to operate the escapement; means to advance the meridian and hour wheels synchronously a predetermined distance upon each revolution of the minute wheel; and a spring drum to actuate said mechanism.

3. In a time recorder, the combination with a clock movement, of a time-recording mechanism including minute, meridian and hour wheels having impression devices upon the perimeters thereof; a rotary escapement comprising a pair of toothed wheels, the teeth of one of which wheels are staggered relative to the teeth of the other wheel; an escapement pawl controlled by the clock movement to permit the advance of the escapement one tooth space each minute; means to intermittently rotate the minute wheel synchronously with the movements of the escapement; and means to advance the meridian and hour wheels synchronously a predetermined distance upon each revolution of the minute wheel; and a spring drum to actuate said mechanism.

4. In a time recorder, the combination with a clock movement, of a time-recording mechanism including meridian, minute and hour wheels having impression devices upon the perimeters thereof, said minute wheel comprising an annular member having internal gear teeth; a fixed disk upon which the minute wheel is rotatably mounted; an escapement; an escapement pawl controlled by the clock movement to permit the escapement to advance one tooth space each minute; means to advance the minute wheel synchronously with the advancing movement of the escapement; and to advance the meridian and hour wheels upon each revolution of the minute wheel; and a spring drum to actuate said mechanism.

5. In a time recorder, the combination with a clock movement, of a time-recording mechanism including meridian, minute and hour wheels having impression devices upon the perimeters thereof, said minute wheel comprising an annular member having internal gear teeth; a fixed disk upon which the minute wheel is rotatably mounted; an escapement; an escapement pawl controlled by the clock movement to permit the escapement to advance one tooth space each minute; means to advance the minute wheel synchronously with the advance movement of the escapement, comprising a pinion rotatable with the escapement and meshing with the internal gear teeth of the minute wheel; means to advance the meridian and hour wheels upon each revolution of the minute wheel; and a spring drum to actuate said mechanism.

6. In a time recorder, the combination with a clock movement, of a time-recording mechanism including a minute wheel, comprising an annular member having internal gear teeth and impression devices on the perimeter thereof; a disk fixed to the framework of the recording mechanism upon which the minute wheel is rotatably mounted; a meridian wheel and an hour wheel having impression devices upon the perimeters thereof; a rotatable shaft to which said wheels are fixed; an escapement; an escapement pawl controlled by the minute wheel of the clock movement to permit the escapement to advance one tooth space upon each revolution of said minute wheel; means to advance the minute wheel of the recording mechanism synchronously with the movement of the escapement, comprising a pinion rotatable with the escapement and meshing with the internal teeth of the minute wheel of the recording mechanism; a ratchet on the shaft of the meridian and hour wheels; a pawl to engage with said ratchet; means to cause said pawl to advance the ratchet one tooth space and the meridian and hour wheels upon each revolution of the minute wheel; and a spring drum to actuate said mechanism.

7. In a time recorder, the combination with a clock movement, of a time-recording mechanism including minute, meridian and hour wheels having impression devices upon the perimeters thereof; an escapement to control the movement of the minute wheel; an escapement pawl controlled by the minute wheel of the clock movement to advance the escapement and the minute wheel of the recording mechanism upon each revolution of the minute wheel of the clock movement; means to advance the meridian and hour wheels one space upon each revolution of the minute wheel and to impart a complete revolution to said wheels upon twenty-four revolutions of said minute wheel; a card or record surface carrier; means to adjust said carrier a predetermined distance in a direction horizontal to the recording mechanism upon each revolution of the meridian and hour wheels; means to lock the carrier in its adjusted positions; a spring drum to actuate said mechanism; and means to adjust the card in the carrier transversely to the adjustment of the carrier, comprising a movable support upon which the bottom of the card rests, a crank, and a link connection between said support and crank.

8. In a time recorder, the combination with a clock movement, of a time recording mechanism including minute, meridian and hour wheels having impression devices upon the perimeters thereof; an escapement to control the movement of the minute wheel; an escapement pawl controlled by the clock movement; means to advance the meridian and hour wheels one space upon each revolution of the minute wheel and to impart a complete revolution to said wheels upon twenty-four revolutions of said minute wheel; a card or record-surface carrier; means to adjust said carrier a predetermined distance upon each revolution of the meridian and hour wheels; means to lock the carrier in its adjusted positions; a spring drum to actuate said mechanism; a movable support for the card in the carrier; and a crank connected to said support to adjust the card in the carrier transversely to the adjustment of the carrier.

