

949,232.

W. D. HAWLEY.  
TIME RECORDER.  
APPLICATION FILED MAR. 2, 1905.

Patented Feb. 15, 1910.

9 SHEETS—SHEET 1.

Fig. 1.

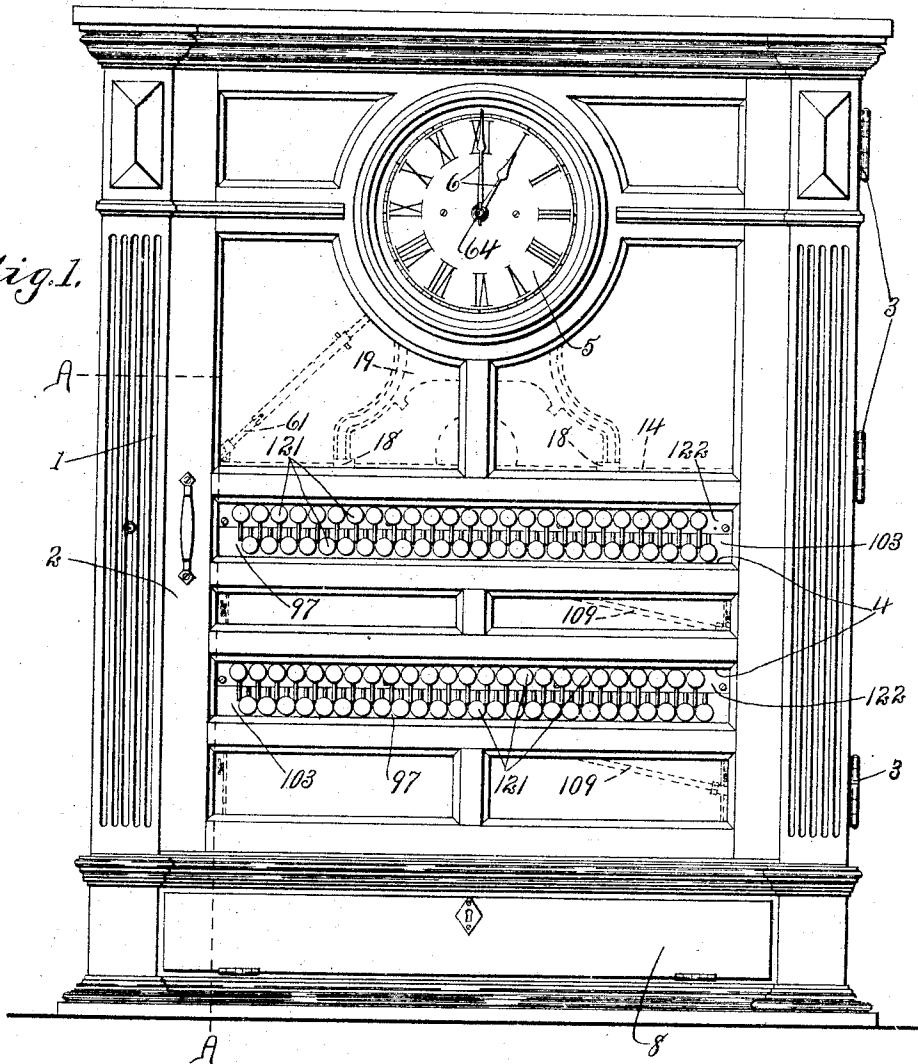
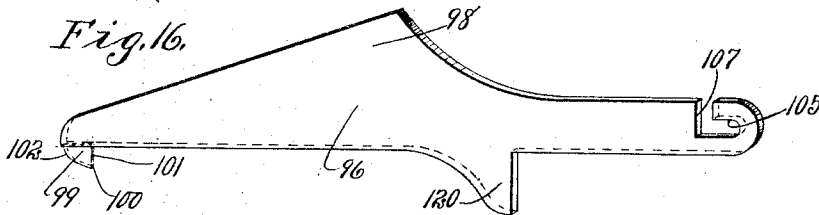


Fig. 16.



WITNESSES:

*Chas. Toner.*  
*Chas. Young.*

INVENTOR

*William D. Hawley*

BY

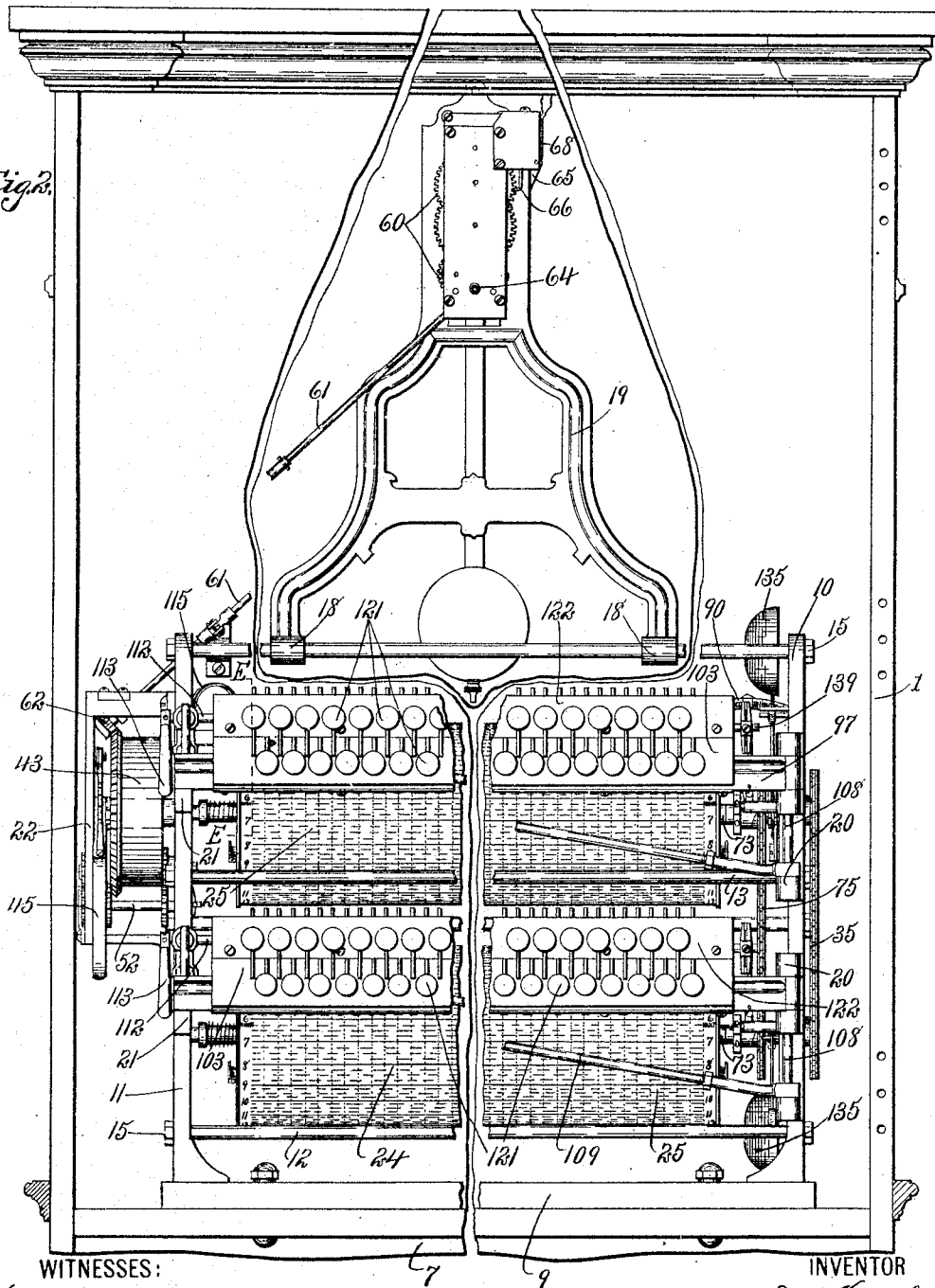
*Heg. Parsons*  
ATTORNEYS

TIME RECORDER.

Patented Feb. 15, 1910.

9 SHEETS—SHEET 2.

*Fig. 2.*



WITNESSES:

Chas. Foner.  
Chas Young.

INVENTOR

William D. Hawley

BY

*Key & Parsons*  
ATTORNEYS

W. D. HAWLEY.

TIME RECORDER.

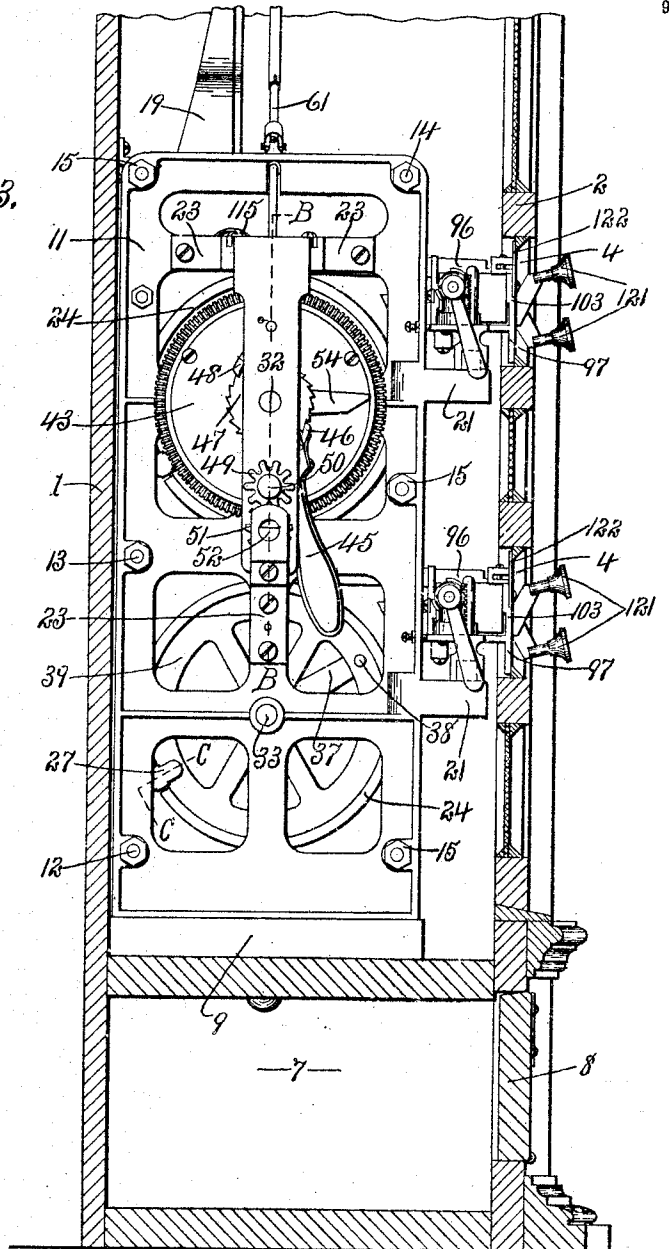
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9 SHEETS—SHEET 3.

