July 10, 1934. V. O. STURTEVANT 1,965,969

TIME RECORDER

Filed Jan. 5, 1929 3 Sheets-Sheet 1

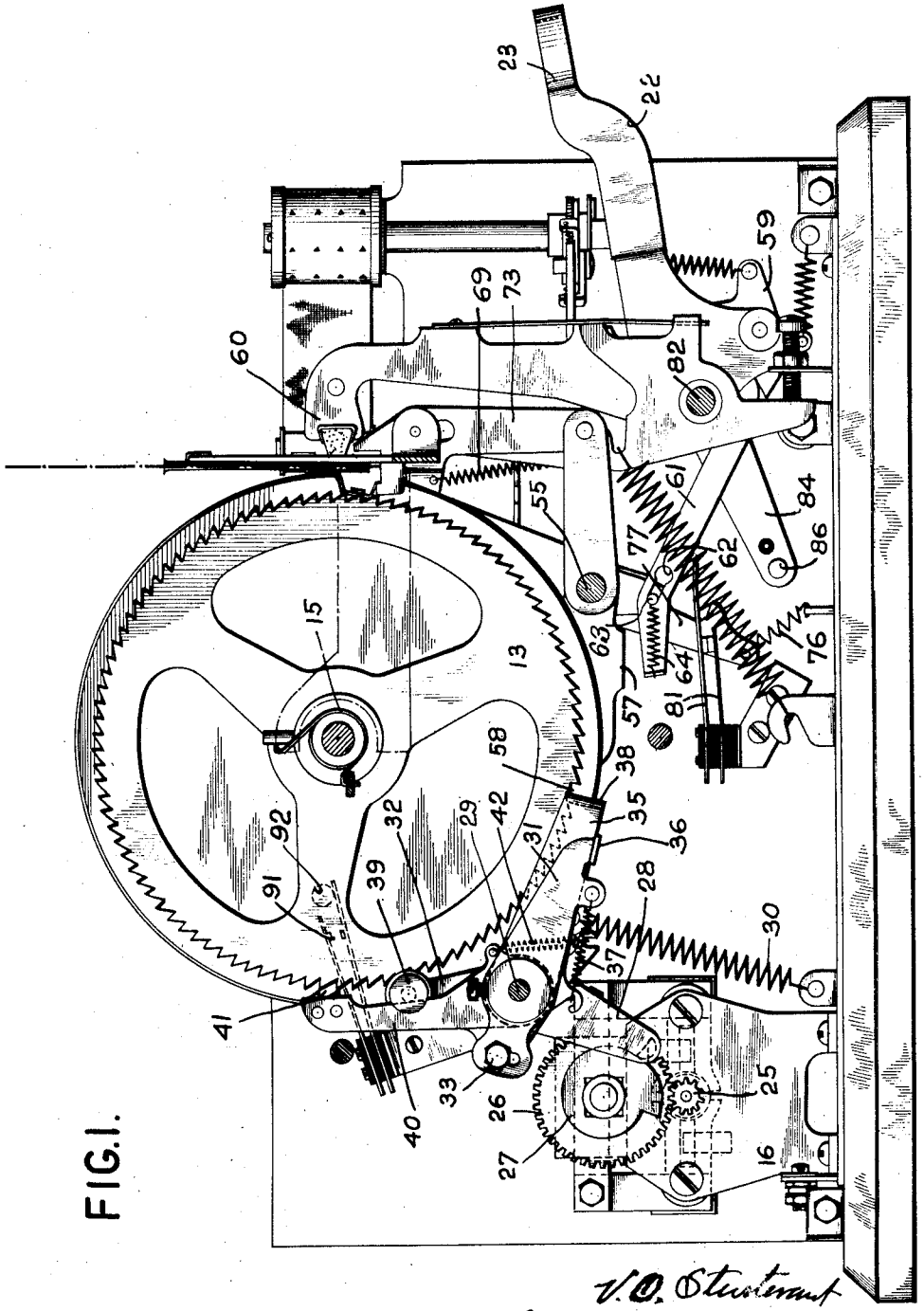


FIG. 1.