9. In a time recorder, the combination with a clock movement, of a time-recording mechanism including minute, meridian and hour wheels having impression devices upon the perimeters thereof; an escapement to control the movement of the minute wheel; an escapement pawl operated by the clock movement to control the movement of the escapement; means to advance the meridian and hour wheels one space upon each revolution of the minute wheel and to impart a complete revolution to said wheels upon twenty-four revolutions of the minute wheel; a card or record-surface carrier; means to adjust said carrier a predetermined distance in a direction horizontal to the recording mechanism upon each revolution of the meridian and hour wheels; means to lock the carrier in its adjusted positions; a spring drum to actuate said mechanisms; a movable support for the card in the carrier; a crank connected to said support to adjust the card in the carrier transversely to the adjustment of the carrier; a dial; and a pointer connected to the crank to indicate on the dial the extent of the movement of the card.

10. In a time recorder, the combination with a clock movement, of a time-recording mechanism including minute, meridian and

hour wheels having impression devices upon the perimeters thereof; a spring drum to actuate said mechanism; an escapement comprising a pair of toothed wheels, the teeth of one of which wheels are staggered relative to the teeth of the other wheel; an escapement pawl controlled by the clock movement to permit the escapement to advance one tooth space each minute; means to advance the minute wheel synchronously with the movement of the escapement; means controlled by the escapement to advance the meridian and hour wheels one space upon each revolution of the minute wheel and to impart a complete revolution to said wheels upon twenty-four revolutions of said minute wheel; a card or record-surface carrier; means controlled by the escapement and actuated by the spring drum; to adjust said carrier a predetermined distance in a direction horizontal to the recording mechanism upon each revolution of the meridian and hour wheels; means to adjust the card in the carrier transversely to the adjustment of the carrier; and manually operable means to force the card against the impression devices on the minute, meridian and hour wheels to make an impression upon the card.

11. In a time recorder, the combination with a clock movement, of a time recording mechanism, including minute, meridian and hour wheels having impression devices upon the perimeters thereof; a spring drum to actuate said mechanism; an escapement; an escapement pawl controlled by the clock movement to control the movement of the escapement and through said escapement the movements of the minute, meridian and hour wheels; a card or record-surface carrier; means to adjust said carrier a predetermined distance in a direction horizontal to the recording mechanism upon each revolution of the meridian and hour wheels; a spring drum to actuate said mechanisms; means to adjust the card in the carrier transversely to the adjustment of the carrier; and manually operable means to force the card against the impression devices on the minute, meridian and hour wheels to make an impression upon the card, comprising a trip arm having a head or platen movable radially toward the minute, meridian and hour wheels, a spring to normally maintain the platen out of engagement with the card and wheels, a second spring to cause the platen to impinge against the card and wheels, and a lever to trip said arm to cause the latter spring to impinge the platen against the card and wheels.

12. In a time recorder, the combination with a clock movement, of a time-recording mechanism including minute, meridian and hour wheels having impression devices upon the perimeters thereof; a spring drum to actuate said mechanism; an escapement; an escapement pawl controlled by the clock movement to control the movement of the escapement and through said escapement the movements of the minute, meridian and hour wheels; a card or record-surface carrier; and manually operable means to force the card against the impression devices to make an impression thereon, comprising a pivoted arm having a notch and a head or platen movable toward the minute, meridian and hour wheels, a spring to normally maintain the arm in position with the platen out of engagement with the card and wheels, a second spring to cause the platen to be impinged against the card and impression devices, a hand lever, a spring pressed pawl pivotally carried by said lever to engage in the notch in the arm; the said lever operable to force the arm against the tension of the second spring and throw the pawl out of engagement with the notch in the arm whereby the said spring will cause the arm to impinge the platen against the card and impression devices on the wheels.