Fig. 3.



WITNESSES:

*Chas. Jones.*  
*Chas. Young.*

INVENTOR

*William D. Hawley*

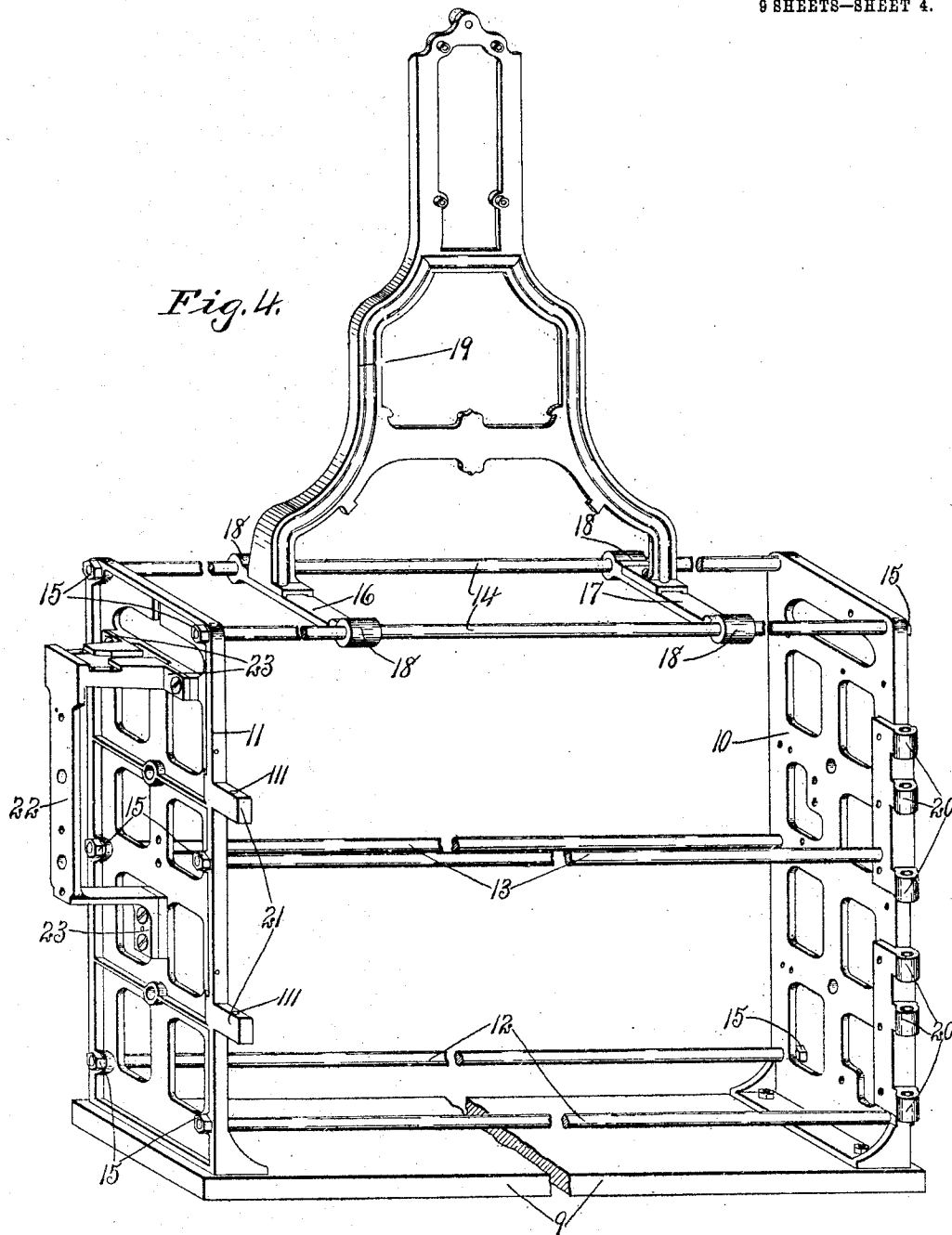
BY

*Wey & Parsons*  
ATTORNEYS

949,232.

Patented Feb. 15, 1910.

9 SHEETS—SHEET 4.



WITNESSES:

*Chas. Jones.*  
*Chas. Young.*

INVENTOR

*William D. Hawley*

BY

*Wm. Parsons*  
ATTORNEYS

949,232.

Fig. 9.

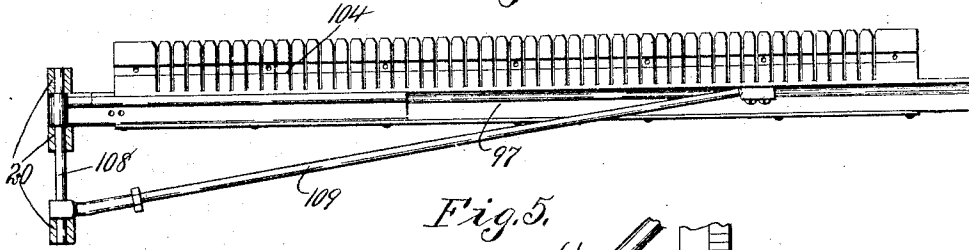


Fig. 5.

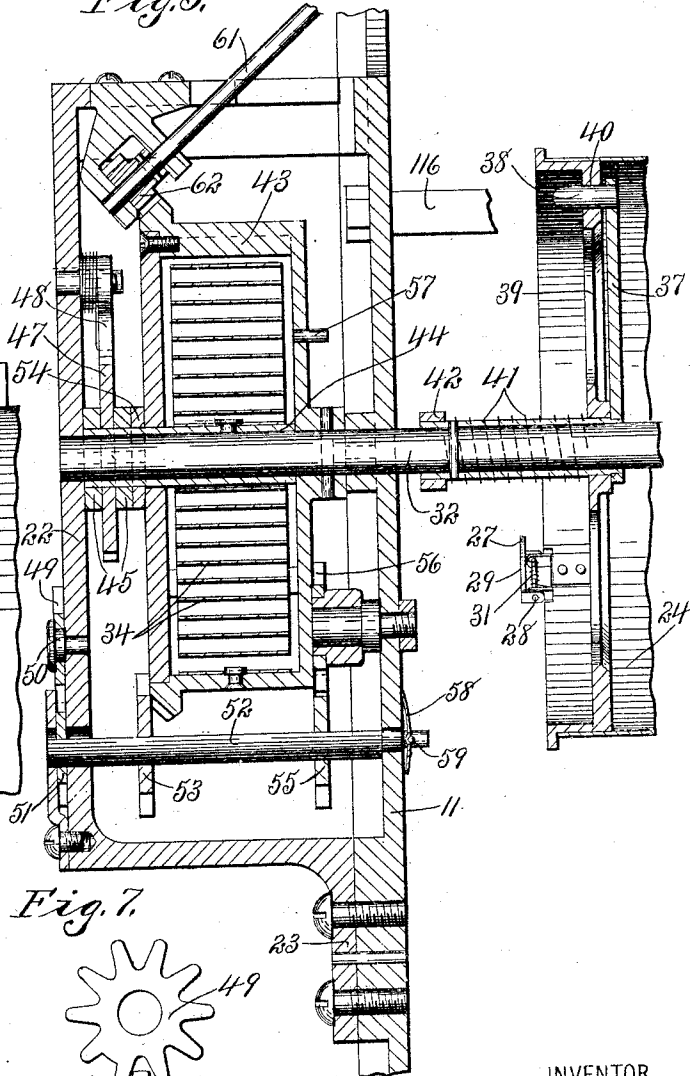


Fig. 6.

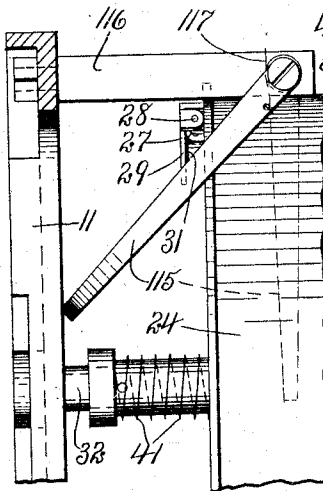


Fig. 8.

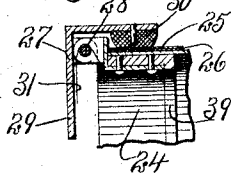
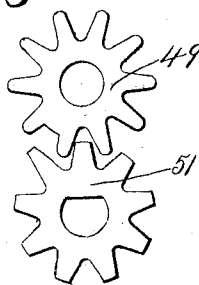


Fig. 7.



WITNESSES:

*Chas. Stoner.*  
*Chas. Young.*

INVENTOR

*William D. Hawley*

BY

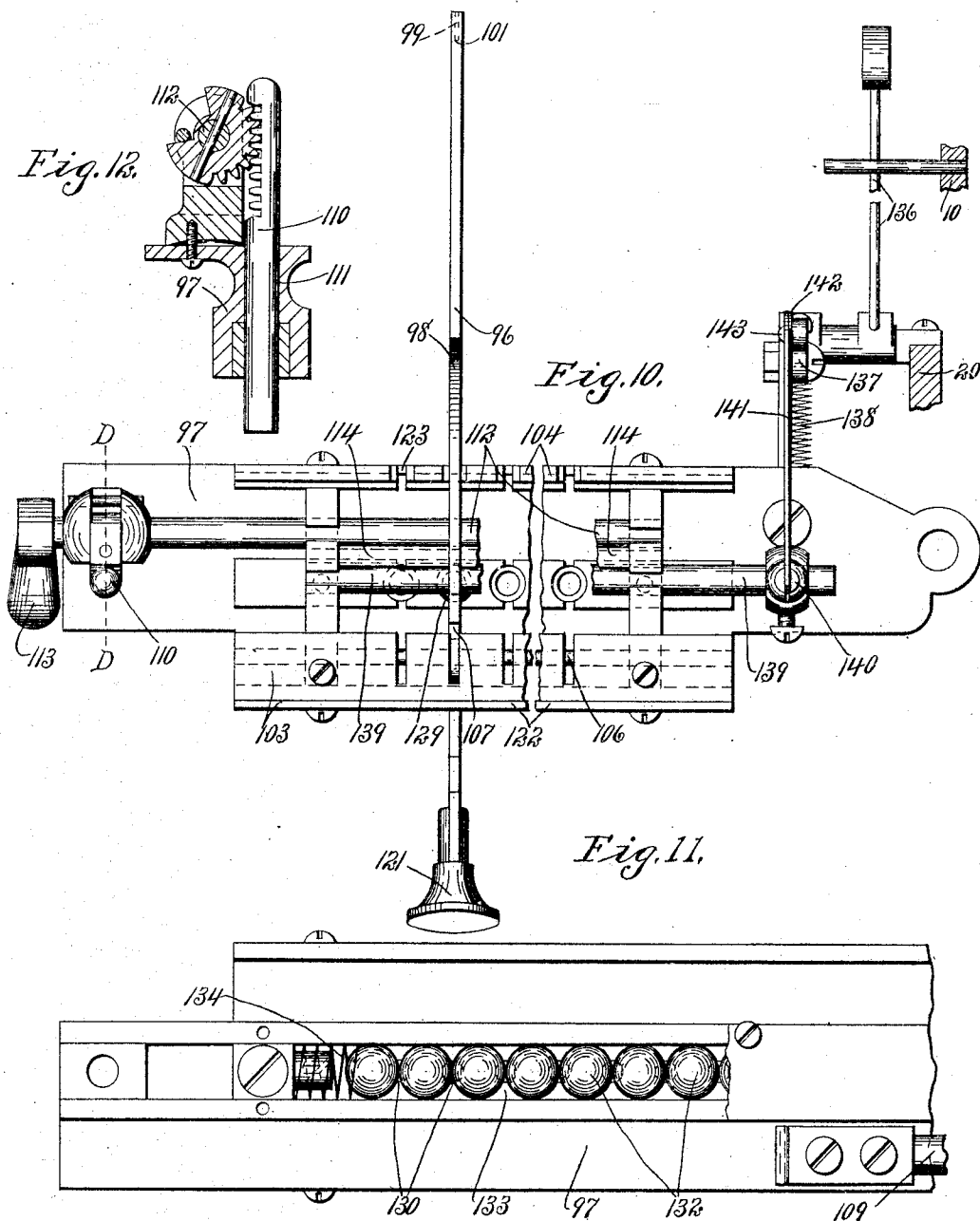
*Arg. Parsons*  
ATTORNEYS

W. D. HAWLEY.  
TIME RECORDER.  
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Patented Feb. 15, 1910.

9 SHEETS—SHEET 6.



WITNESSES:  
*Chas. Jones.*  
*Chas. Young.*

INVENTOR  
*William D. Hawley*  
BY  
*Wm. Parsons*  
ATTORNEYS

W. D. HAWLEY.

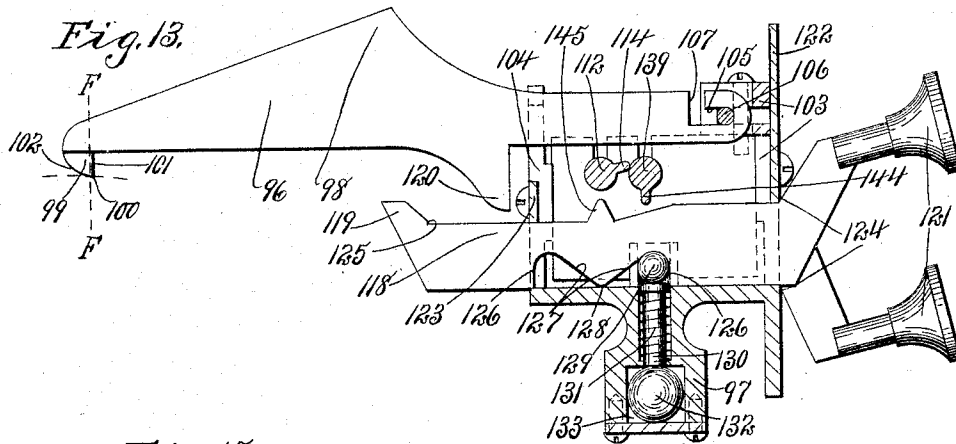
TIME RECORDER.

APPLICATION FILED MAR. 2, 1905.

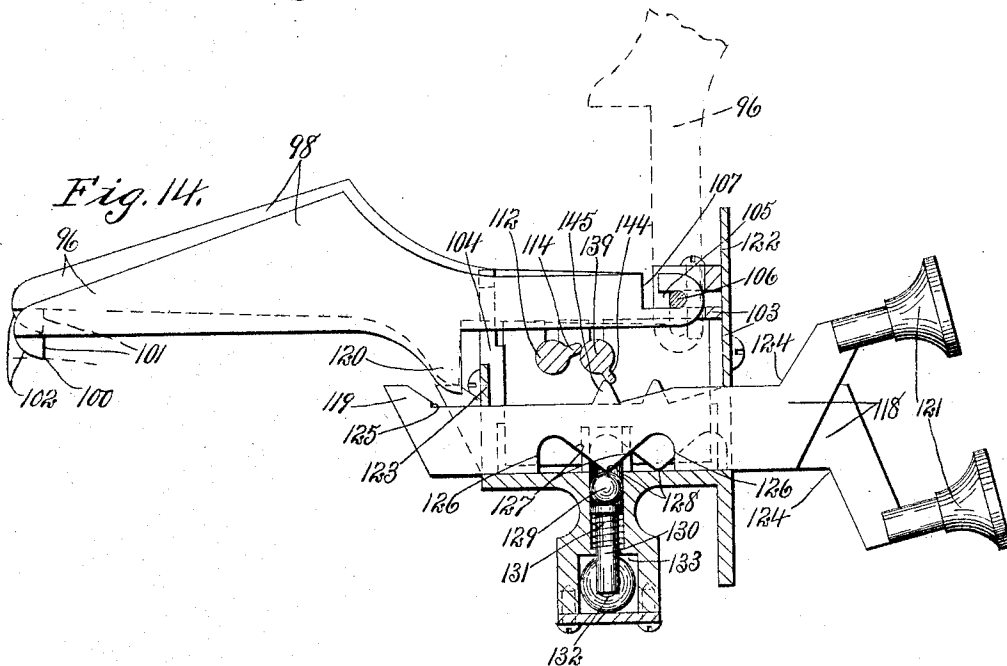
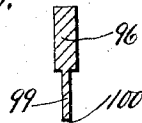
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9 SHEETS—SHEET 7.



*Fig. 15.*



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Patented Feb. 15, 1910.

9 SHEETS—SHEET 8.

Fig. 17.

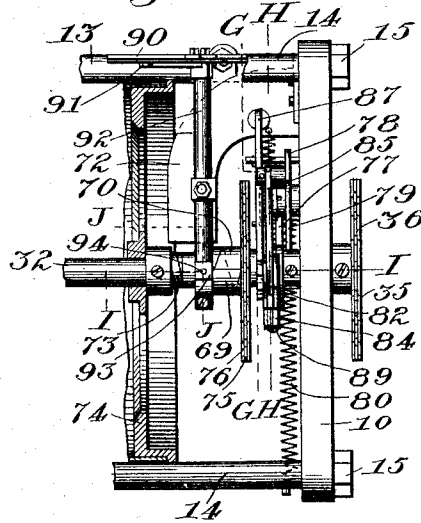


Fig. 19.

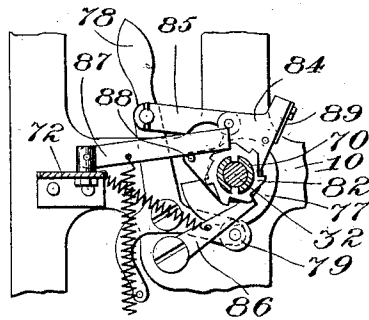
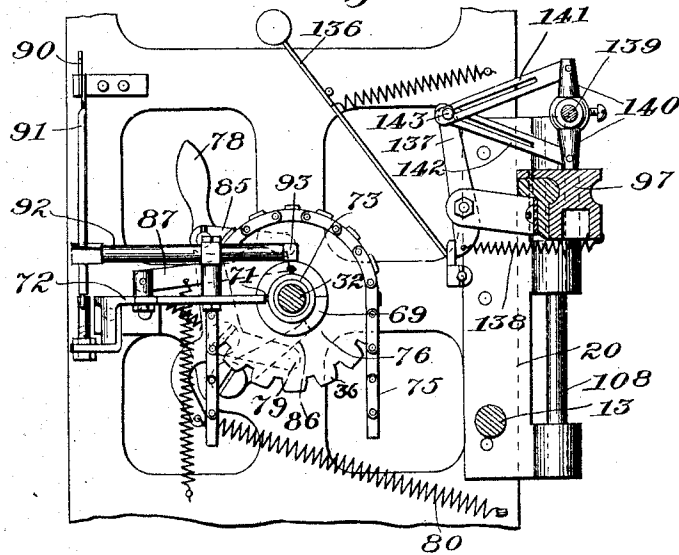


Fig. 18.

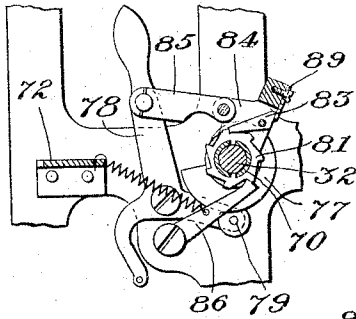


Witnesses:  
Chas. J. Zoner.  
Chas. Young.

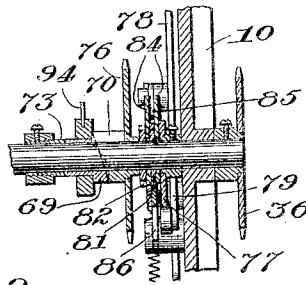
Inventor:  
William D. Hawley.  
By Heyr Parsons.  
Attorneys.

949,232.

