

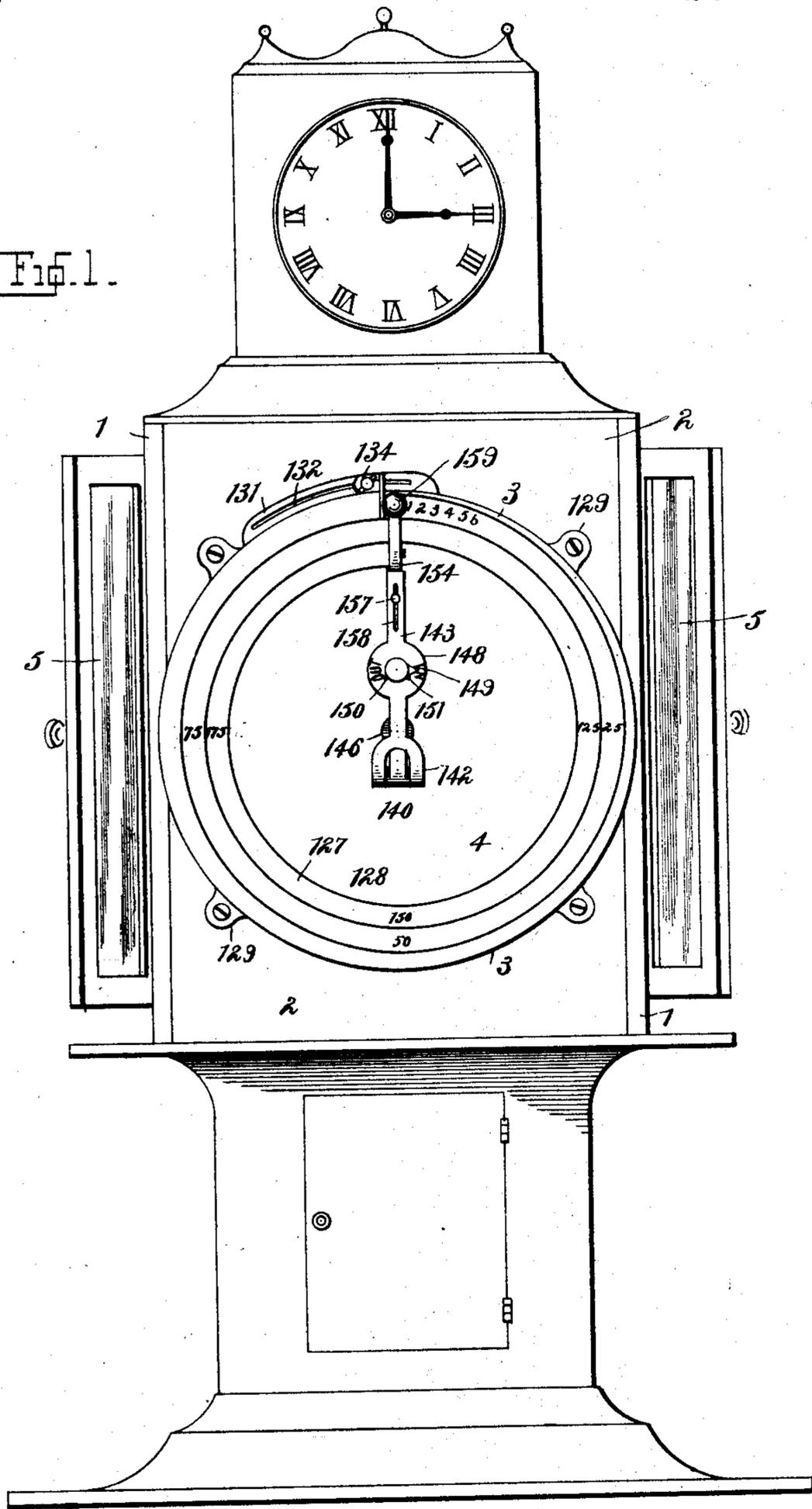
J. GARDAM.
WORKMAN'S TIME RECORDER.

(Application filed Mar. 25, 1898.)

(No Model.)

10 Sheets—Sheet 1.

Fig. 1.



Witnesses
 Am. Poppendieck.
 J. A. Gardam.

Inventor
 Joseph Gardam
 By his Attorneys
 Wm. A. Courtland

J. GARDAM.
WORKMAN'S TIME RECORDER.

(Application filed Mar. 25, 1898.)

(No Model.)

10 Sheets—Sheet 2.

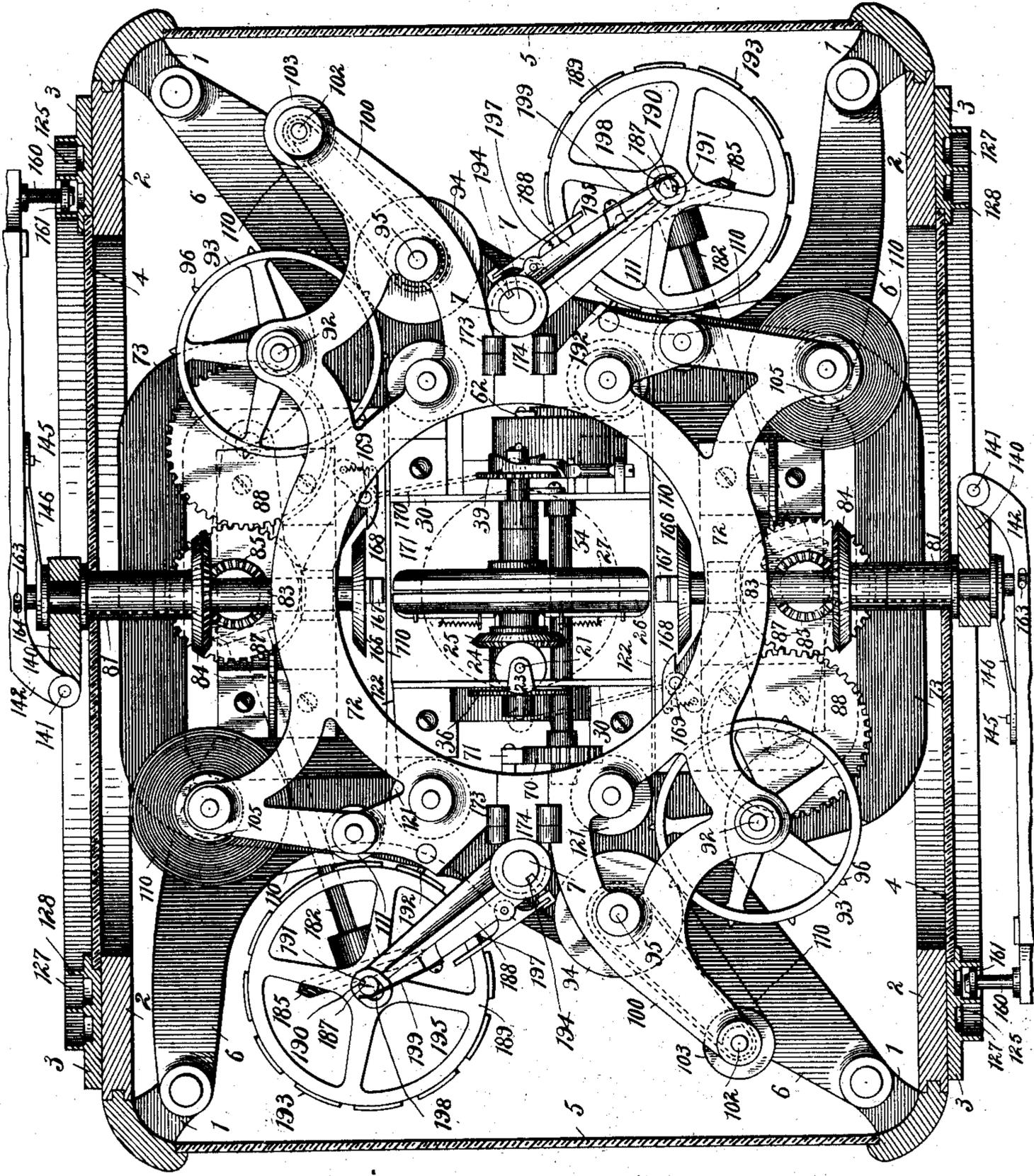


FIG. 2.

Witnesses
 Wm. Poppendick.
 J. A. Gardam.

Inventor
 Joseph Gardam
 By his Attorney
 Wm. A. Courtland.

J. GARDAM.

WORKMAN'S TIME RECORDER.

(Application filed Mar. 25, 1896.)

(No Model.)