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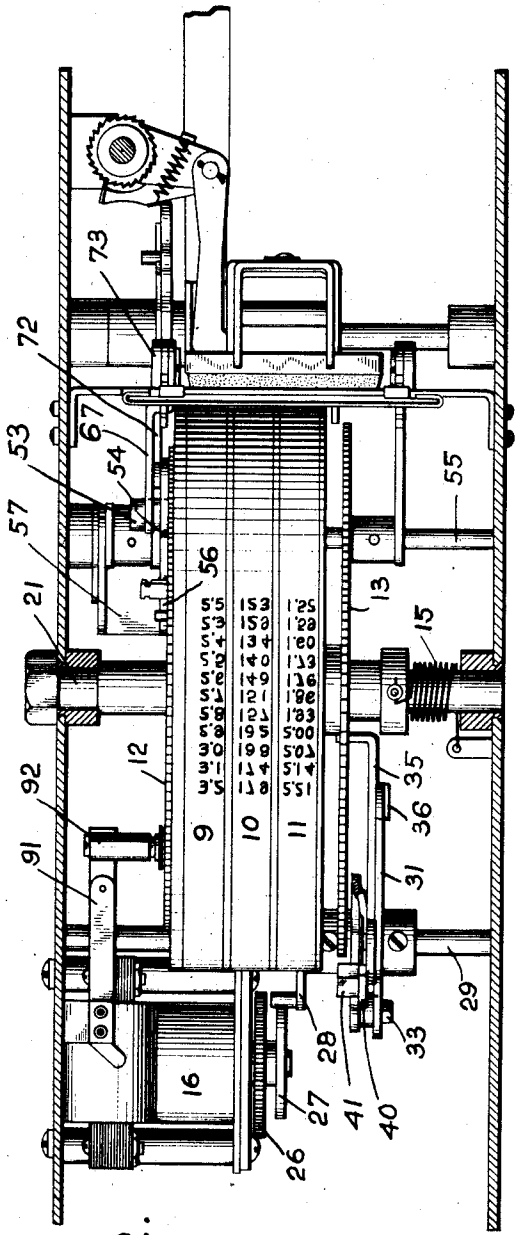


FIG. 2.

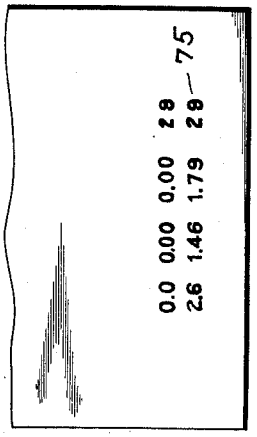


FIG. 5.

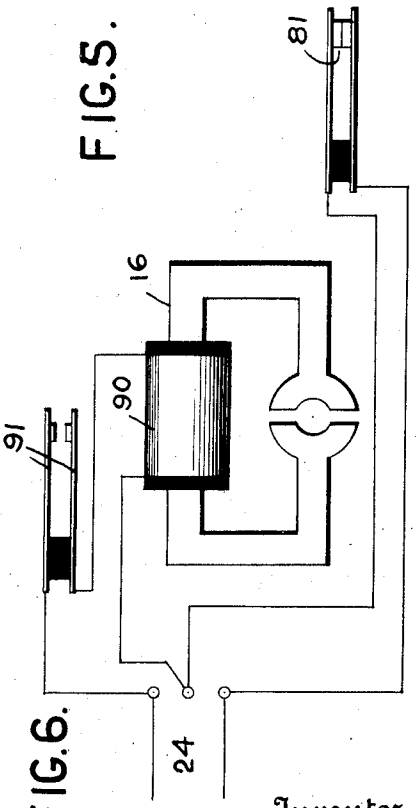


FIG. 6.