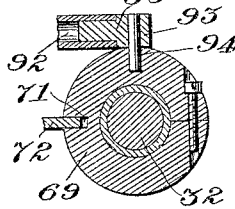
*Fig. 20.*



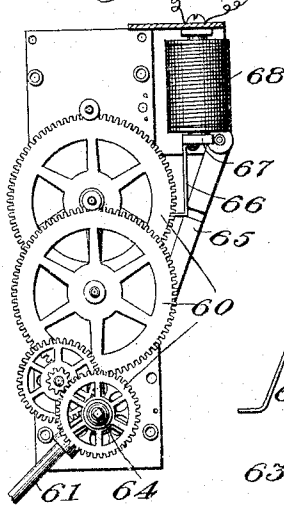
*Fig. 21.*



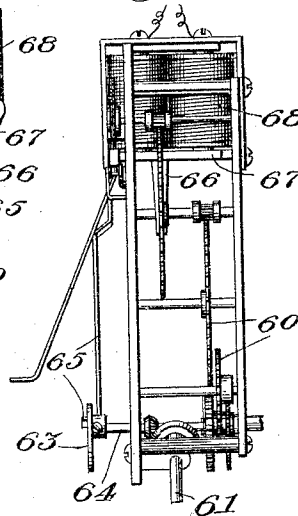
*Fig. 22.*



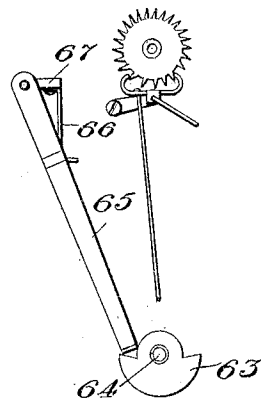
*Fig. 23.*



*Fig. 24.*



*Fig. 25.*



Witnesses:  
*Chas. Toner.*  
*Chas. Young.*

Inventor:  
*William D. Hawley.*  
By *Key Parsons.*  
Attorneys.

# UNITED STATES PATENT OFFICE.

WILLIAM D. HAWLEY, OF SYRACUSE, NEW YORK, ASSIGNOR TO HAWLEY TIME REGISTER COMPANY, OF SYRACUSE, NEW YORK, A CORPORATION OF NEW YORK.

## TIME-RECORDER.

949,232.

Specification of Letters Patent.

Patented Feb. 15, 1910.

Application filed March 2, 1905. Serial No. 248,076.

*To all whom it may concern:*

Be it known that I, WILLIAM D. HAWLEY, of Syracuse, in the county of Onondaga and State of New York, have invented a certain new and useful Time-Recorder, of which the following is a specification.

This invention has for its object the production of a time-recorder, which is particularly simple in construction and effective in operation, and it consists in the novel combinations and devices hereinafter pointed out and claimed.

In describing the invention, reference is had to the accompanying drawings, in which like characters designate corresponding parts in all the views.

Figure 1 is a front elevation of one construction of time-recorder embodying this invention, some of its internal parts being shown by dotted lines. Fig. 2 is a front elevation, partly broken away, of the time-recorder mechanism, a portion of the outer case being also illustrated. Fig. 3 is a sectional view, partly in elevation, on line A—A, Fig. 1. Fig. 4 is an isometric view of the main frame, portions thereof being broken away. Fig. 5 is a sectional view, partly broken away and in elevation, on line B—B, Fig. 3. Fig. 6 is a detail view illustrating one end of the record-receiving element, a movable time-indicator, and a portion of the main frame. Fig. 7 is a face view of the detached gears forming part of the means for preventing undue winding of the motor-spring. Fig. 8 is a sectional view on line C—C, Fig. 3. Fig. 9 is an inner face view of the greater portion of the supplemental frame, parts of the main frame being also shown. Fig. 10 is a plan, partly broken away and in section, of the supplemental frame, and contiguous parts. Fig. 11 is an inverted plan, partly broken away, of a portion of the means seen in Fig. 10. Fig. 12 is a sectional view, partly in elevation, on line D—D, Fig. 10. Fig. 13 is a sectional view, partly in elevation, on line E—E, Fig. 2. Fig. 14 is a view similar to Fig. 13, one of the markers being shown by full lines in its inoperative position, and by dotted lines in the position assumed for detaching the same. Fig. 15 is an enlarged sectional view on line F—F, Fig. 13. Fig. 16 is a detail view of one of the markers. Figs. 17 and 18 are, respectively, plan and inner face views of the means for moving the record-receiving

element endwise, and contiguous parts, the supplemental frame and a portion of the alarm-actuating means being also illustrated in Fig. 18. Figs. 19, 20, 21 and 22 are sectional views taken, respectively, on lines G—G, H—H, I—I and J—J, Fig. 17. Figs. 23 and 24 are, respectively, front and side elevations of the gearing for rotating the time-indicating means, the synchronizing means for said gearing, and contiguous parts, a portion of the frame being removed in Fig. 23. Fig. 25 is a detail view of parts shown in Figs. 23 and 24.

This time-recorder comprises, an outer case, a main frame, a record-receiving element, time-controlled means for moving said element in two directions at an angle to each other, markers coacting with the record-receiving element, a supplemental frame for supporting the markers, actuating members for said markers, and an alarm connected to the actuating members.

The outer case 1, which may be of any desirable form, size, and construction, is preferably provided with a front door 2, Figs. 1 and 3, hinged at 3, and having transverse openings 4 in the lower part thereof. The upper portion of the door 2 is provided with a transparent part 5 for permitting inspection of the time-indicating means, or hands, 6 of a time-movement. As best seen in Fig. 3, the lower portion of the case 1 is provided with a compartment 7 having a door 8, said compartment serving as a convenient place to store parts of the time-recorder, as the record-sheets.

In the preferable construction of this time-recorder, the main frame is of skeleton formation comprising, a base 9, opposing sides 10, 11 rising from the ends of the base 9, lower, intermediate, and upper pairs of rods 12, 13, 14 uniting the front and rear portions of the sides 10, 11 and provided with clamping nuts 15, parts 16, 17 extending from front to rear and terminating in eyes 18 mounted on the upper rods 14, and an upright 19 rising from said parts 16, 17. The front portions of the sides 10, 11 are, respectively, provided with forwardly projecting hinge-members 20 and supporting parts or arms 21, and the side 11 is provided with a substantially U-shaped frame-member or bracket 22 having the ends of its opposing branches formed with lateral extensions 23 removably secured to the outer

face of said side 11. The main frame is arranged within the case 1, is removably secured thereto by any desirable means, and serves as the support for all the movable parts of the time-recorder, except the door 2.

The record-receiving element preferably consists of a rotary cylinder 24 provided on its periphery with an exposed record-receiving surface 25, Figs. 2 and 8, which is non-removable by handling and is removable by a stylus, and also provided with a surface 26, Fig. 8, of contrasting color underlying the surface 25. These surfaces 25, 26 are usually provided on a detachable record-sheet consisting of a strip of paper having a glazed surface which forms the underlying surface 26, and also having a coating of ink or other suitable material forming the surface 25. The record-sheet may be held in place on the cylinder 24 by any desirable means, as levers 27, pivoted intermediate of their ends at 28 to the ends of the cylinder 24, and each formed with angularly-arranged arms, one extending at an angle to the periphery of the cylinder 24 and having a hand-engaging part 29, and the other being lapped upon the periphery of said cylinder, and provided with a yielding part 30 for engaging the exposed surface of the record-sheet and clamping the same to the cylinder 24, the arm provided with the hand-engaging part 29 being connected to a spring 31 for rocking the lever 27 on its pivot relatively to the cylinder 24 and thereby forcing the part 30 against the record-sheet. Suitable time-indicating graduations and numerals, Fig. 2, are generally provided on the exposed surface of the record-sheet, to facilitate the determination of the time represented by the records formed in said surface.

In the illustrated time-recorder, two record-receiving elements of similar construction are arranged one above the other, but it is obvious that one of said elements may be dispensed with, if desired.

The record-receiving elements are mounted, respectively, on shafts 32, 33, one being connected to a suitable motor, as a spring 34, Fig. 5, and the other being driven by a sprocket-chain 35, Fig. 2, running over toothed wheels 36 fixed respectively, to the shafts 32, 33. Both record-receiving elements are thus rotated simultaneously by a single motor.

As preferably constructed, the connection between the cylinder 24 of either of the record-receiving elements and the corresponding shaft, comprises a radial arm 37, Fig. 5, fixed to said shaft and provided with engaging means, as a laterally-extending pin 38 substantially parallel to the axis of the shaft, and a part or head 39 within said cylinder provided with an opening 40 receiving and closely fitting the pin 38. A

spring 41 is interposed between an annular shoulder 42 on said shaft and the head 39 and yieldingly presses said head toward the arm 37 coacting therewith. If desired, the shafts 32, 33 may each be provided with a plurality of arms 37 coacting with a like number of parts or heads 39 of the cylinder 24. The pins 38 and the openings 40 in the heads 39 constitute simple and effective connections which cause the record-receiving elements to rotate with the shafts 32, 33, and permit said elements to move or slide axially step by step relatively to the shafts 32, 33 a predetermined distance against the action of the springs 41 without disconnecting said elements from the shafts 32, 33. It will be understood, however, that the record-receiving elements may be moved axially sufficiently to move the heads 39 beyond the ends of the pins 38, whereupon said elements may be revolved freely on the shafts 32, 33.

The connection between the motor-spring 34 and the shaft 32, Fig. 5, consists of a barrel 43 fixed to the shaft 32 between opposing surfaces of the bracket 22 and the side 11 of the main frame, and encircling said spring which is coiled around the axis of the shaft 32 within the barrel 43. The ends of the spring 34 are respectively secured to the inner face of the barrel 43 and the periphery of one end of a rotary winding member or sleeve 44 which encircles the shaft 32, is movable relatively to said shaft, and projects laterally beyond one side of the barrel 43. An oscillating operating member, as a lever 45, is loosely mounted on the projecting end of the sleeve 44 and carries a feeding pawl 46, Fig. 3, coacting with a ratchet-wheel 47 fixed to said sleeve. As the lower end of the lever 45 is rocked to and fro, the pawl 46 and ratchet-wheel 47 advance the winding member or sleeve 44 step by step. Retrograde movement of the sleeve 44 and the ratchet-wheel 47 fixed thereto may be prevented by a spring-pressed pawl 48, Figs. 3 and 5.

Undue winding of the spring 34 may be prevented by means including, intermeshing gears, one 49 being journaled on a pin 50, Fig. 5, fixed to the bracket 22, and the other 51 being fixed to a shaft 52 journaled in said bracket and the side 11 of the main frame. The shaft 52 is rotated in one direction by power-transmitting mechanism comprising, a toothed wheel 53 fixed to said shaft, and an arm 54, Fig. 3, fixed to the winding member or sleeve 44 and operating to encounter one of the teeth of the wheel 53 upon each revolution of the winding sleeve 44, and thus advance the wheel 53 and the shaft 52, step by step. The space between two of the teeth of the gear 49 is shallower than the spaces between the remaining teeth thereof, and one of the teeth of the gear 51 is elongated and, consequently, whenever the

elongated tooth of the gear 51 enters this shallow space, further rotation of the shaft 52 is prevented, and the arm 54 upon again engaging one of the teeth of the wheel 53 is unable to continue rotation, and no additional winding of the spring 34 can take place. During the rotation of the shaft 32 by the spring 34, the gears 49, 51 are returned to their initial position by power-transmitting mechanism rotating the shaft 52 in the reverse direction and comprising, a gear 55 fixed to the shaft 52, a toothed wheel 56 meshing with the gear 55 and journaled on a stud projecting from the side 11 of the main frame, and a pin 57 which is carried by the barrel 43 and successively engages the teeth of the wheel 56, for advancing said wheel a single tooth upon each rotation of the barrel 43. Undue movement of the shaft 52 may be prevented by friction-means, as a spring washer 58, Fig. 5, engaging opposing surfaces of the frame-side 11 and a shoulder 59 on the shaft 52.