10 Sheets—Sheet 3.

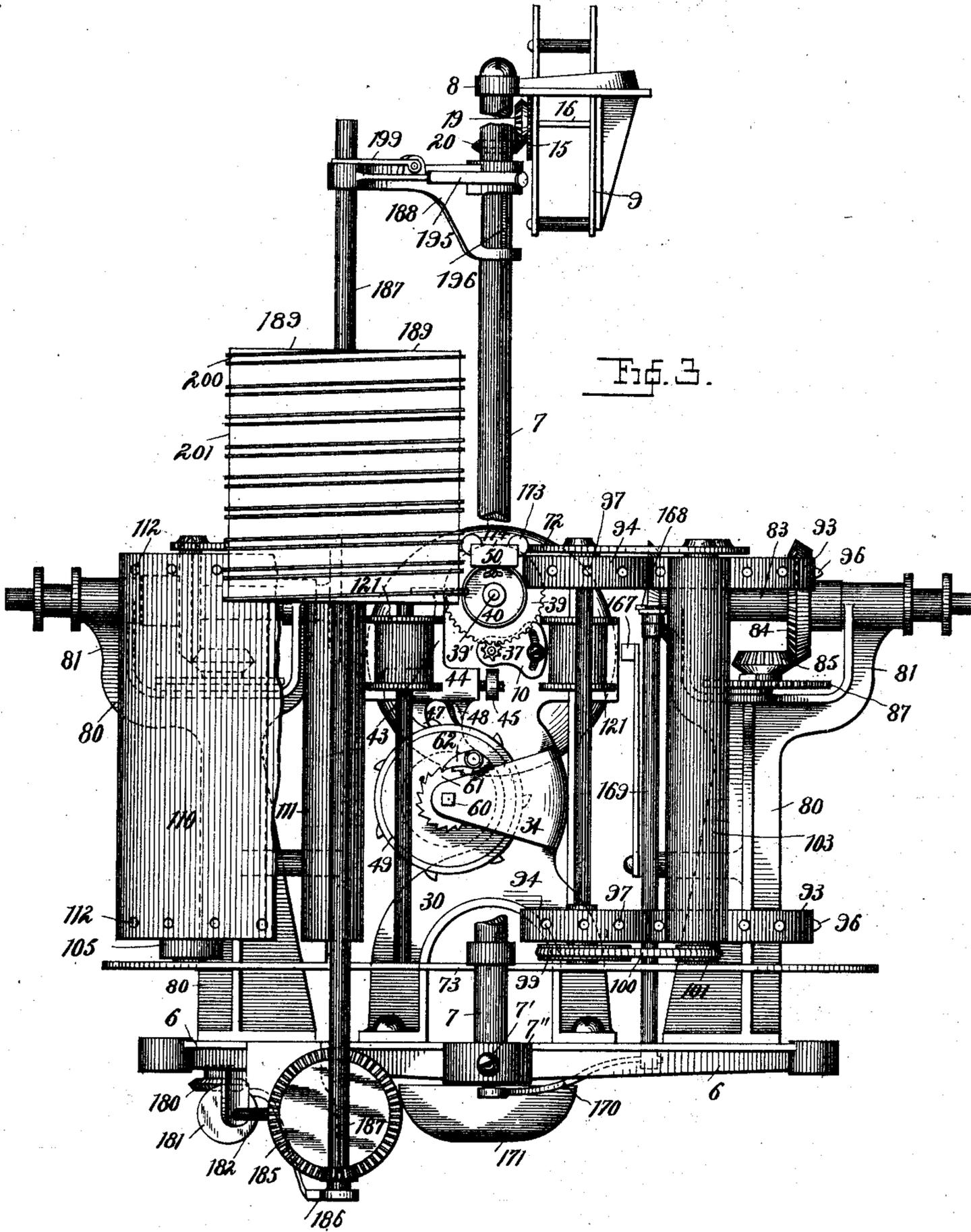


Fig. 3.

Witnesses
Am. Poppendieck.
J. W. A. Gardam.

Inventor
Joseph Gardam
 By his Attorney
Wm. A. Covittand

J. GARDAM.
WORKMAN'S TIME RECORDER.

(Application filed Mar. 25, 1898.)

(No Model.)

10 Sheets—Sheet 4.

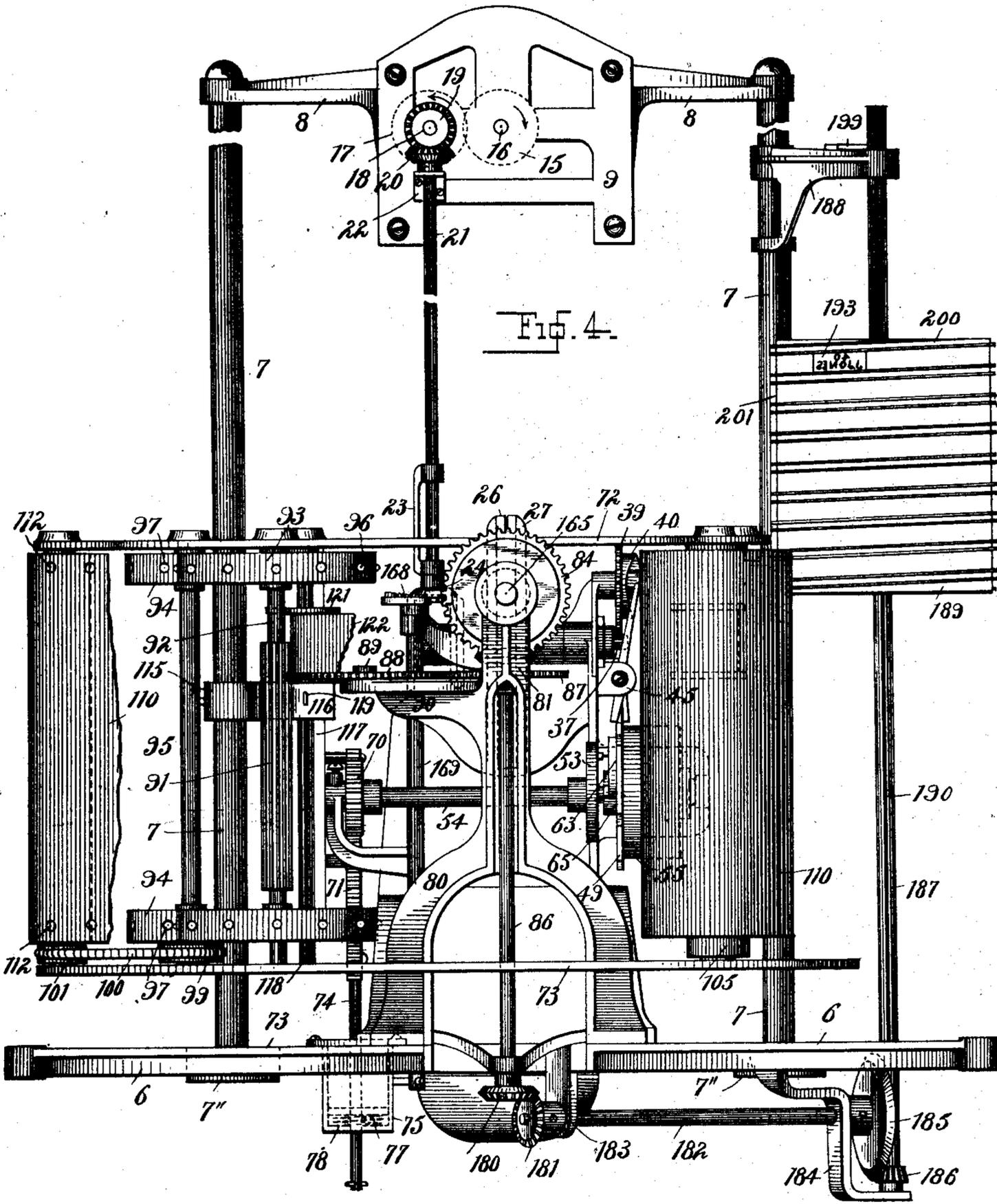


Fig. 4.

Witnesses
 Wm. Poppendieck
 J. A. Gardam.