13. In a time recorder, the combination with a clock movement, of a time-recording mechanism including minute, meridian and hour wheels having impression devices upon the perimeters thereof; an escapement to control the movement of the minute wheel; an escapement pawl operated by the clock movement to control the movements of the escapement; means to advance the meridian and hour wheels one space upon each revolution of the minute wheel and to impart a complete revolution to said wheels upon twenty-four revolutions of the minute wheel; comprising a pinion rotatable with the escapement, a main drive gear with which said pinion meshes having a plurality of equidistantly spaced pins in the face thereof, a ratchet wheel rotatable with the meridian and hour wheels, a spring pressed pawl to engage with said ratchet wheel and operable by the gear-pins; a card or record-surface carrier; means to adjust said carrier a predetermined distance horizontally to the recording mechanism upon each revolution of the meridian and hour wheels, comprising a rack carried by said carrier, a pivoted two arm lever, a rotatably supported spiral or helical cam with which one arm of the lever engages, a spring pressed pawl to engage with the carrier rack, a gear connected to the cam, a pinion on the shaft of the main drive gear to mesh with the cam gear, a second gear on said shaft, and a spring drum having gear teeth to mesh with said latter gear; said drum actuating the mechanisms of the time recorder.

14. In a time recorder, the combination with a clock movement, of a time-recording mechanism including minute, meridian and hour wheels having impression devices upon

the perimeters thereof; a spring drum to actuate said mechanism; an escapement; an escapement pawl controlled by the clock movement to control the movements of the escapement; means controlled by the escapement to advance the minute wheel one space each minute; and to advance the meridian and hour wheels one space upon each revolution of the minute wheel and to impart a complete revolution to said wheels upon twenty-four revolutions of the minute wheel, comprising a pinion rotatable with the escapement and meshing with the internal gear teeth of the minute wheel, a second pinion rotatable with the escapement, a main drive gear with which said latter pinion meshes having a plurality of equidistantly spaced pins in the face thereof, a ratchet wheel rotatable with the meridian and hour wheels, a spring pressed pawl to engage with said ratchet wheel and operable by the gear pins.

15. In a time recorder, the combination with a clock movement, of a time-recording mechanism including minute, meridian and hour wheels having impression devices upon the perimeters thereof; an escapement to control the movement of the minute wheel; an escapement pawl operable by the clock movement to control the movements of the escapement; means to advance the meridian and hour wheels one space upon each revolution of the minute wheel and to impart a complete revolution to said wheels upon twenty-four revolutions of the minute wheel, comprising a pinion rotatable with the escapement, a main drive gear with which said pinion meshes having a plurality of equidistantly spaced pins in the face thereof, a ratchet wheel rotatable with the meridian and hour wheels, and a spring pressed pawl to engage with said ratchet wheel and operable by the gear pins; a card or record-surface carrier; means to adjust said carrier a predetermined distance horizontally to the recording mechanism upon each revolution of the meridian and hour wheels, comprising a rack carried by said carrier, a pivoted two arm lever, a rotatably supported spiral or helical cam with which one arm of the lever engages, a spring pressed pawl to engage with the carrier rack, a gear connected to the cam, a pinion on the shaft of the main drive wheel to mesh with the cam gear, a second gear on said shaft, and a spring drum having gear teeth to mesh with said latter gear; said drum actuating the mechanisms of the time recorder; and means to lock the carrier in its adjusted positions.

16. In a time-recorder, the combination of a spring actuated time-recording mechanism including minute, meridian and hour wheels having impression devices upon the perimeters thereof; an escapement mechanism to advance the minute wheel one space each minute; means also controlled by the escapement mechanism to advance the meridian and hour wheels one space upon each revolution of the minute wheel; a card or record-surface carrier to have movement in a direction axially to the minute, meridian and hour wheels; means controlled by the escapement mechanism to advance said card-carrier a predetermined distance upon each revolution of the meridian and hour wheels; and manually operable means to adjust the card in the carrier in a direction transverse to the movement of said carrier.

17. In a time-recorder, the combination of a spring actuated time-recording mechanism including minute, meridian and hour wheels having impression devices upon the perimeters thereof; an escapement mechanism to advance the minute wheel one space each minute; means also controlled by the escapement mechanism to advance the meridian and hour wheels one space upon each revolution of the minute wheel; a card or record-surface carrier to have movement in a direction axially to the minute, meridian and hour wheels; means controlled by the escapement mechanism to advance said card-carrier a predetermined distance upon each revolution of the meridian and hour wheels; manually-operable means to adjust the card in the carrier in a direction transverse to the movement of said carrier; and manually-operable means to force the card against the impression devices on the minute, meridian and hour wheels to cause an impression to be made thereon.