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TIME RECORDER

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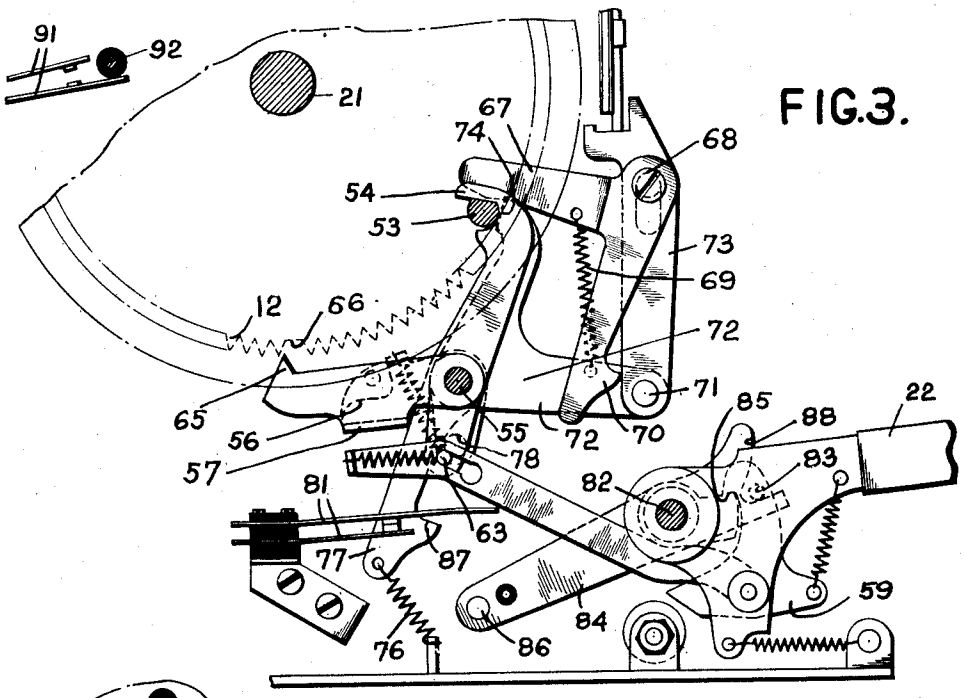


FIG.3.

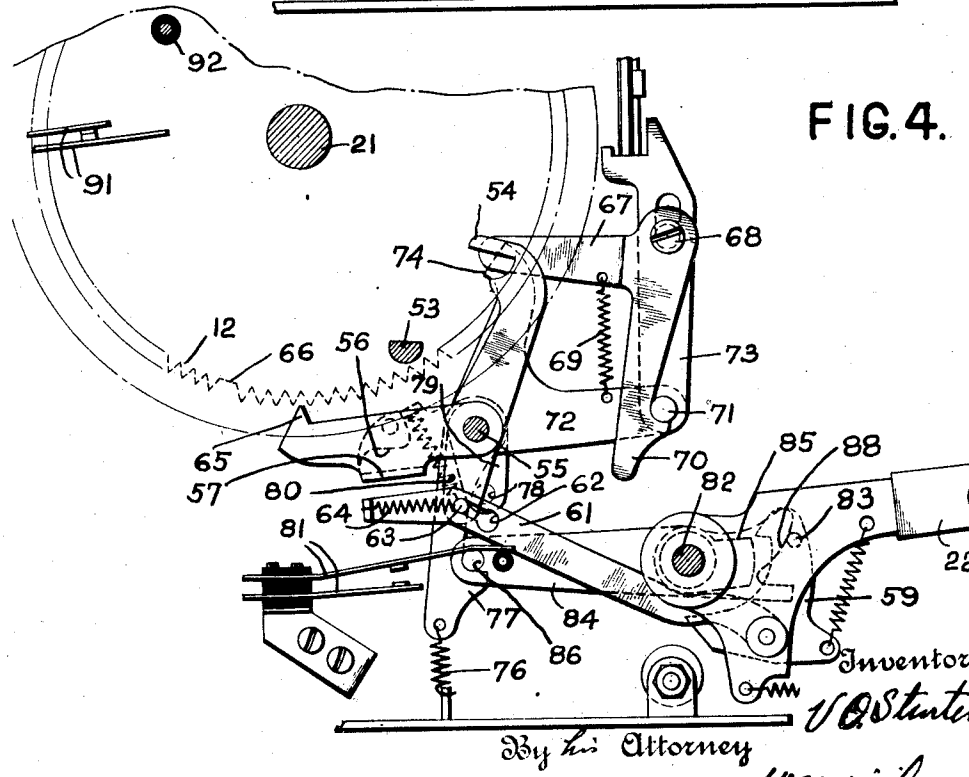


FIG.4.