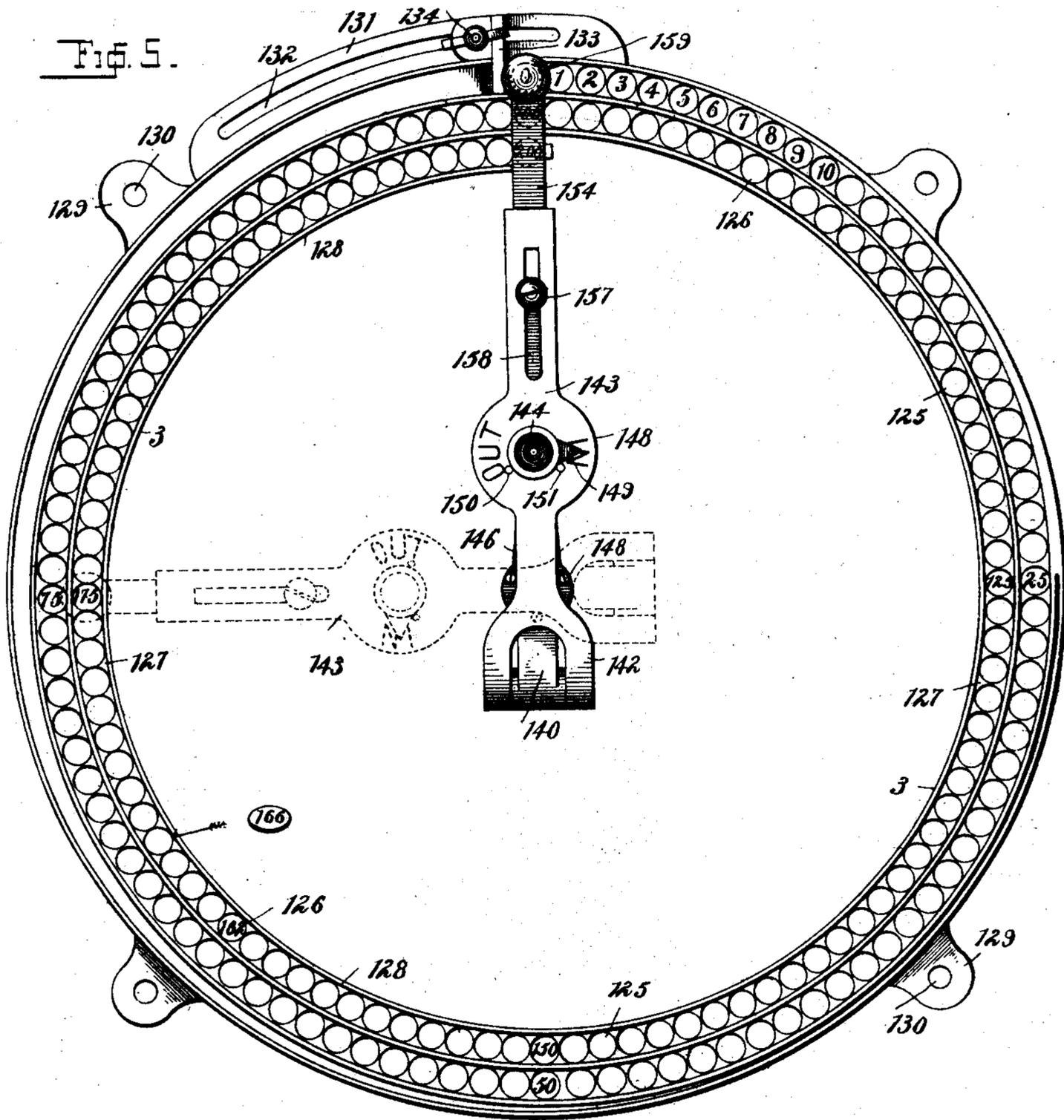
Inventor
 Joseph Gardam
 By his Attorneys
 Wm. A. Courtland

J. GARDAM.
WORKMAN'S TIME RECORDER.

(Application filed Mar. 25, 1898.)

(No Model.)

10 Sheets—Sheet 5.



Witnesses
Am. Toppendick.
J. W. Gardam

Inventor
Joseph Gardam
 By his Attorney
Wm. A. Coutland

J. GARDAM.
WORKMAN'S TIME RECORDER.

(Application filed Mar. 25, 1898.)

10 Sheets—Sheet 6.

(No Model.)

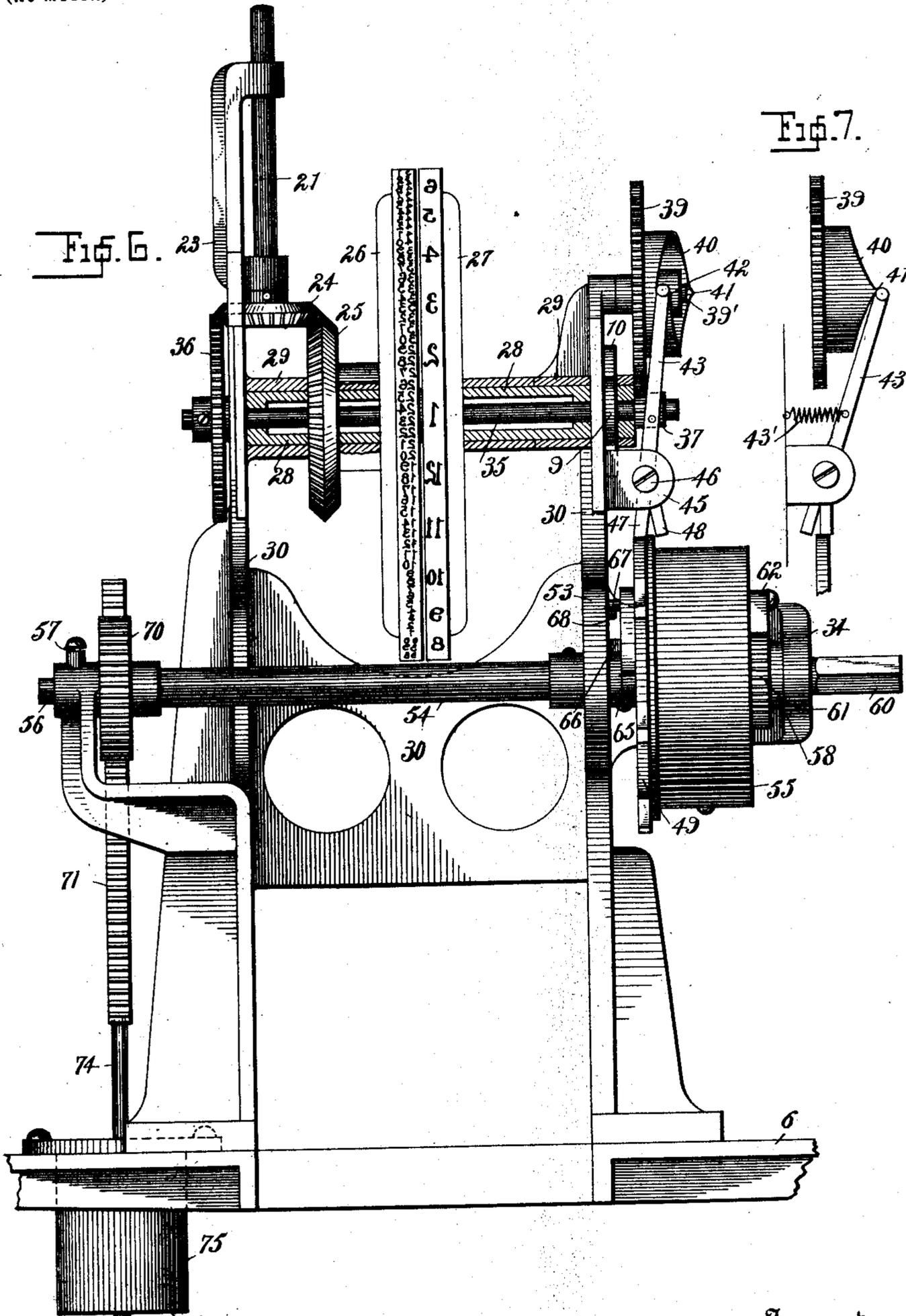


Fig. 6.

Fig. 7.

Witnesses
 Wm. Poppendieck.
 J. W. Gardam.

Inventor
 Joseph Gardam.
 By his Attorney
 W. A. Courtland.