In the preferable construction of this recorder, the motor-spring 34 is not only connected to the shaft 32 for rotating the same, but also forms the spring of the time-movement including the time-indicating means, or hands 6, previously mentioned, the gearing 60, Figs. 2, 23 and 24, for advancing said hands 6, being connected to one end of an inclined shaft 61 having its other end provided with a bevel-pinion 62 meshing with a series of bevel-teeth on the barrel 43. The time-indicating means 6 and the record-receiving elements are thus rotated simultaneously by a single motor. The movement of the time-indicating means 6 and the record-receiving elements, rotated by the spring 34, may be synchronized at intervals with a given time determined by the movement of another device, as a master-clock keeping substantially correct time, a suitable mechanism for this purpose being illustrated in Figs. 23, 24 and 25. This mechanism includes, a cam 63 fixed on a shaft 64, of the gearing 60, making a complete revolution in a predetermined time, as an hour, a pivoted lever 65 having one end riding upon the periphery of the cam 63, a stop-arm 66 movable with the lever 65 and operating to engage the teeth of one of the gears of the gearing 60, an armature 67 fixed to the lever 65, and an electro-magnet 68. The weight of the lever 65 and the armature 67 normally holds the stop-arm 66 out of engagement with the gear coacting therewith, and the cam 63 during the last half of the revolution thereof engages the lever 65 and prevents the movement of said lever by the electro-magnet 68 which is energized by the master-clock after the high part of said cam engages the lever 65. As soon as said high part of the cam 63 passes out of engagement with the lever 65, the

electro-magnet 68 attracts the armature 67 and moves the arm 66 into operative position to prevent the advance movement of the gearing 60 and the record-receiving elements, until the end of the predetermined time, as an hour. Upon the expiration of said time, the electro-magnet 68 is de-energized, thus permitting the movement of the armature 67 and the lever 65 by gravity to withdraw the stop-arm 66 from the gear engaged thereby, whereupon the gearing 60 and the record-receiving elements commence to advance in synchronism with the master-clock which controls the operation of the electro-magnet 68. It will be understood by those skilled in the art, that in the illustrated embodiment of this invention, the motor-spring 34 always advances the parts driven thereby, a predetermined distance in slightly less time than said parts would advance if moving in exact synchronism with the master-clock, but that these parts always commence each advance in synchronism with said master-clock.

The record-receiving elements are moved axially, or at right angles to the direction of their rotary motion, by suitable means, here illustrated as comprising cams 69, 70, and movable means for advancing the cams 70 step by step. Said cams 69 are mounted respectively on the shafts 32, 33, are movable axially lengthwise of these shafts, and are non-revoluble with said shafts, being shown as provided with sockets 71, Figs. 18 and 22, which receive stationary arms 72. As best seen in Figs. 2, 17, 18 and 21, sleeves 73 loosely mounted on the shafts 32, 33 are interposed between the cams 69 and transverse parts or heads 74, Fig. 17, of the cylinders 24, and, consequently, as the cams 69 move endwise to the left they force the sleeves 73 and the cylinders 24 in the same direction against the action of the springs 41. Said sleeves 73 are usually provided with annular shoulders which are adjustable lengthwise thereof, engage the parts or heads 74, and permit axial adjustment of the cylinders 24 relatively to the cams 69. The cams 70 are loosely mounted on the shafts 32, 33 and are rotated step by step relatively thereto, the cam 70 on the shaft 32 being advanced a single step by suitable means upon each rotation of the record-receiving element on said shaft, and both cams 70 being connected by power-transmitting mechanism, comprising, a sprocket-chain 75, and sprocket-wheels 76 engaged by the chain 75 and fixed to said cams 70. As the cams 70 rotate simultaneously step by step, the cams 69 are moved endwise to the left, but as soon as the cams 70 have made a complete revolution, the high parts thereon pass into engagement with the low parts of the cams 69, whereupon the springs 41 move the record-receiving elements axially to the

right to their initial position. It will be understood that after each advance movement of the cams 70 and the consequent axial movement to the left of the cams 69 and the record-receiving elements, said elements are in position to receive records at one side of those previously made.

As illustrated, the means for advancing the upper cam 70 step by step consists of a cam 77, Figs. 19 and 20, fixed to the shaft 32, a lever 78 pivoted to the frame of the machine and provided with a lateral arm 79 engaged by the periphery of the cam 77 in order that said cam 77 may move the lever in one direction, a spring 80, Fig. 18, for moving the lever 78 in the opposite direction, ratchet-wheels 81, 82, Figs. 19 and 20, fixed to said cam 70 and usually provided with keys detachably mounted in lengthwise grooves in the hub of the cam 70, a feeding pawl 83 engaged with the ratchet-wheel 81, a lever 84 journaled on the hub of the cam 70 and connected by a link 85 to the lever 78, said lever 84 carrying the pawl 83, a stop-pawl 86 for preventing retrograde movement of the ratchet-wheel 81, a pawl 87 for engaging the ratchet-wheel 82 and preventing rotation of said cam 70, and means, as a pin 88, carried by the lever 84 for forcing the pawl 87 out of engagement with the ratchet-wheel 82. The lever 84 usually consists of plates arranged on opposite sides of the ratchet-wheel 81, and is provided with a suitable spring 89 for holding the feeding pawl 83 in its operative position. As the shaft 32 rotates, the cam 77 depresses the arm 79 and rocks the lever 78 against the action of the spring 80, but as soon as the high part of this cam has passed the arm 79, the spring 80 moves the lever 78 in the reverse direction. The movement of the lever 78 against the action of the spring 80 rocks the pawl-carrying lever 84 on the axis of the shaft 32 and engages the pawl 83 with the next advance tooth of the ratchet-wheel 81, and upon the return movement of the lever 78 by the spring 80, the lever 84 and the pawl 83 advance the cam 70 fixed to the ratchet-wheel 81, a single tooth. It will be understood, however, that just before the advance movement of the cam 70, the pin 88 encounters the pawl 87 and raises the free end thereof out of engagement with the ratchet-wheel 82 also fixed to the cam 70. The described means for moving the record-receiving elements axially step by step upon the rotation of said elements, is particularly simple in construction and effective in operation, but it will be apparent that the same is only one exemplification of such means suitable for use in this recorder.

It is particularly desirable to indicate the position to which the record-receiving elements are shifted axially, and for this purpose suitable indicating means is utilized, the

same comprising a scale or series of graduations 90, Fig. 2, a pivoted indicator 91, Figs. 17 and 18, having one end movable relatively to the scale or graduations 90, and its other end suitably connected to one extremity of a lever 92 pivoted intermediate of its ends. The other extremity of the lever 92 is provided with a section 93, Fig. 22, which is formed with a depending arm 94 arranged in a socket in the axially movable cam 69 on the shaft 32, and is also formed with a part 95 of reduced diameter movable endwise in a socket in the contiguous portion of said lever 92, so that as the cam 69 moves axially, the section 93 of the lever 92 may move with said cam and also slide or telescope endwise relatively to the main portion of the lever 92. The extremity of the lever 92 connected to the indicator 91 is usually provided with a section having a slight turning movement relatively to the main portion of said lever on an axis extending substantially lengthwise of the lever, said section being formed with a lengthwise slot for receiving the indicator 91.

The markers 96 operate to remove narrow lines of the removable surfaces 25 from the record-receiving elements, and thus form time-records in said elements. As preferably constructed, said markers are held in their operative position by gravity, are pivoted at corresponding ends to supplemental frames 97, are provided with weights 98 intermediate of their ends, and terminate at their opposite or free ends in depending engaging portions 99, Fig. 15, formed of less thickness than the contiguous parts of the markers and of uniform thickness throughout, the substantially parallel sides of the engaging portions 99 being disposed at an angle to the record-receiving elements. Said portions 99 of the markers 96 are provided with transverse cutting or scraping edges 100, Figs. 13 and 14, at the junction of edges 101 arranged at substantially right-angles to the parts of the surfaces of the record-receiving elements engaged by the markers, and edges 102 diverging from said edges 101 at angles less than a right-angle. The pivoted ends of the markers 96 are mounted in narrow transverse slots formed in opposing portions 103, 104 of the frames 97, and are provided with openings 105 which receive pivotal supports or pins 106 extending crosswise of the slots in the portions 103, and with lateral extensions 107 of the openings 105 extending through the upper edges of the pivoted ends of the markers. By constructing the markers as described, it is possible to readily detach the same independently of each other, and the pivotal pins 106, upon elevating the free ends of the markers until they are substantially upright, and then slightly depressing said markers as indicated by dotted lines in Fig. 14, until the ex-

tensions 107 are alined with the pivotal pins 106, which latter readily pass through said extensions 107 as the markers when in such position are moved laterally. Markers constructed and arranged as described, are cheaply manufactured and highly efficient in use, and always make lines of the same thickness irrespective of the amount of wear on the portions thereof engaging the record-receiving elements.

As preferably constructed, the frames 97 are arranged one above the other opposite to the door 2 of the outer case 1, and extend substantially parallel to the record-receiving elements, corresponding ends of the frames 97 being hinged upon pivotal pins 108 carried by the main frame, and their opposite or free ends being detachably engaged with upper surfaces of the arms 21 of the main frame. Said supplemental frames are alined with the openings 4 in the door 2 and serve as closures for said openings when the door 2 is closed, as shown in Figs. 1 and 3. It will be understood that the door 2 is detachable from the supplemental frames 97 when movable on its hinges 3, and that the supplemental frames 97 are supported on the main frame independently of the outer case 1, or its door 2, and are readily accessible when said door is open. Suitable longitudinally-adjustable upwardly inclined braces 109 are connected to the supplemental frames 97, said braces having their lower ends journaled on the pivotal pins 108 and their upper ends fixed to the free portions of said frames 97.