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Patented July 10, 1934 1,965,969

UNITED STATES PATENT OFFICE

1,965,969

TIME RECORDER

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Application January 5, 1929, Serial No. 330,543

13 Claims. (Cl. 234—43)

This invention relates to improvements in time recorders and is more particularly directed to improvements in the type of individual workmen's time recorder shown and described in the patent to T. J. Watson, No. 1,481,574, dated January 22, 1924, and patent to C. D. Lake, No. 1,608,888, dated November 30, 1926.

In the recorder shown in the above mentioned patents means are provided for taking a start and finish record from a time controlled wheel after which the wheel is reset to zero by the operator. In the time recorder shown the advance of the wheel from zero was controlled by a magnet which in turn was time controlled but no provisions were made heretofore whereby the machine would call into operation the controlling mechanism at a start operation and inhibit the operation upon taking a finish record. Such controlling devices could only be obtained by the usual program unit which entailed the operation and maintenance of additional machines.

In the present embodiment the controlling device for the advancing mechanism comprises a self starting synchronous motor which has associated therewith suitable contact devices controlled by manipulations of the printing manual.

One object of the present invention is to provide in a time recorder means whereby the time wheel advancing mechanism is controlled by operation of the machine.

Another object of the invention is to incorporate in a workman's time recorder a time wheel controlling mechanism comprising a self starting synchronous motor, the operation of which is controlled by the usual printing manual.

Other objects of the present invention reside in the improvements of certain details of construction which will be more fully set forth in the accompanying specification and claims and shown in the drawings which disclose a preferred embodiment of the invention.

In the drawings:

Fig. 1 is a side view of the recorder.

Fig. 2 is a top plan view of the recorder.

Fig. 3 is a side view illustrating the position of the parts at the zero start position of the machine.

Fig. 4 is a view similar to Fig. 3 showing the parts in moved position.

Fig. 5 is a concrete example of a card printed by the machine.

Fig. 6 is a diagram of the preferred electrical circuit connections.

In more detail, the recorder comprises a suitable casing within which are rotatably mounted a time wheel 9 and time value wheels 10 and 11. Fixed to these wheels is aligning wheel 12 and an escapement wheel 13. The time, value, escapement and aligning wheels are normally advanced as a unit by a coil spring 15.

The reset shaft 21 is fast to wheels 9, 10 and 11 and to the aligning and escapement wheels and is provided with a hexagonal or like end to receive the hexagonal aperture 23 provided for the purpose of resetting the machine preferably formed as a part of the removable printing manual 22 (Fig. 1).

The time controlling mechanism in the present instance comprises a self starting synchronous motor 16 preferably of the two pole type which will run at a speed of 3600 revolutions per minute when connected to a 60 cycle current supply 24 (Fig. 6). The armature drives a pinion 25 through a suitable reduction gearing (not shown) so that the pinion makes a complete revolution each minute. Pinion 25 meshes with a gear 26 the gear ratio providing a single revolution of gear 26 each six minutes, so that through suitable escapement mechanism the time wheel may print in tenths of the hourly period.