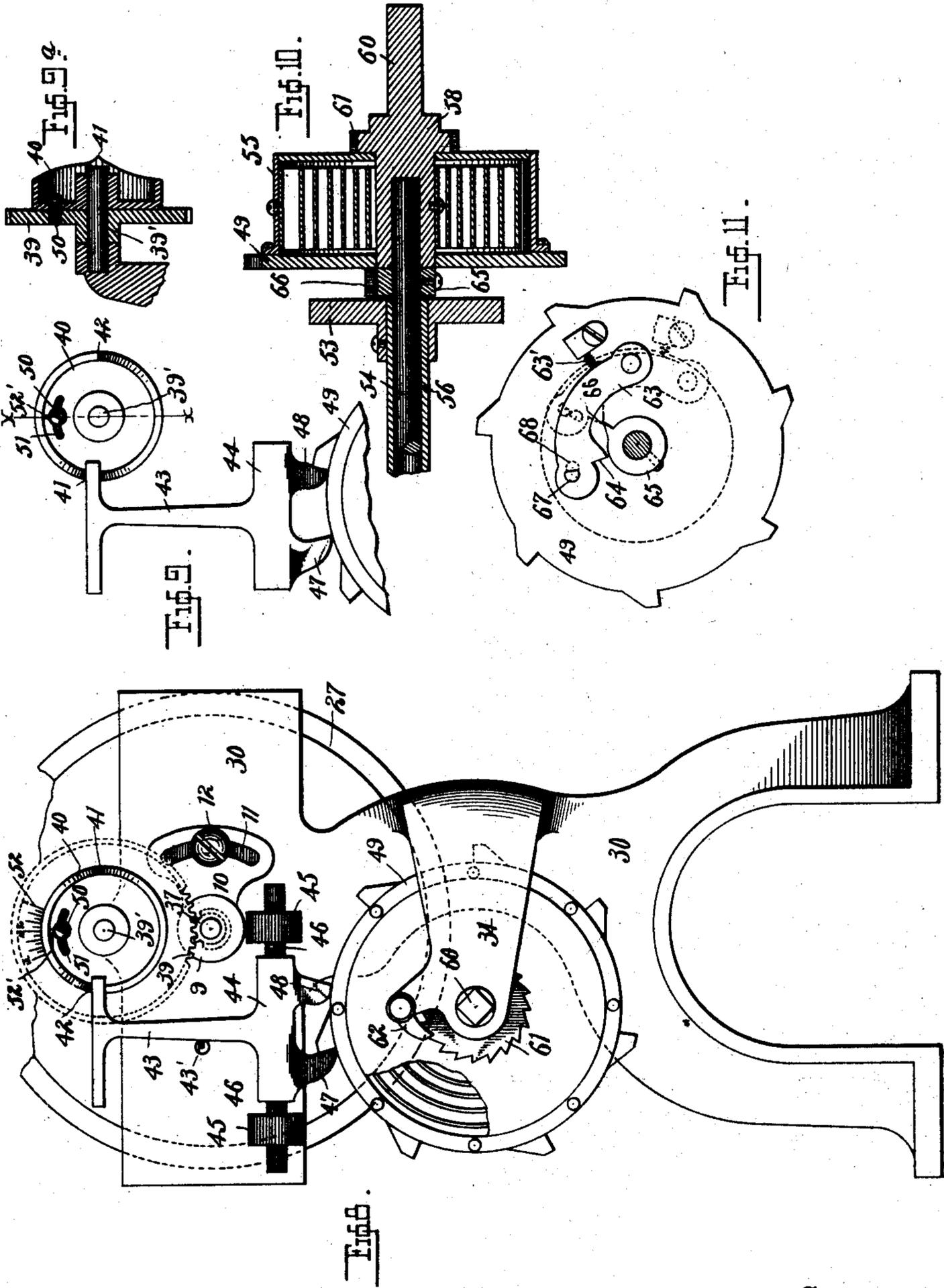
J. GARDAM.

WORKMAN'S TIME RECORDER.

(Application filed Mar. 25, 1898.)

(No Model.)

10 Sheets—Sheet 7.



Witnesses
 Wm. Poppendiek.
 J. W. A. Gardam.

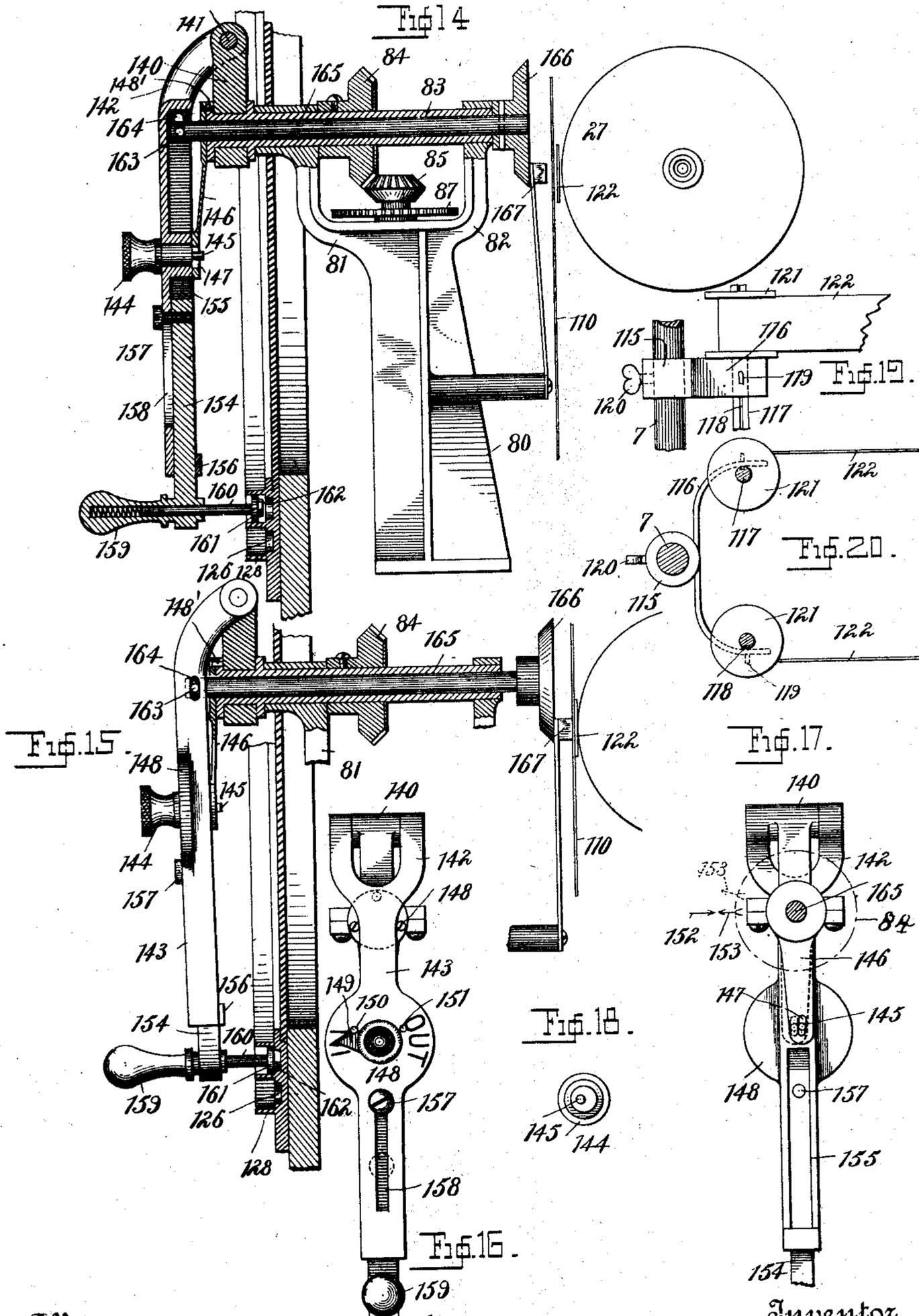
Inventor
 Joseph Gardam
 By his Attorney
 Wm. A. Courtland.

J. GARDAM.
WORKMAN'S TIME RECORDER.

(Application filed Mar. 25, 1898.)

(No Model.)