18. In a time-recorder, the combination of a spring-actuated time-recording mechanism including minute, meridian and hour wheels, having impression devices upon the perimeters thereof; an escapement mechanism to advance the minute wheel one space each minute; means also controlled by the escapement mechanism to advance the meridian and hour wheels one space upon each revolution of the minute wheel; a card or record-surface carrier to have movement in a direction axially to the minute, meridian and hour wheels; means controlled by the escapement mechanism to advance said card-carrier a predetermined distance upon each revolution of the meridian and hour wheels; manually-operable means to adjust the card in the carrier predetermined distances in a direction transverse to the movement of said carrier; manually operable means to force the card against the impression devices on the minute, meridian and hour wheels to cause an impression to be made thereon; and an inking ribbon interposed between the impression devices on the minute, meridian and hour wheels and card-carrier and caused to be intermittently fed by the means to force the card against the impression devices after an impression has been made on the card.

19. In a time-recorder, the combination of a spring actuated time-recording mechanism including minute, meridian and hour wheels having impression devices upon the perimeters thereof; an escapement to advance the minute wheel one space each minute; means also controlled by the escapement to advance the meridian and hour wheels one space upon each revolution of the minute wheel; a card or record-surface carrier to have movement in a direction axially to the minute, meridian and hour wheels; means controlled by the escapement to advance said carrier a predetermined distance upon each revolution of the meridian and hour wheels; manually operable means to adjust the card in the carrier in a direction transverse to the movement of the carrier; manually operable means to force the card against the impression devices on the minute, meridian and hour wheels to cause an impression to be made thereon; an inking ribbon interposed between the impression devices on the minute, meridian and hour wheels and the card-carrier and caused to be intermittently fed by the means to force the card against the impression devices after an impression has been made on the card; and means to automatically reverse the direction of travel of the ribbon after it has traveled a certain distance in one direction.

20. In a time recorder, the combination with a clock movement, of a time-recording mechanism including minute, meridian and hour wheels having impression devices upon the perimeters thereof; an escapement to control the movement of the minute wheel; a pawl operable by the clock movement to control the movements of the escapement; means to advance the meridian and hour wheels one space upon each revolution of the minute wheel; a card or record-surface carrier; means to adjust said carrier a predetermined distance horizontally to the recording mechanism upon each revolution of the meridian and hour wheels, comprising a rack carried by said carrier, said rack having notches or recesses at the base of the teeth, a pivoted two-arm lever, a rotatably supported spiral or helical cam with which one arm of the lever engages, a spring pressed pawl to engage with the carrier rack, a gear connected to the cam, a pinion on the shaft of the main drive wheel, and a spring drum having gear teeth on the periphery thereof to mesh with said latter gear; said drum actuating the mechanisms of the time recorder; and means to lock the carrier in its adjusted positions, comprising a bell-crank lever one arm of which has a finger to normally engage in a notch at the base of the carrier-rack teeth, a spring tensioned to normally tend to throw the finger out of engagement with the rack notch, and a spring influenced pawl carried by the two-arm cam lever having a finger to engage in a notch in the arm of the rack-notch engaging lever when the cam arm runs or rides over the high point on the cam and just as the card carrier is advanced to permit the bell-crank lever spring to momentarily throw the finger on the one arm of said lever out of engagement with the rack notch.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."

Correction in Letters Patent No. 1,074,069.

It is hereby certified that in Letters Patent No. 1,074,069, granted September 23, 1913, upon the application of Jacob Sokolov, of New York, N. Y., for an improvement in "Time-Recorders," an error appears in the printed specification requiring correction as follows: Page 6, line 127, after the word "escapement," page 8, line 19, after the word "drum," and page 9, line 7, after the word "minute" strike out the semicolons; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 14th day of October, A. D., 1913.

[SEAL.]

R. T. FRAZIER,

Acting Commissioner of Patents.

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