The frames 97 may be secured to the arms 21 by suitable locking means as vertically moving bolts 110 carried by the free ends of said frames and having their lower ends movable into sockets 111 in the arms 21. The upper ends of the bolts 110 are provided with gear teeth meshing with corresponding teeth on rock-shafts 112 which are operated by hand-pieces 113, and extend longitudinally beneath the pivoted ends of the markers 96. Said shafts 112 are provided with cams 114 which engage the lower edges of the overlying parts of the markers 96 as said shafts 112 are moved to withdraw the bolts 110 connected thereto from the sockets 111. It thus follows that the rock-shafts 112 operate to elevate the free ends of the markers from engagement with the record-receiving elements before the free ends of the supplemental frames 97 are disengaged from the main frame to permit said supplemental frames to rock on their pivots and withdraw the markers from the record-receiving elements.

It is sometimes desirable to ascertain the time-indicating graduations on the record-receiving elements in position for registration with the cutting edges 100 of the markers, especially when said markers are withdrawn from the record-receiving elements

by the movable frames 97. This recorder is therefore provided with a suitable indicator 115, Fig. 6, having one end pivoted to a support 116, as a part of the main frame, extending parallel to the upper record-receiving element in close proximity thereto, the free end of the indicator being movable laterally into and out of position to register with the graduations on said record-receiving element. A spring 117 holds the indicator 115 in its inoperative position, as illustrated in full lines in Fig. 6, with its free end at one side of the upper record-receiving element and out of register with the time-indicating graduations thereon. When it is desired to use the indicator 115, the free end thereof is swung laterally against the action of the spring 117 to its operative position, shown by dotted lines in Fig. 6, whereupon said free end will be alined with the graduation on the record-receiving elements in position to register with the cutting edges of the markers.

In the preferable construction of this recorder, the markers 96 are actuated by members or keys 118, Figs. 13 and 14, consisting of slides movable to and fro in substantially straight lines in transverse guides in the supplemental frames 97 beneath the pivoted ends of the markers and projecting beyond the inner and outer sides of said frames 97. The inner ends of the actuating members 118 are provided with upwardly extending parts 119 which encounter depending parts 120 provided on the markers 96 intermediate of their ends, and force said markers upwardly against the action of the weights thereof, thus disengaging the portions 99 of the markers from the record-receiving elements. The opposite ends of the actuating members 118 projecting beyond the outer sides of the supplemental frames, are provided with laterally extending ends carrying finger-pieces 121. Said frames 97 are provided with removable plates 122 and 123 which normally hold the actuating members 118 in position and facilitate detachment or removal thereof. The outer sides of these plates 122, 123 may be engaged by shoulders 124, 125 on the actuating members 118 for limiting the movement of said members. Each actuating member 118 is provided intermediate of its ends with upright faces 126 spaced apart, and with faces 127 interposed between the faces 126 and diverging upwardly from the point or junction 128. The faces 126, 127 of the actuating members cooperate with balls 129 resting upon the upper ends of plungers 130 which are encircled by suitable springs 131 for forcing the plungers 130 upwardly. In the movement of one of the actuating members in either direction, one of the inclined faces 127 depresses the corresponding ball 129, thus tensioning the spring 131 for the plunger 130 coacting with

said ball, so that when the point 128 passes beyond the highest portion of this ball 129, said spring 131 automatically forces said actuating member to the limit of its movement with one of its faces 126 engaged with said ball 129. It is thus impossible for the actuating members 118 to be partly moved in either direction, as the movement thereof must continue until the limit is reached.

The lower ends of the plungers 130 are arranged above the opposing surfaces of locking means, as balls 132, Figs. 13 and 14, and are movable between said surfaces when the faces 127 depress the balls 129 and cause the same to force the plungers 130 downwardly. These balls 132 are confined in guides 133 formed in the lower portions of the frames 97 and provided with removable bottoms, the length of each of the guides being less than the total length of the diameters of the balls 132 therein and the diameters of the lower ends of two of the plungers 130. Said balls 132 are forced toward the centers of the guides 133 by springs 134, Fig. 11, arranged in the ends of the guides. Immediately after an actuating member 118 in one of the series thereof commences its movement in either direction, one of the faces 127 of this member will engage the corresponding ball 129 and depress the lower end of the underlying plunger 130 between two of the balls 132 in one of the series of said balls, and thus take up substantially all the unoccupied space in the guide 133 for said series of balls 132, so that the balance of the actuating members 118 in said series are locked from movement until after said actuating member is approaching the limit of its complete movement.

This recorder is preferably provided with alarms 135, one for each record-receiving element supported by the main frame, and with means for actuating the hammers 136 of these alarms, each means, Fig. 18, comprising a lever 137 pivoted intermediate of its ends to one of the frames 97 and having one end detachably engaged with the corresponding hammer 136 and connected to a spring 138, a rock-shaft 139 having oppositely extending arms 140, diverging links 141, 142 pivoted to the outer ends of the arms 140 and having lengthwise slots which receive a lateral extension or common pin 143 provided on the other end of the lever 137. Each rock-shaft 139 is provided with a cam 144, Figs. 13 and 14, which is arranged in the path of upwardly projecting parts 145 on the corresponding series of actuating members 118 when moving in either direction, said cams and projecting parts being so arranged that whenever any of the actuating members has advanced substantially one-half of its movement in either direction, the part 145 on said member oper-

ates the cam 144 on the contiguous rock-shaft 139 to move the corresponding lever 137 and rock one of the hammers 136 against the action of the spring which returns said hammer and actuates the corresponding alarm. It will be noted that as the levers 137 detachably engage the hammers 136, it is possible to support the alarms 135 and their hammers 136 on the main frame, and to carry their actuating mechanism on the supplemental frames.

The construction and operation of this time-recorder will now be readily understood upon reference to the foregoing description and the accompanying drawing, and it will be obvious to those skilled in the art that more or less change may be made in the component parts thereof without departing from the spirit of my invention.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a time-recorder, the combination with the indicating means of a time-movement, and the gearing for advancing said means; of a shaft, a record-receiving element mounted on the shaft and revoluble therewith, a barrel mounted on the shaft and revoluble therewith, said barrel being connected to the gearing, a rotary winding member mounted on the shaft and revoluble relatively thereto, and a spring coiled about the axis of the shaft and having its ends connected respectively to the barrel and the winding member, substantially as and for the purpose specified.

2. In a time-recorder, the combination of a revoluble shaft, a record-receiving element mounted on the shaft and revoluble therewith, a barrel mounted on the shaft and revoluble therewith, a rotary winding member mounted on the shaft and revoluble relatively thereto, and a spring coiled about the axis of the shaft within the barrel and having its ends connected respectively to the barrel and the winding member, substantially as and for the purpose specified.

3. In a time-recorder, the combination of a shaft, a record-receiving element mounted on the shaft and revoluble therewith, a barrel mounted on the shaft and revoluble therewith, said barrel being provided with gear teeth, a rotary winding member arranged with its axis substantially coincident with that of the shaft, a spring coiled about the axis of the winding member within the barrel and having its ends connected respectively to the barrel and the winding member, time-indicating means, and power-transmitting mechanism between said gear teeth and time-indicating means, substantially as and for the purpose set forth.

4. In a time-recorder, the combination of a movable record-receiving element, a shaft for actuating said element, a barrel revo-

luble with the shaft, a rotary winding member arranged with its axis substantially coincident with that of the shaft, a spring coiled about the axis of the winding member within the barrel and having its ends connected respectively to the barrel and the winding member, an oscillating operating member mounted on the winding member, and power-transmitting mechanism for connecting said winding and operating members, substantially as and for the purpose described.

5. In a time-recorder, the combination of a revoluble shaft, a record-receiving element mounted on the shaft and revoluble therewith, a barrel mounted on the shaft and revoluble therewith, a rotary winding member mounted on the shaft and revoluble relatively thereto, a spring coiled about the axis of the shaft within the barrel and having one end connected to the barrel and its other end connected to one end of the winding member, an oscillating operating member mounted on the other end of the winding member, and power-transmitting mechanism for connecting said winding and operating members, substantially as and for the purpose specified.

6. In a time-recorder, the combination of a movable record-receiving element, a rotary part for actuating said element, a rotary winding member arranged with its axis substantially coincident with that of said part, a spring coiled about such axis and connected to the rotary part and the winding member, and means for preventing the rotation of the winding member including, a rotary shaft, power-transmitting mechanism between the winding member and the shaft for rotating said shaft in one direction, and power-transmitting mechanism between the rotary part and the shaft for rotating such shaft in the reverse direction, substantially as and for the purpose set forth.

7. In a time-recorder, the combination of a movable record-receiving element, a rotary part for actuating said element, a rotary winding member arranged with its axis substantially coincident with that of said part, a spring coiled about such axis and connected to the rotary part and the winding member, and means for preventing the rotation of the winding member including, a rotary shaft, wheels fixed to the shaft, means revoluble with the winding member and coacting with one of the wheels for rotating said shaft in one direction, and means revoluble with said rotary part and coacting with another of the wheels for rotating said shaft in the reverse direction, substantially as and for the purpose described.

8. In a time-recorder, the combination of a movable record-receiving element, a rotary part for actuating said element, a rotary winding member arranged with its axis sub-

stantially coincident with that of said part, a spring coiled about such axis and connected to the rotary part and the winding member, and means for preventing the rotation of the winding member including, a rotary shaft, friction-means for preventing undue rotation of the shaft, means revoluble with the winding member for rotating said shaft in one direction, and means revoluble with said rotary part for rotating said shaft in the reverse direction, substantially as and for the purpose specified.

9. In a time-recorder, the combination of a shaft, a record-receiving element mounted on the shaft and revoluble therewith, a barrel mounted on the shaft and revoluble therewith, a rotary winding member mounted on the shaft and revoluble relatively thereto, a spring coiled about the axis of the shaft within the barrel and having its ends connected respectively to the barrel and the winding member, and means for preventing the rotation of the winding member including, a rotary shaft, wheels fixed to the second-mentioned shaft, friction-means for preventing undue rotation of the second-mentioned shaft, means revoluble with the winding member into and out of engagement with one of the wheels for rotating the second-mentioned shaft in one direction, and means revoluble with the barrel into and out of engagement with another of the wheels for rotating said second-mentioned shaft in the reverse direction, substantially as and for the purpose set forth.

10. In a time-recorder, the combination of a cylinder for supporting a record-receiving element, a lever pivoted intermediate of its ends to the cylinder and movable on its pivot for carrying one arm thereof into and out of engagement with the record-receiving element on the cylinder, for detachably clamping said element to the cylinder, and a spring for holding said lever in its clamping position, substantially as and for the purpose specified.