10 Sheets—Sheet 9.



Witnesses
Wm. Poppendieck
J. A. Gardam

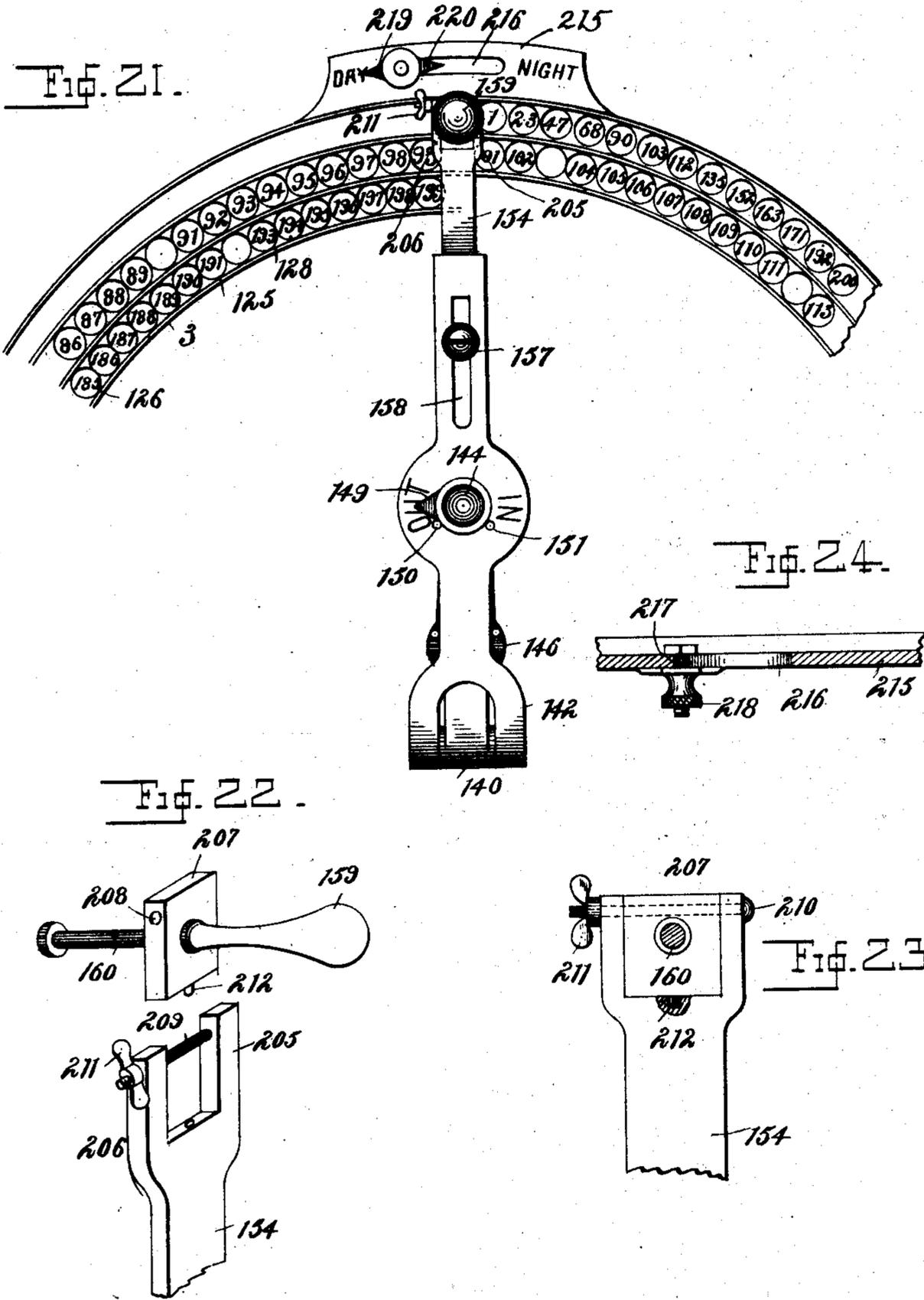
Inventor
Joseph Gardam
 By his Attorney
Wm. A. Courtland

J. GARDAM.
WORKMAN'S TIME RECORDER.

(Application filed Mar. 25, 1898.)

(No Model.)

10 Sheets—Sheet 10.



Witnesses
 Wm. Poppendieck.
 J.W.A. Gardam.

Inventor
 Joseph Gardam
 By his Attorney
 Wm. A. Courtland

UNITED STATES PATENT OFFICE.

JOSEPH GARDAM, OF NEW YORK, N. Y.

WORKMAN'S TIME-RECORDER.

SPECIFICATION forming part of Letters Patent No. 667,771, dated February 12, 1901.

Application filed March 25, 1898. Serial No. 675,081. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH GARDAM, a citizen of the United States, residing at New York, (Brooklyn,) in the county of Kings and State of New York, have invented certain new and useful Improvements in Workmen's Time-Recorders, of which the following is a specification.

This invention relates generally to workmen's time-recorders, and more particularly to that class of recorders wherein suitable mechanism is provided for recording on a continuous roll of paper all phases of a workman's time.

One object of this invention is to simplify the method of recording time by using a continuous roll of paper having the necessary number and properly-ruled individual time-cards printed thereon or continuous sheets of paper in such a manner that each time-card bearing the previously-printed name and number of the employee can be instantly brought in position to receive the record of time "in" or "out" or "overtime" printed thereon by the record-printing wheels, which are operated by a standard train of clock mechanism, which forms an essential part of workmen's time-recorders. The continuous roll of paper having the required time-cards printed thereon is adapted to move laterally and vertically through the machine in such manner as to always bring the proper allotted space to be printed in on each time-card directly in line with the record-printing wheels. The lateral movement of the paper is accomplished by the workman when he rotates the operating-handle to his designated number on the dial, and the vertical movement is produced through the medium of the clock mechanism.

A further object of this invention is to so construct the recorder that it will be double—that is, one set of printing-wheels and one train of clock mechanism will practically operate two recorders, thereby reducing the multiplicity of parts and the movements of same. By having the printing-wheels located and operated in the center of the recorder two continuous sheets of numbered individual time-cards can be operated and will be printed upon from two diametrically opposite sides of the record-printing wheels.

A still further object of this invention is to provide adequate mechanism for raising all parts of the recorder except the printing-wheels, so that each successive day of the week to be printed on the continuous roll of numbered individual time-cards will be automatically brought in proper position to receive an impression from the record-printing wheels. The record-printing wheels and the traveling carriage are operated by the clock mechanism, which is preferably located on top of the machine.

Of course I am aware that workmen's time-recorders of the kind wherein continuous rolls of paper are used and the workman's time recorded thereon are not wholly new, but the state of the art as revealed up to the present time does not show the construction the invention herein described sets forth. Continuous sheets of paper having a series of numbered individual time-cards printed thereon, consecutive or otherwise, and each card bearing the name and number of the employee, and each card adapted to receive an impression at the proper time and in the proper place from the time-regulated record-printing wheels when the operator sets the handle over a given number on the dial and the passing of the continuous sheets of paper backward and forward through the machine are the new and novel features this invention sets forth.

This invention consists of certain new and novel features of construction and operation which will be fully and clearly set forth in the following specification and the essential points of merit pointed out in the claims.

In the accompanying drawings, forming a part of this specification, the several views are described as follows:

Figure 1 is a side elevation showing an exterior view of the recorder when set up for operation, the two side doors being shown slightly opened. Fig. 2 is a plan view of the recorder, the clock mechanism having been removed and the housing and dials shown in section. Fig. 3 is an end elevation of the recorder, showing all the parts up to a vertical central line through the machine, the paper being broken away to more clearly show the parts. Fig. 4 is a side elevation at right angles to Fig. 3, showing all the parts up to a

vertical central line through the machine, the paper being broken away to more clearly show the parts. Fig. 5 is a front elevation of the spiral dial, showing the operating-lever and manner of adjusting and stopping the same. Fig. 6 is a detail view, enlarged, showing the stationary bracket which supports the printing-wheels and the carriage-lifting mechanism, the bearings and shafts upon which the printing-wheel is mounted being shown in section. Fig. 7 is a detail view of the double pawl-operating cam, showing the opposite extreme movement to that shown in Fig. 6. Fig. 8 is an end view of Fig. 6 looking to the left of the same. Fig. 9 is a detail view showing the extreme opposite movement of the double-toothed pawl to that shown in Fig. 7. Fig. 9^a is a detail vertical section on the line *x x*, Fig. 9, of the cam and supports for the same. Fig. 10 is a vertical central detail section of the carriage-lifting spring-drum and the bearings for the same. Fig. 11 is a detail face view of the stop-wheel which is secured to the spring-drum, showing the tripping-pawl for dropping the carriage. Fig. 12 is a detail view showing an exterior side elevation of the paper-drums and the mechanism for moving the same, the principal drum being shown in section. Fig. 13 is a detail view showing an interior reverse side elevation of Fig. 11. Three time-cards are shown printed upon the sheet of paper, the printing-wheels being shown in dotted lines in a position to make an impression in the first space of the card as marked at *x*. Fig. 14 is a detail central vertical section of the operating-lever, dial-shafts, and component parts. The paper, inking-ribbon, and printing-wheels are shown in normal position—that is, free from contact. Fig. 15 is a view similar to Fig. 16, the operating-lever being shown in elevation and thrust inward, so that the paper, inking-ribbon, and printing-wheels are shown in position to make an impression upon the time-card. Fig. 16 is a front elevation of the operating-lever detached. Fig. 17 is a reverse or rear view of the operating-lever, showing the manner of shifting the spring by an eccentric-pin. Fig. 18 is a detail view of the thumb-screw having the eccentric-pin thereon. Fig. 19 is a detail side elevation of the inking-ribbon and bobbin-supports. Fig. 20 is a plan view of the same. Fig. 21 is a detail view showing the method of shifting from the day time-cards to the night time-cards. Fig. 22 is a perspective view of the adjustable handle. Fig. 23 is a side view of the same. Fig. 24 is a horizontal detail section through the night and day dial.