Rotatable with gear 26 is a spiral cam 27 (Fig. 1) against which bears a follower of one arm of a bell crank arm 28 secured to a cross rod 29, the other arm having connected thereto a spring 30 to constantly urge the follower against the profile of the cam. Also secured to the rod 29 is an arm 31 connected to an adjacent upstanding arm 32 by a screw 33, adjustable to change the relative position of said arms. Loosely mounted on rod 29 and adjacent arm 31 is an escapement pawl 35 having an integral lug 36. Interconnected between pawl 35 and arm 31 is a spring 37 which acts to urge the engaging lug 38 of the pawl 35 in cooperation with the teeth of escapement wheel 13. Loosely mounted upon rod 29 and guided by a stud 39 secured to arm 32 is a supplemental pawl 40 carrying a pawl block 41 for cooperation with wheel 13. A spring 42 urges the pawl in this direction but is normally limited by the shank of the stud 39.

At the termination of a tenth of an hour period bell crank 28 urged by spring 30 will drop to the low part of the spiral cam 27 rocking arms 31 and 35, the latter by means of lug 36. This withdraws pawl 35 from cooperation with the escapement wheel, which then rotates until one of the teeth thereof engages the upper tooth of shifted pawl block 41, stopping the rotation of the printing wheels. During the subsequent period the pawls 35 and 40 are operated reversely to bring the parts in the position shown in Fig. 1.

Fixed to the aligning wheel 12 is a reset to zero stop pin 53. Cooperating with this stop pin when the recorder is reset to zero is a dog 54 loosely pivotally mounted on a shaft 55 and having a tail portion 56 normally resting upon a bail 57 which is also loosely pivoted upon shaft 55. When the recorder is being restored to zero the operator applies the resetting wrench 22 to the end of the shaft 21 and turns the shaft and parts 9, 10, 11, 12 and 13 connected therewith in a counterclockwise direction (Fig. 3) until pin 53 engages the notch in dog 54 which then snaps forward under the lower edge of pin 53. During this resetting operation either the pawls 40 and 35 click idly over the teeth of escapement wheel 13 and coil spring 15 is wound up.

At the time when the dog 54 has engaged under the lower edge of the pin 53, pawl 35 will be disposed in a large notch 58 of ratchet wheel 13 (see Fig. 1). If now the dog 54 be rocked clockwise to withdraw it from out of cooperation with pin 53, ratchet wheel 13 and parts connected therewith will automatically make a half step of advance under influence of coil spring 15. Such movement will not occur, however, until the dog 54 is retracted rearwardly. This retraction of the dog is effected by taking of the start record in the following manner.

The depression of manual 22 through hook 59 effects the operation of printing hammer 60 in the usual manner. Pivotally connected to the frame which is rocked by the manual is a link 61 which is slotted at its end as shown at 62 to receive a pin 63 which is spring connected by spring 64 to the end of link 61. Upon actuation of the manual, spring 64 will draw forward on the pin 63 which pin is carried by the bail frame 57 thereby rocking the bail in a clockwise direction and engaging an aligning dog 65 integral with the bail with a notch 66 in the aligning wheel 12. The upward rocking of bail 57 will cause the tail 56 of the dog 54 to be elevated thereby rocking the dog clockwise and releasing the zero stop pin 53. This half step of movement of the printing drum will be held by the escapement pawl 35 as the lug 38 of pawl 35 will now be in an abutting relationship with the radial edge defining one wall of the notch 58. During the printing operation the upper imprint on the card (Fig. 5) will be effected, indicating zero time, value and the workman's number "29". If the escapement mechanism should be in such a position that pawl 40 is in cooperation with the ratchet wheel 13 instead of pawl 35, the pawl block 41 will permit this initial half step of movement, as is well understood.

When the pin 53 is restored to the zero start position it will contact one arm of a bell crank latch arm 67 pivoted at 68 and rock it against the action of a spring 69 to withdraw a hooked portion 70 thereof out of engagement with a stud 71 which is the pivotal connection between one arm of a supplemental bell crank lever 72 connected to rod 55 and a card abutment slide 73. The latter is slidably mounted upon the pivot stud 68.