11. In a time-recorder, the combination of a cylinder for supporting a record-receiving sheet, levers pivoted intermediate of their ends to the cylinder and each provided with angularly-arranged arms, one extending at an angle to the periphery of the cylinder and having a hand-engaging part, and the other being lapped upon the periphery of said cylinder and provided with a yielding part for clamping the sheet to the cylinder, and means for holding the levers in their clamping position, substantially as and for the purpose described.

12. In a time-recorder, the combination of a time movement, a rotary record-receiving element, controlled by the time movement, means for forcing said element axially, said means being non-revoluble with the record-receiving element and being movable length-

wise of the axis of said element, actuating means revoluble with the record-receiving element, and power-transmitting means between the first- and second-mentioned means, substantially as and for the purpose described.

13. In a time-recorder, the combination of a shaft, a record-receiving element mounted on the shaft, engaging parts carried respectively by the shaft and the record-receiving element and slidably and detachably engaging each other for rotating the record-receiving element with the shaft, and for permitting said element to move axially relatively to the shaft, and to be disconnected therefrom, means for forcing said element axially, said means being non-revoluble with the record-receiving element and being movable lengthwise of the axis of said element, actuating means revoluble with the record-receiving element, and means coacting with the first- and second-mentioned means, substantially as and for the purpose specified.

14. In a time-recorder, the combination of a record-receiving element movable in two directions at an angle to each other, means arranged concentric with the record-receiving element and movable in one of said directions for forcing the record-receiving element in said direction, means for preventing the first-mentioned means from moving in the other direction with the record-receiving element, and means moving with the record-receiving element in said other direction for effecting the movement of the first-mentioned means, substantially as and for the purpose set forth.

15. In a time-recorder, the combination of a rotary record-receiving element, a cam movable lengthwise of the axis of the record-receiving element for forcing said element axially, means for preventing the cam from rotating with the record-receiving element, and means revoluble with the record-receiving element for effecting the movement of the cam, substantially as and for the purpose described.

16. In a time-recorder, the combination of a shaft, a rotary record-receiving element revoluble with the shaft, a cam mounted on the shaft and movable lengthwise thereof for forcing the record-receiving element axially, said cam being formed with a socket, a stationary part having a portion thereof inserted into the socket, and means revoluble with the record-receiving element for effecting the movement of the cam, substantially as and for the purpose specified.

17. In a time-recorder, the combination of a rotary record-receiving element, means revoluble relatively to the record-receiving element and connected thereto for forcing said element axially, means for preventing the rotation of the first-mentioned means with the record-receiving element, and means

revoluble with the record-receiving element for effecting the operation of said first-mentioned means, substantially as and for the purpose set forth.

18. In a time-recorder, the combination of a shaft, a record-receiving element revoluble with the shaft, means for forcing the record-receiving element axially, a cam mounted on the shaft and revoluble about the axis thereof relatively to the record-receiving element for actuating said means, means for preventing the rotation of the cam with the record-receiving element, and means movable with the record-receiving element for effecting the operation of the cam, substantially as and for the purpose described.

19. In a time-recorder, the combination of a shaft, a record-receiving element revoluble with the shaft, a cam mounted on the shaft and movable lengthwise thereof for forcing the record-receiving element axially, a second cam mounted on the shaft and revoluble about the axis thereof relatively to the record-receiving element for actuating the first-mentioned cam, means for preventing the rotation of the cams with the record-receiving element, and means movable with the record-receiving element for effecting the operation of the second-mentioned cam, substantially as and for the purpose specified.

20. In a time-recorder, the combination of a rotary record-receiving element, means for forcing the record-receiving element axially, means movable relatively to the record-receiving element for actuating the first-mentioned means, and a cam revoluble with the record-receiving element for actuating said movable means, substantially as and for the purpose specified.

21. In a time-recorder, the combination of a rotary record-receiving element, means for forcing the record-receiving element axially, means revoluble relatively to the record-receiving element for actuating the first-mentioned means, a ratchet-wheel revoluble with the second-mentioned means, movable means coacting with the ratchet-wheel for advancing the same step by step, a spring connected to the movable means, and means revoluble with the record-receiving element coacting with the movable means, substantially as and for the purpose described.

22. In a time-recorder, the combination of a rotary record-receiving element, means for forcing the record-receiving element axially, means revoluble relatively to the record-receiving element for actuating the first-mentioned means, a ratchet-wheel revoluble with the second-mentioned means, a movable lever provided with a pawl coacting with the ratchet-wheel, a second movable lever connected to the first-mentioned lever, a cam revoluble with the record-receiving element and coacting with the second-mentioned lever for moving the same in one direction,

and a spring for moving the second-mentioned lever in the reverse direction, substantially as and for the purpose specified.

23. In a time-recorder, the combination of  
 5 a rotary record-receiving element, means for forcing the record-receiving element axially, means having a revoluble movement relatively to the record-receiving element for actuating the first-mentioned means, means for  
 10 preventing said revoluble movement of the second-mentioned means, and means for rotating the second-mentioned means relatively to the record-receiving element, the last-mentioned means comprising a part for  
 15 forcing the third-mentioned means from operative position, substantially as and for the purpose set forth.

24. In a time-recorder, the combination of a rotary record-receiving element, means for  
 20 forcing the record-receiving element axially, means having a revoluble movement relatively to the record-receiving element for actuating the first-mentioned means, a ratchet-wheel revoluble with the second-mentioned  
 25 means, a pawl coacting with the ratchet-wheel for preventing said revoluble movement of the second-mentioned means, a movable lever provided with means for rotating the second-mentioned means step by step,  
 30 said lever being provided with a part for forcing the pawl from operative position as the lever reaches the limit of its movement in one direction, and means revoluble with the record-receiving element for effecting  
 35 the operation of the lever, substantially as and for the purpose described.

25. In a time-recorder, the combination of a plurality of rotary record-receiving elements, time-controlled mechanism for rotating  
 40 said elements simultaneously, a plurality of means coacting respectively with the record-receiving elements for moving the same axially, a plurality of means revoluble relatively to the record-receiving elements and  
 45 coacting respectively with the first-mentioned means for actuating the latter, power-transmitting mechanism connecting the second-mentioned plurality of means for transmitting motion from one to another, and  
 50 means movable with one of the record-receiving elements for effecting the operation of one of the second-mentioned means, substantially as and for the purpose specified.

26. In a time-recorder, the combination of  
 55 a plurality of shafts, record-receiving elements mounted respectively on the shafts and revoluble therewith, power-transmitting mechanism connecting the shafts for transmitting motion from one to another, time-  
 60 controlled mechanism for rotating one of the shafts, a plurality of means mounted respectively on the shafts and coacting with the record-receiving elements for moving the same axially, a plurality of means mounted  
 65 respectively on the shafts and revoluble

thereon relatively to the record-receiving elements and coacting with the first-mentioned means for actuating the same, power-transmitting mechanism connecting the second-mentioned plurality of means for transmitting motion from one to the other, and  
 70 means revoluble with one of the record-receiving elements for effecting the operation of one of said second-mentioned means, substantially as and for the purpose set forth. 75

27. In a time-recorder, the combination of a rotary record-receiving element, means movable lengthwise of the axis of the record-receiving element for forcing said element axially, means for preventing the first-mentioned means from rotating with the record-receiving element, means for automatically actuating the first-mentioned means, a movable indicator for indicating the position of the record-receiving element in its axial  
 80 movement, and a lever connected to the indicator and having a part connected to the first-mentioned means and movable relatively to the remaining portion of the lever, substantially as and for the purpose specified. 90

28. In a time-recorder, the combination of a main frame, a record-receiving element supported by the frame, a supplemental frame movably supported on the main frame  
 95 and movable relatively to the record-receiving element for permitting the withdrawal of the supplemental frame, and a marker coacting with the record-receiving element, the marker being supported on the supplemental frame and movable relatively thereto into  
 100 and out of engagement with said element, substantially as and for the purpose set forth.

29. In a time-recorder, the combination of  
 105 a main frame, a record-receiving element supported by the frame, a marker coacting with said element, a supplemental frame for supporting the marker, said frame being movably supported on the main frame and  
 110 being movable relatively to the record-receiving element for permitting the withdrawal of the supplemental frame and the marker from said element, and means for preventing the supplemental frame from  
 115 moving relatively to the main frame, substantially as and for the purpose specified.

30. In a time-recorder, the combination of a main frame, a record-receiving element supported by the frame, and a supplemental  
 120 frame pivoted at one end to the main frame, and movable relatively to the record-receiving element for permitting the withdrawal of the supplemental frame, means coacting with the other end of the supplemental  
 125 frame for preventing movement thereof relatively to said element when the time-recorder is manipulated to produce time-records, and a marker coacting with the record-receiving element, the marker being sup- 130

ported on the supplemental frame and movable relatively thereto into and out of position to coact with said element, substantially as and for the purpose described.

- 5 31. In a time-recorder, the combination of a main frame provided with a projecting part, a record-receiving element supported by the frame, a marker coacting with said element, a supplemental frame for supporting the marker, said frame being arranged substantially parallel to the record-receiving element and pivoted at one end to the main frame and having its other end detachably supported by said projecting part, and means coacting with said projecting part and the supplemental frame for preventing movement of the latter relatively to the main frame, substantially as and for the purpose set forth.
- 20 32. In a time-recorder, the combination of a main frame provided with a projecting part, a record-receiving element supported by the frame, a supplemental frame arranged substantially parallel to the record-receiving element and pivoted at one end to the main frame and movable relatively to the record-receiving element for permitting the withdrawal of the supplemental frame, means coacting with the projecting part and the other end of the supplemental frame for preventing movement of the supplemental frame relatively to said element when the time-recorder is manipulated to produce time-records, and a marker coacting with the record-receiving element, the marker being supported on the supplemental frame and movable relatively thereto into and out of position to coact with said element, substantially as and for the purpose specified.
- 40 33. In a time-recorder, the combination of a main frame provided with a projecting part, a record-receiving element supported by the frame, a marker coacting with said element, a supplemental frame for supporting the marker, said frame being arranged substantially parallel to the record-receiving element and pivoted at one end to the main frame and having its other end detachably supported by said projecting part, a locking bolt carried by the supplemental frame and coacting with the projecting part of the main frame, and a rock-shaft for actuating the locking bolt, substantially as and for the purpose described.
- 55 34. In a time-recorder, the combination of a main frame, a record-receiving element supported by the frame, a marker coacting with said element, a supplemental frame for supporting the marker, said frame being arranged substantially parallel to the record-receiving element and pivoted at one end to the main frame, and being movable relatively to the record-receiving element for permitting the withdrawal of the supple-

mental frame and the marker from said element, and an upwardly inclined brace having its lower end supported on the main frame and its upper end connected to the free portion of the supplemental frame, substantially as and for the purpose specified. 70