Similar numerals of reference indicate like parts throughout the specification and in the several views of the drawings.

In order to more clearly understand the construction and operation of this invention, it is deemed advisable to first give a general description of the recorder and then a specific

description of the various achievements of the different mechanical movements in a distinct and separate manner.

In the practical application and construction of this workman's time-recorder 1 1 are the corner-standards upon which the housing or casing of the recorder is supported.

2 2 are the dial-supporting frames, which are secured to the standards 1. These dial-supporting frames have the spiral dials 3 3 attached thereto in any suitable manner and have large cylindrical openings therein which are covered with glass plates 4 in such a manner that the operation of the machine can at all times be observed.

Located on the ends of the machine and supported by the standards 1 are doors 5 5, having glass plates therein which permit free observation of the machine from that elevation. A suitable housing is provided for the clock mechanism and is supported upon the framework, standards, and housing of the recording-machine and becomes a part thereof. Secured to the housing at the bottom thereof is the permanent base-plate 6 of the recorder, which supports and carries all parts of the machine. Rigidly attached to the base-plate and extending upwardly therefrom are two standards 7, upon which the traveling carriage operates and which has permanently secured to the tops thereof a bracket 8, carrying the framework 9, in which is mounted any well-known train of clock mechanism. These standards 7 are prevented from rotation or movement by means of the screws 7', located in the collars 7'' on the base-plate 6. The base-plate 6 has four arms, which project out from the body thereof and which are secured to the standards 1 in any desirable manner and support the housing of the recorder.

The method of and mechanism for raising and lowering the carriage, in which are mounted the continuous rolls of paper having the several time-cards printed thereon, is as follows: The minute gear-wheel 15, mounted on its proper spindle 16 and propelled by an ordinary train of clock mechanism in the ordinary manner, meshes with a similarly-proportioned gear-wheel 17, mounted on a spindle 18. This spindle 18 also carries thereon a bevel-gear 19, which meshes with a similar bevel gear-wheel 20, mounted on the upper end of the shaft 21, which shaft has a suitable bearing in the clock-frame, as shown at 22. The shaft 21 extends downwardly to the recorder mechanism and is supported at its lower end in a bracket 23, which bracket forms a part of the framework of the rigid base-plate 6 and in consequence has no vertical or other movement. Secured to the lower end of the shaft 21 is a bevel gear-wheel 24 of the same uniform proportions as that of the gear-wheel 20 and is adapted to engage with and impart motion to the bevel-gear 25. This bevel-gear 25 bears a one-to-two relationship with the bevel-gear 24 and imparts rotary movement to the minute-print-

ing wheel 26, to which it is secured in any desirable rigid manner. By referring to Fig. 6, the description herein set forth of these particular parts will be more readily understood. The minute-printing wheel 26 in turn imparts rotary movement to the hour-printing wheel 27, which is loosely mounted on the permanently-fixed hollow shaft 28, which shaft has suitable bearings in the hubs 29, formed on the inner sides of the supporting-frame 30. This supporting-frame 30 is attached to the permanent base-plate 6 and remains stationary with said base. The minute-printing wheel 26 also rides freely on the fixed hollow shaft 28, the said shaft merely forming a bearing for the minute and hour printing wheels. These printing-wheels are adapted to make only one-half a revolution to each revolution of the minute-wheel 15 of the clock, said movement being obtained by the herein-before-described method of arranging the bevel gear-wheel 25 in proportion of one to two with the bevel-gear 24, which is driven by the shaft 21. The minute-printing wheel 26 has upon its periphery in duplicate raised numerals ranging from "1" to "59," then a "00," and the hour-printing wheel has in duplicate raised numerals upon its periphery ranging from "1" to "12," so that at all times the necessary hours or minutes can be printed upon the time-cards on both sides of the recorder.

By referring to Fig. 6 it will be noticed that the rigidly-secured hollow shaft 28 has a shaft 35 extending longitudinally there-through, protruding beyond the supporting-frame 30 at both ends and has pinned on one end a gear-wheel 36, which is in engagement with the bevel-gear 24 on the shaft 21 and from which gear it receives its rotary motion in proportion of one to two. Fastened to the opposite end of this shaft 35 is a pinion 37, which imparts motion to the gear-wheel 39, mounted on a fixed spindle 39' in the top of the supporting-frame 30. This gear-wheel 39 bears a relation of twelve to one with the pinion 37, and for every twelve revolutions of the bevel-gear 24 the gear-wheel 39 will have made one-half a revolution. Secured to the outer face of the gear-wheel 39 is an adjustable cup-shaped cylindrical cam 40, which has on its operating-face a projection 41 and a depression 42, diametrically opposite each other. Riding over the face of this cam is a T-shaped arm 43, which projects downwardly from the cam and terminates in a double-toothed pawl 44. (See Figs. 6, 7, and 9.) This double-toothed pawl is held in position between the two ears 45, which are part of and project outwardly from the supporting-frame 30 and have therein two adjusting-screws 46, which pass through the ears 45, and upon the ends of the said screws the double pawl 44 is pivotally secured in such manner as to permit it to freely rock in response to the course of travel of the arm on the face of the cam 40 and is held to its

course by the spring 43'. The two teeth 47 and 48 of the pawl 44 are so arranged that they cannot simultaneously have engagement with the escapement-wheel 49, but alternately engage the same tooth when it is released by means of the T-shaped arm 43 traveling over the irregular face of the cam 40. When the arm 43 is in the position shown in Fig. 6—that is, in the depression 42—the tooth 47 of the double pawl will be in engagement with one of the teeth on the escapement-wheel 49 and the tooth 48 will be free; but when the T-arm 43 is in the position shown in Fig. 7—that is, on the point of the projection 41—the tooth 48 will be in engagement with a tooth on the escapement-wheel and the tooth 47 of the pawl will be free. This change of the teeth in engagement with the teeth on the escapement-wheel occurs twice in twenty-four hours—say at noon and midnight—that is, when it is desired to stop work at noon—but if at any intermediate time between twelve and one o'clock the cam 40 can be adjusted to suit such time (see Figs. 8, 9, and 9^a) by loosening the set-screw 50, which screws into the gear 39 and rides in the concentric slot 50 in the cam and permitting the cam to have its relation with the gear 39 changed to the desired time indicated by the graduations 52 and the registering of the indicator 52' on the set-screw 50 with the graduations. The gear 39 does not change its operative condition with the clock mechanism, so that when the position of the cam is changed it will operate to change the time when said cam will have the projection or depression in a position to operate the double pawl.

The escapement-wheel 49 is secured to one end of the spring-drum 55, which in turn is mounted on the fixed shaft 56, said shaft being held from rotation by the set-screw 57. The shaft 58 of the spring-drum is hollow at one end and receives and forms a bearing for the fixed shaft 56 and upon which the drum is free to revolve.

The spring 59 is secured at one end to the casing of the drum, the other end being secured to the shaft 58, so that when a key is placed on the square end 60 of the shaft 58 and turned the spring can be wound up and will retain the desired tension, owing to the fact that the double pawl 44 has one tooth always in engagement with a tooth on the escapement-wheel 49, and the ratchet-wheel 61, which is part of the shaft 58, is in engagement with the pawl 62, which is pinned to the side of the arm 31, forming part of the supporting-frame 30 and which also forms a bearing for one end of the drum-shaft 58. The spring tension in the drum keeps one of the teeth on the escapement-wheel 49 in constant engagement with one of the teeth on the double pawl.

Pivotally attached to the face of the escapement-wheel 49 is a spring-actuated pawl 63, having a tooth 64 near one end which is

adapted to ride on the periphery of the collar 65 and held in contact with said collar by means of the spring 63'. The collar 65 is fixed to the shaft 56, said collar having thereon a
 5 lug 66, over which the tooth 64 rides and by means of which the pawl 63 is lifted. On one end of the said pawl is a pin 67, which engages with a corresponding pin 68, located on
 10 the face of the disk 53, and is firmly secured to the rotatable hollow shaft 54, which is supported and has a bearing in the bracket-arm 34, said arm being L-shaped and forming a part of the supporting-frame 30, the bearing-arm of the bracket being parallel with the side
 15 of the supporting-frame. These two pins 67 and 68 are in constant engagement while the tooth on the pawl 63 rides over the concentric portion of the collar 65; but when the tooth reaches the limit or apex of the lug 66 on the
 20 collar the pawl-pin 67 will be released from the disk-pin 68, and the disk and hollow shaft will be free to make one backward revolution, when it will again come in contact with the pawl-pin. The escapement-wheel makes one
 25 revolution every seven days and lifts the traveling carriage fourteen distinct times, which is twice for each day of the week. Then the pawl-pin 67 releases the pin on the disk 68 and the traveling-carriage frame drops back
 30 again to the first day of the week. The hollow shaft 54 has fixed at the end opposite to the disk 62 a pinion 70, which engages with a rack 71, said rack being in turn secured to the frame of the traveling carriage.