Restoration of pin 53 will contact the engaging end 74 of one arm of bell crank 72 to positively restore the card abutment to its lowermost position (Fig. 3). When pin 53 is moved to the position shown in Fig. 4, which occurs as an incident to a setting of the printing drums to indicate elapsed time, the elevation of the card abutment is changed in order that the line of print 75 may occur on a different line of the card. In the present embodiment this action is secured by a spring 76 secured to a latch member 77 loose on shaft 55 and which abuts a pin 78 secured to an arm 79 attached to rod 55. In the zero start position (Fig. 3) spring 76 is tensioned permitting it to be effective to rock arm 79 and bell crank member 72 to elevate the card abutment 73.

It will be understood that after the pin 53 leaves the notch in the dog 54 the dog will be restored by a suitable restoring spring 80 which is connected to the tail 56 of the dog and to pin 63.

The manual 22 rocks the platen by the cooperation of a pawl 59 with a shouldered element 85 secured to the platen support shaft 82. A pin 83 secured to pawl 59 is in engagement with a notch in one end of a rock lever 84. Initial depression of manual 22 will cause lever 84 to temporarily open contact blades 81 but the lever will be free to be restored to normal to permit blades 81 to close upon themselves since at the zero start position pin 78 will hold the latch lever 77 in such a position that a pin 86 of lever 84 will not contact a shoulder 87 of latch lever 77.

When the elevation of the card abutment is changed latch lever 77 will be in the position shown in Fig. 4 permitting a latching of lever 84 as it is subsequently operated by manual 22 to retain contact blades 81 open. As the manual is restored a cam edge 88 of the notch in the lever 84 will be effective to cam pawl 59 out of engaging relationship with the shouldered element 85. This serves to prevent further printing operations after the finish record has been taken. Latch lever 77 is, of course, brought to ineffective position when the printing wheels are zeroized.

The motor 16 referred to is preferably of the synchronous self-starting type and may be of the form shown in the patents to Warren, No. 1,283,432, dated October 29, 1918 and No. 1,456,082, dated May 22, 1923. In the diagram (Fig. 6) the coil 90 of the motor is electrically connected to the alternating current supply 24 when contacts 81 and 91 are closed. Contacts 91 are retained opened by a pin 92 secured to the printer drum when the latter is in its zero start position (see Fig. 3). These contacts close by their own resiliency when the drum is given an initial half step of movement. As previously stated this occurs when the handle 22 is initially operated to print a starting time record upon the inserted card. During depression of manual 22 the contacts 81 open temporarily disconnecting the motor which thereupon resumes operation when the manual is restored. Since both contacts 81 and 91 are now closed the motor starts automatically to control the positioning of the drums to indicate elapsed time and corresponding money values.

As soon as the type wheels move forward the card abutment slide 73 is elevated to the position shown in Fig. 4 so as to position a different portion of the record card at the printing point for the next recording operation. Latch lever 77 is then set into the path of lever 84. Upon the following recording operation the card is reinserted in the card chute and the handle 22 again actuated. This operation prints the finish time record showing the direct elapsed time upon the record card. After the finish record has been taken latch lever 77 holds 84 elevated to keep contacts 81 opened to stop the motor. Cam edge 88 comes into operation to prevent further printing operations after the final record has been taken. Following the taking of the elapsed time record, the

type wheels and pertinent parts must be reset by a manual rotation of shaft 21. When the type wheels are fully reset pin 53 will engage the notch in dog 54 which will snap forward under it. This dog will then prevent further advance of the type wheel until the taking of a new start record.

While in the present embodiment the motor has an indirect control over the time wheels it is obvious that with a slight modification of the parts it could directly adjust the wheel proportional to the elapsed time and it is to be understood that it is within the spirit of the invention to employ the modification described or substitute other forms of motor and controlling devices.

While there has been shown and described and pointed out the fundamental novel features of the invention as applied to a single modification it will be understood that various omissions and substitutions and changes in the form and details of the device illustrated and in its operation may be made by those skilled in the art without departing from the spirit of the invention. It is the intention, therefore, to be limited only as indicated by the scope of the following claims:

1. A time recorder in which there is provided a time representing device and means for taking zero and elapsed time records from said device; in combination, a motor inoperative upon taking an elapsed time record and controlling the time advancement of said device, and means under control of the record taking means for initiating operation of the motor upon taking a zero record.