35. In a time-recorder, the combination of an outer case, a main frame within the case, a record-receiving element supported by the frame, a marker coacting with said element, and a supplemental frame for supporting the marker, said frame having one end pivoted to the main frame independently of the outer case and its other end detachably supported on the main frame independently of the outer case, and said frame being movable relatively to the record-receiving element for permitting the withdrawal of the supplemental frame and the marker from said element, substantially as and for the purpose described. 75

36. In a time-recorder, the combination of a support for a record-receiving element having an exposed removable surface, and a marker having a portion for removing a narrow strip of such surface, said portion being formed of less thickness than the contiguous part of the marker and with substantially parallel sides, and having an edge arranged at substantially a right-angle to the part of the surface of the record-receiving element engaged by the marker, and a second edge diverging from the first-mentioned edge at an angle less than a right-angle, the second edge being located in rear of the cutting edge and designed to rest on the record-receiving element when the marker is in operative position, substantially as and for the purpose specified. 80

37. In a time-recorder, the combination of a record-receiving element, a pivotal support, a marker having an opening for receiving the pivotal support and thereby pivoting the marker to the support, said opening having an extension leading through an edge of the marker and permitting detachment of said marker from the support, and time-controlled mechanism for effecting the formation of the record, substantially as and for the purpose described. 85

38. In a time-recorder, the combination of a record-receiving element, a support, a plurality of markers coacting with said element, said markers being pivoted independently to the support and each being formed with an angular slot for receiving the pivot and permitting the marker to be detachable from the support, substantially as and for the purpose described. 90

39. In a time-recorder, the combination of a record-receiving element, a support, a plurality of markers coacting with said element, said markers being pivoted independently to the support and being provided

with a hook for engaging the pivot and permitting the marker to be detachable from the pivot, substantially as and for the purpose specified.

40. In a time-recorder, the combination of a main frame, a record-receiving element supported by the frame, a marker coacting with said element, a supplemental frame for supporting the marker, said frame being movably supported on the main frame and being movable relatively to the record-receiving element for permitting the withdrawal of the supplemental frame and the marker from said element, locking means for preventing the supplemental frame from moving relatively to the main frame, and means for moving the markers from the record-receiving element and for forcing the locking means from its position assumed when preventing the supplemental frame from moving relatively to the main frame, substantially as and for the purpose described.

41. In a time-recorder, the combination of a main frame, a record-receiving element supported by the frame, a marker coacting with said element, a supplemental frame for supporting the marker, said frame being arranged substantially parallel to the record-receiving element and pivoted at one end to the main frame and having its free portion detachably engaged with said main frame, locking-means carried by the supplemental frame and coacting with the main frame for preventing the supplemental frame from moving relatively to the main frame, and a rock-shaft extending crosswise of the markers and provided with means for moving the markers from the record-receiving element, said rock-shaft being connected to the locking means for actuating the same, substantially as and for the purpose set forth.

42. In a time-recorder, the combination of a record-receiving element, a marker having an engaging portion coacting with said element and movable toward and from the same, and an actuating member contiguous to the marker and movable for co-acting with the marker in reverse directions in a substantially straight line substantially parallel to the lengthwise axis of the marker, substantially as and for the purpose described.

43. In a time-recorder, the combination of a record-receiving element, a marker having an engaging portion coacting with said element and movable toward and from the same, and an actuating member engaging directly with the marker and movable in reverse directions in substantially a straight line parallel to the lengthwise axis of the marker, substantially as and for the purpose specified.

44. In a time-recorder, the combination of

a record-receiving element, a marker having an engaging portion coacting with said element and movable toward and from the same, and an actuating member movable in reverse directions in a line substantially parallel to the lengthwise axis of the marker and provided with a projecting part for slidably engaging the marker, substantially as and for the purpose described.

45. In a time-recorder, the combination of a record-receiving element, a marker having an engaging portion coacting with said element and movable toward and from the same, said marker being provided with a projecting part, and an actuating member movable in reverse directions in a line substantially parallel to the lengthwise axis of the marker and slidably engaged with the projecting part of the marker, substantially as and for the purpose set forth.

46. In a time-recorder, the combination of a record-receiving element, a support, a marker pivoted to the support and having an engaging portion coacting with said element, the marker being movable by gravity on its pivot for engaging said portion with the record-receiving element, and an actuating member movable in reverse directions beneath the pivoted portion of the marker and coacting with said marker for rocking the latter on its pivot and withdrawing the engaging portion of the marker from the record-receiving element, substantially as and for the purpose described.

47. In a time-recorder, the combination of a record-receiving element, a marker coacting with the record-receiving element, an actuating member coacting with the marker, said marker being movable relatively to the actuating member into position to coact with said element and being movable from such position into an inoperative position, and means for moving the actuating member automatically from a point intermediate of said positions, either into its position to coact with said element, or into its inoperative position, substantially as and for the purpose specified.

48. In a time-recorder, the combination of a record-receiving element, a marker coacting with the record-receiving element, an actuating member movable in reverse directions and coacting with the marker, said marker being movable automatically relatively to the actuating member into position to coact with said element and being movable from such position into an inoperative position, and means for moving the actuating member in reverse directions automatically from a point intermediate of said positions, either into its position to coact with said element, or into its inoperative position, substantially as and for the purpose set forth.

49. In a time-recorder, the combination of a record-receiving element, a marker having an engaging portion coacting with said element and movable toward and from the same, an actuating member movable in reverse directions and coacting with the marker, said actuating member being provided with diverging faces, a ball for engaging said faces, a plunger coacting with the ball, and a spring for moving the plunger endwise in one direction, substantially as and for the purpose described.

50. In a time-recorder, the combination of a record-receiving element, a marker having an engaging portion coacting with said element and movable toward and from the same, an actuating member movable in reverse directions and coacting with the marker, said actuating member being provided with faces spaced apart and with diverging faces between the first-mentioned faces, a ball for engaging said faces, a plunger coacting with the ball, and a spring for moving the plunger endwise in one direction, substantially as and for the purpose specified.

51. In a time-recorder, the combination of a record-receiving element, a plurality of markers each having an engaging portion coacting with said element and movable toward and from the same, a plurality of actuating members coacting with the markers and movable in reverse directions into positions indicating in and out, and means for preventing the operation of the balance of the actuating members when one of said members is being moved in either direction, said means being operable by any one of the actuating members when being moved from either its in to its out position, or from its out to its in position, substantially as and for the purpose set forth.

52. In a time-recorder, the combination of a record-receiving element, a plurality of markers each having an engaging portion coacting with said element and movable toward and from the same, a plurality of actuating members coacting with the markers, and means for moving the actuating members automatically and for preventing the operation of the balance of the actuating members when one of said members is being operated, substantially as and for the purpose described.

53. In a time-recorder, the combination of a record-receiving element, a plurality of markers each having an engaging portion coacting with said element and movable toward and from the same, a plurality of actuating members coacting with the markers and movable in reverse directions, and means for preventing the operation of the balance of the actuating members when one of said members is being moved in either

direction, said means comprising a plurality of balls, plungers movable between the balls, and movable means coacting respectively with the actuating members for moving the plungers between the balls, substantially as and for the purpose specified.

54. In a time-recorder, the combination of a record-receiving element, a plurality of markers each having an engaging portion coacting with said element and movable toward and from the same, a plurality of actuating members coacting with the markers and movable in reverse directions, and means for preventing the operation of the balance of the actuating members when one of said members is being moved in either direction, said means comprising a plurality of balls, plungers movable between the balls, movable means coacting respectively with the actuating members for moving the plunger between the balls, and springs for moving the plungers in the reverse direction, substantially as and for the purpose set forth.

55. In a time-recorder, the combination of a record-receiving element, markers, each having an engaging portion coacting with said element and movable toward and from the same, actuating members for the markers, each movable in reverse directions and provided with diverging faces, balls for engaging said faces, plungers coacting with the balls, springs for moving the plungers endwise in one direction, locking balls between which the plungers are movable, and means for confining the locking balls and causing the combined space between the same to be less than the combined width of two of the plungers movable between said balls and thereby preventing the operation of more than one actuating member at a time, substantially as and for the purpose described.

56. In a time-recorder, the combination of a record-receiving element, a marker having an engaging portion coacting with said element and movable toward and from the same, an actuating member for the marker movable in reverse directions, an alarm, a rock-shaft provided with oppositely extending arms, a movable lever for actuating the alarm provided with a lateral extension, diverging links having corresponding ends connected to the oppositely extending arms, the links being provided with lengthwise slots for receiving said extension, and means operated by the actuating member when moving in either direction for moving the rock-shaft on its axis, substantially as and for the purpose described.

57. In a time-recorder, a frame, a member provided with lengthwise parallel portions spaced apart and each formed with transverse slots, the slots of one portion being

alined with those of the other portion and markers guided in the alined transverse slots, substantially as and for the purpose specified.

5 58. In a time-recorder, a frame-member provided with lengthwise portions spaced apart and each formed with transverse slots, a pivotal pin extending lengthwise of one of  
10 said portions through the transverse slots therein, and markers extending crosswise of the frame-member and guided in the slots, corresponding ends of the markers being detachably engaged with the pivotal pin and pivoted thereon, and the opposite ends of the  
15 markers being extended laterally beyond the lengthwise portion of the frame-member opposed to the pivotal pin, substantially as and for the purpose set forth.

20 59. In a time-recorder, a frame-member provided with transverse guides, markers carried by the frame-member, and actuating members projecting beyond opposite sides of the frame-member, corresponding ends of the actuating members coacting with the

markers, and the opposite ends of said mem- 25 bers being provided with finger-pieces, substantially as and for the purpose described.

60. In a time-recorder, the combination with a record-receiving element, a marker coacting therewith, and time-indicating 30 means connected to the record-receiving element; of a main frame comprising, a base, opposing sides rising from the ends of the base; lower, intermediate and upper pairs of rods uniting said sides, parts extending from 35 front to rear and terminating in eyes mounted on the upper rods, and an upright rising from said parts, substantially as and for the purpose specified

In testimony whereof, I have hereunto 40 signed my name in the presence of two attesting witnesses, at New York, in the county of New York, in the State of New York, this 1st day of March 1905.

WILLIAM D. HAWLEY.

Witnesses:

F. M. HAWKINS,

H. B. MARTIN.