35 72 represents the upper or hinged frame-plates, forming a portion of the traveling carriage, and 73 is the lower frame-plate of the same. These plates are securely bound together by brackets, so that they become sub-
 40 stantially one part.

Fixed on one end of the hollow shaft 28, which supports the printing-wheels 26 and 27, is a collar 9, provided on one side with a projecting plate 10, having a slot 11 therein
 45 through which a binding-screw 12 passes, said binding-screw engaging in the side of the supporting-frame 30. The object of this collar is to provide means for adjusting the hour-printing wheel with proper relation to the
 50 minute-printing wheel. By loosening the binding-screw 12 the plate 10 can be moved, which in turn moves the hollow shaft 28, and consequently the hour-printing wheel. When the binding-screw is set, the wheels will not
 55 change their relationship while performing their required functions.

By referring to Figs. 2, 3, 4, 12, 13, and 14 the roll of paper bearing the time-cards thereon and the mechanism for operating the same
 60 will be readily understood from the following description: Located on both sides of the recorder are supporting-brackets 80, secured to the permanent base-plate 6 and have projecting arms on the tops thereof forming
 65 bearings 81 and 82 for the hollow shafts 83. Mounted on and secured to the hollow shafts

83 and situated between the projecting arms 81 and 82 are bevel-gears 84, which mesh with and operate the bevel-gears 85, secured to the ends of the vertical shafts 86, said shafts
 70 having suitable bearings in the base-plate 6 and the brackets 80. On these shafts 86, under the bevel-gears 85, are gears 87, which in turn mesh with and impart motion to the gears 88, that are carried on studs 89, supported by arms 90, forming a part of the
 75 bracket 80. These gears 88 are adapted to rotate the elongated pinions 91, carried by the vertical shafts 92, said shafts receiving proper support from the upper and lower
 80 plates 72 and 73 of the traveling carriage. The pinions 91 are elongated, so that as the traveling carriage moves up and down they will always be in engagement with the fixed gears 88. Located on the extremities of the
 85 shafts 92 and between the plates 72 and 73 are the paper-operating wheels 93, which receive rotary motion from the above-described chain of gears and in turn impart rotary motion to the wheels 94, with which they have
 90 peripheral contact, said wheels 94 being supported on vertical shafts 95, also having suitable bearings in the plates 72 and 73 of the traveling carriage. The wheels 93 have on their peripheries pins 96, adapted to fit into
 95 holes 97 in the peripheries of the wheels 94, whereby the said wheels 94 are given a positive rotary movement. The shafts 95, carrying the wheels 94, have secured on their lower ends, between the plate 73 of the traveling
 100 carriage and the wheels 94, pulleys 99, on which the spring-belts 100 travel and drive the pulleys 101, located on and secured to the ends of the shafts 102, said shafts being supported by the plates 72 and 73 of the traveling
 105 carriage, said shafts also having thereon the paper-receiving drums 103. These driving-belts 100 are made of spiral springs for the purpose of avoiding any possibility of the paper being torn or mutilated as it is
 110 wound up on the drums 103, and, further, by using spring-belts the paper will be loosely wound on the drums, inasmuch as the spring-belts will stretch and slip on the pulleys when the paper is too tightly drawn.
 115

Between the plates 72 and 73 of the traveling carriage and on the ends opposite to the paper-receiving drums 103 are the principal or main paper-drums 105, which are supported on shafts 106 between the plates 72 and 73.
 120 The drums 105 are spring-actuated and constructed somewhat on the principle of a curtain-roller—that is, spiral springs 107 encircle the shafts and have one of their ends secured to the shafts 106, which shafts are formed
 125 with square heads 108 on their lower ends and rest in corresponding square holes 109 in the plate 73 and are thereby prevented from rotating. The upper ends of the spiral springs 107 are attached to the drums proper,
 130 so that when the paper is unwound from the drums the springs 107 will be wound up, and

as soon as the paper is to be returned to the drums the springs will have sufficient tension to rewind the paper.

The strips of paper 110, upon which the form of time-cards to be used are printed so that they can be read from top to bottom, are located on both sides of the recorder on the main paper-drums 105 and pass through the machine to the paper-receiving drums in the following manner: When the paper leaves the main drums 105, it passes over the auxiliary rollers 111, which are carried between the plates 72 and 73 of the traveling carriage, across the machine between the wheels 93 and 94, and onto the receiving-drums 103. (See Fig. 2.) On the upper and lower longitudinal sides of the paper in the center of each time-card are perforations 112, which are equally spaced to register with the pins on the paper-operating wheels 93, and by means of said paper-operating wheels the paper receives a positive movement, whereby it is at command of the operator to always bring the desired numbered time-card in front of the printing-wheels to receive an impression therefrom.

The time-cards 104 that are preferably used in this recorder are clearly shown in Fig. 13, where three cards are displayed of about one-half of the desired proportions. The cards are arranged to receive the designated number of a workman, also his name.

The days of the week are arranged vertically on the card and divisions for "A. M." and "P. M.," also time "in" and time "out." On the bottom of the card is the "total time" and "total wages." The cards are always brought into proper position by the operator to allow the printing-wheels to record the exact time in the proper space on the card that it is intended the time should appear.

In Figs. 2, 3, and 4 the manner of securing, adjusting, and retaining the inking-ribbons in their proper positions relative to the printing-wheels is clearly shown. The collars 115 encircle and slide on the standards 7 and are provided with semicircular arms 116, which extend under and support the ribbon-bobbins 121, said bobbins being adapted to slide vertically on the shafts 117, said shafts being supported by and located between the traveling-carriage plates 72 and 73. These shafts 117 have longitudinal grooves or splines 118 therein, which receive the ends of the pins 119, said pins being carried in the arms 116 of the collars 115. The thumb-screws 120, which are carried by the collars 115, are utilized to shift the inking-ribbons and adjust them to the positions desired. The inking-ribbons 122 are carried by the bobbins 121 on each side of the machine and are arranged to travel between the paper and the printing-wheels, so that when the paper is forced against the printing-wheels the necessary impression will result. When the traveling carriage moves on the standards 7, the inking-ribbons will remain at all times in the

same position of adjustment, owing to the fact that they receive their support from the standards 7, and when the shafts 117 move with the carriage the pins 119 in the arms 116 will travel in the splines 118 of said shafts, the inking-ribbon remaining in a position to always be operated upon.

The dials 3 have numerals spirally arranged thereon consecutively from "1" to any designated number, shown in Fig. 5 as "200." The dials have holes or depressions 125 therein, which contain the numerals 126 on removable disks arranged spirally around the dials in channels 127, said channels being formed by the outwardly-projecting spiral ribs 128. These ribs also form guides or ways for conducting and retaining in their proper positions the operating-levers of the machine when said operating-levers are rotated for the purpose of seeking a designated numeral. On the outer edge of the dials are ears 129, having holes 130 therein for securing them to the housing of the machine. The object of having the center of the dials cut out, as shown, is to permit glass to be inserted therein, so that at all times the operator may see the operation of the record of time being made. On top of the dials are concentrically formed strips 131, having concentric slots 132 therein, which are adapted to receive for adjustment the operating-lever stops 133, that are made to be tightened and loosened by means of the thumb-screws 134. The operating-levers abut against these stops 133 and prevent them from moving beyond the depression marked "Zero;" but when it is desired to pull the paper having the time-cards thereon back, so that the first card can be seen when the machine is first started, the thumb-screws 134 are loosened, which will permit the stops to be moved around in the slots 132, so that the operating-lever can be turned backward until the card desired to be examined is in sight, after which the stop is pushed back to the first position (zero) and re-locked.