2. A time recorder in which there is provided a time representing device and means for taking zero and elapsed time records from said device; in combination, a motor inoperative after taking an elapsed time record from said device and controlling the operation of said device, and means for preventing operation of said motor until a zero record has been taken.

3. A time recorder in which there is provided a time representing device and means for taking a zero and an elapsed time record from said device; in combination, a motor inoperative after taking an elapsed time record for controlling the operation of said device, and means controlled by the record taking means for initiating operation of the motor upon taking a zero record and inhibiting operation thereof upon taking an elapsed time record.

4. A time recorder in which there is provided a time representing device, means for taking a zero and an elapsed time record from said device, and means for resetting said device; in combination, a motor inoperative after taking a zero record and controlling the operation of the device, means for rendering said motor inoperative after taking an elapsed time record, and means whereby said motor is rendered inoperative at the reset position of said device.

5. A time recorder in which there is provided a time controlled wheel from which an elapsed time record is taken by a device and after which said wheel is reset to a zero start position; in combination, a motor adapted to turn said wheel, means whereby an initial operation of the wheel from reset position sets said motor into operation, and means controlled by said device upon taking an elapsed time record for rendering the motor inoperative.

6. A time recorder in which there is provided a time representing device, an escapement for controlling the advancement of said device and inoperative upon taking an elapsed time record, and means for taking an elapsed time record from said device; in combination, means inoperative upon taking an elapsed time record and controlled by suitable current impulses for controlling the operation of said escapement, and means whereby said record taking means causes said escapement and the last named means to be inoperative when taking an elapsed time record.

7. A time controlled recorder in which there is provided a time representing device from which records are taken and in which there is provided resetting means for said device; in combination, a motor controlling the advancement of said device, means whereby the motor is inoperative at the reset position of said device, means for initiating operation of the motor when a zero record is taken, and means for rendering the motor inoperative when an elapsed time record is taken.

8. A time recorder in which there is provided a time controlled wheel from which records are taken by a printing manual; in combination, a motor for controlling the advancement of the wheel and inoperative upon taking a record from said wheel, means for controlling the duration of operation of said motor, and means whereby said printing manual controls said means in accordance with the taking of zero and elapsed time records.

9. A time recorder having a time designating wheel and means for taking records from said wheel; in combination, a synchronous motor, means whereby said motor is silent after taking a record, said motor having the inherent capability of being self starting and by its continuous operation control the advancement of the wheel to represent time, and means whereby said record taking means causes said motor to be set in operation upon taking one record and causes the silencing means to be effective upon taking another record.

10. In a time recorder, a record representing device, a motor controlling the advancement of said record representing device and inoperative upon taking a second record from the record representing device, means for starting the motor upon taking the first record, means for stopping the motor upon taking the second record, and common means for causing the starting and stopping means to be effective in accordance with taking the first and second record from said record representing device, respectively.

11. A time recorder wherein there is provided a time controlled device and means for taking a zero and an elapsed time record from said device; in combination a self-starting electric motor operable in synchronism with the frequency of an alternating current supply and inoperative upon taking an elapsed time record and adapted to control the operation of said device, and means under control of the record taking means adapted to cause the initiation of the operation of said motor upon taking a zero time record and to cause the termination of its operation upon taking an elapsed time record.

12. A time recorder wherein there is provided a time controlled wheel with means for taking a zero and an elapsed time record from said wheel; in combination, an electric motor adapted to control the position of said wheel and inoperative upon taking an elapsed time record, and means including electrical devices under control of the record taking means adapted to cause the operation of said electric motor only during

the time between taking a zero record and an elapsed time record.

13. A time recorder in which there is provided a wheel advanced in proportion to elapsed time and record taking means for said wheel; in combination, a self-starting motor coupled to said wheel and by its continuous operation advance said wheel, means including an electric circuit for controlling the time of starting and stopping of the motor whereby said wheel represents an elapsed time, and means whereby the last named means and said circuit are controlled by the record taking means.

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