On the outer ends of the hollow shafts 83 (see Figs. 14 and 15) are loosely journaled standards 140, to which are pivotally secured, by means of the pins 141, the bifurcated ends 142 of the operating-levers 143. Carried in the operating-levers about midway in suitable bearings are the thumb-nuts 144, having eccentric pins 145 on their inner ends which ride in slots 147 in the spring-arms 146. These spring-arms 146 have their upper ends rigidly secured to the outer ends of the hollow shafts 83 by means of the screws 148' and whereby the hollow shafts 83 are secured to the operating-levers 143 in such manner that rotation of said operating-levers will correspondingly rotate the hollow shafts 83. Located on the circular portions 148 of the operating-levers are the words "In" and "Out," and secured to the thumb-nuts 144 are indicators 149, which are free to be rotated by said thumb-nuts between the stops 150 and

151. The stops 150 permit the indicators to rest on the word "In" and the stops 151 permit them to rest on the word "Out." When the indicators rest on the word "In," the 5 spring-arms are held in the position shown in Fig. 17—that is, the eccentric pins 145 will have reached one limit of their throw and the bevel-gear 84 will be held in the position shown in dotted lines in Fig. 17, the arrow 10 153 meeting exactly the fixed arrow 152. When the indicators rest on the word "Out," the eccentric pins 145 will have reached their extreme positions opposite to the one first described and the bevel-gear 84 will have been 15 rotated the distance between the fixed arrow 152 and the arrow 153. (Shown in dotted lines.) This movement of the gear-wheel 84 is sufficient to operate its connecting elements to cause the paper bearing the time-cards thereon to be moved the required distance to allow the printing-wheels 26 and 27 to make an impression in the "In" or "Out" columns of the time-cards.

The operating-levers are provided with extension-bars 154, sliding in ways 155 in the levers and retained therein by means of the cross-pieces 156 and the screws 157, which play in the slots 158 in the face of the operating-levers. The lower ends of these extension-bars 154 carry handles 159, provided with interior longitudinal holes, which receive and support the spindles 160, said spindles having on their outer ends rollers 161, that travel around the spiral dials between the ribs or 35 guides 128 for the purpose of reducing frictional contact therewith. On the extreme ends of the spindles 160, beyond the rollers 161, are conical heads 162, which are intended to be pressed into the depressions 126 on the dials 125 when it is intended to operate the mechanism of the recorder. Secured to the upper ends of the operating-levers by means of pins 163 and playing freely in the slots 164 are the shafts 165, which are acted upon 45 by the operating-levers to receive an inward longitudinal thrust, said movement in turn forcing the disks 166, that are pinned to said shafts, inwardly, thereby forcing the spring-actuated platen-hammers 167, secured to the 50 supporting-frames 80, against the paper 110, bearing the time-cards thereon, which meet the inking-ribbons 122 and carry them against the printing-wheels 26 and 27. Fig. 14 shows these parts in their normal or inoperative positions, and Fig. 15 shows the same parts after said parts have been operated as hereinbefore described and for the purpose of printing the desired time upon the time-cards.

60 In order to notify the operator that all parts of the machine have properly performed their various functions, a bell located under the base-plate 6 is employed, which will give an alarm immediately after the operating-levers, 65 through the medium of shafts 165 and the disks 166, have forced the platen-hammers against the paper bearing the time-cards there-

on and one of the time-cards has received the proper impressions from the printing-wheels. The disks 166 when moved inwardly trip the 70 dogs 168, (see Figs. 2 and 3,) said dogs being mounted on the rock-shafts 169, supported by the base-plate and the supporting-frames 80. On the lower ends of these rock-shafts 169 are hammers 170, which are secured to 75 the rock-shafts and move therewith when the dogs 168 are tripped by the disks, and when the said dogs are released by the said disks the hammers will, through the medium of the springs 172, situated on the tops of the dogs, 80 be drawn back until they strike the bell 171, thereby notifying the operator that the recorder has properly performed the required operations.

In order to insert new rolls of paper into 85 the machine when so desired, I have hinged the two upper plates 72 of the traveling carriage, as shown at 173, to a central standard 174 in such a manner that each of the plates 72 can be readily lifted away from the ends 90 of the shafts it supports, the paper-carrying drums removed, new ones inserted, and the plate 72 dropped down to form the proper support for the different shafts.

When the traveling carriage which carries 95 the paper upon which the time-cards are printed is raised from day to day by the hereinbefore-described mechanism and is upon the last day of the week, it will at the time previously set be released and drop down to 100 the proper position to allow the time-cards on the paper to be printed upon for the first day. In order to prevent any shock to the parts when the traveling carriage drops, as above stated, a piston-rod 74 is attached to the lower 105 end of the rack 71 and extends downwardly into and through the cylinder 75, said cylinder having a flanged top that is secured to the permanent base-plate. The piston-rod 74 has a piston-head 76 therein, which slides in 110 the cylinder and is adapted to cushion on a spring 77, located between said piston-head and the bottom 78 of the cylinder. (See Figs. 4 and 6.) Thus it will be seen that when the traveling carriage carrying the rack 71 is 115 dropped the shock to the parts will be removed and the traveling carriage allowed to cushion itself by means of the above-described parts.

The shafts 86, which are rotated through 120 the medium of the operating-levers 143, the hollow shaft 83, and the bevel-gears 84 and 85, have mounted on their lower ends bevel-gears 180, which in turn drive the bevel-gears 181, to which are pinned the shafts 182, which 125 receive support from the brackets 183 and 184, said brackets being secured to the permanent base-plate 6. On the outer ends of the shafts 182 are bevel-gears 185, which rotate the bevel-gears 186, that are pinned to 130 the vertical rods 187.

The printing-cylinders 189 slide vertically on the rods 187 and are rotated thereby and secured thereto by means of tongues 191,

which ride in the longitudinal grooves in said rods. The cylinders have spiral grooves 200, arranged in the peripheries thereof, which receive pins 192, that are secured to the hinged plates 72 of the traveling carriage. Between the spiral channels 201 are carried the impression-plates 193, bearing the names and numbers of the workmen that it is desired to print on the previously-printed individual time-cards. The vertical standards 7 have on their tops brackets 188, which form bearings for the tops of the rods 187, but in such manner that the said rods can be released from the brackets when it is desired to remove the cylinders therefrom. These brackets slide freely on the vertical standards, but are prevented from any lateral motion by means of the pins 194, carried by the pivoted levers 195. These pins enter the grooves 195 in the vertical standards and are held there by the springs 197 on the handles of the pivoted levers 195. The holes 198 in the hubs of the printing-cylinders which receive the vertical rods 187 are made oval to permit the cylinders to properly impress the printing-plates carried thereby against the paper on the auxiliary or impression rollers 111. The cylinders are held against the auxiliary or impression rollers by means of the spring-arms 199, which are secured to the brackets 188. The impression-plates 193 are made to conform to the contour of the printing-cylinders and are attached to said cylinders in any suitable manner, whereby the plates can be readily removed or shifted when new names are added or the number of workmen decreases.

When it is desired to adjust and operate the printing-cylinders, the pins 194 are withdrawn, by means of the pivoted levers 195, from the grooves in vertical standards and the brackets raised until the vertical rods 187 are free. The printing-cylinders are then placed in position on the vertical rods 187, so that the pins 192 on the hinged plates of the traveling carriage will be in the spiral grooves of the cylinders. When the operating-levers 143 are rotated, the cylinders will be rotated by the hereinbefore-described intermediate train of mechanism and the impression-plates will be brought in contact with the moving paper as the printing-cylinders are drawn down on the vertical rods by means of the pins 192, traveling in the spiral grooves of said printing-cylinders. After all the names on the cylinders have been printed the cylinders are removed from the machine and need not be again used until a new weekly set of time-cards are needed. These printing-cylinders are also constructed to carry a number of impression-plates of the individual time-cards, whereby the said individual time-cards can be printed on said sheets of paper, in which instance it is only necessary to place rolls of blank paper in the machine.

By referring to Figs. 22, 23, and 24 the method of changing from the day record sheets or cards to the night record sheets or

cards is clearly shown. The outer ends of the extension-bars 154 have two arms 205 and 206, that receive therebetween the removable handle-carrying blocks 207. These blocks have holes 208 through the tops thereof, which receive therethrough the bolts 209, that pass through the arms 205 and 206. These bolts have heads 210 on one of their ends and thumb-nuts 211 on the other end and can be removed from the arms when it is desired to remove the handle-carrying blocks. On the bottoms of the handle-carrying blocks are studs 212, which fit into holes 213 in the extension-bars and prevent any lateral movement of the handle-carrying blocks.

Located on the tops of the dials are strips 215, having slots 216 therein and bolts 217, having adjusting-nuts 218, adapted to travel in said slots. On opposite ends of the strips are the words "Day" and "Night," and secured to the bolts 217 are pointers 219 and 220, which point out what parts of the continuous sheets of paper are in use. This adjustment is preferably made by the operator, but can be done automatically, if so desired. Fig. 21 also shows how the numbers on the dials can be changed when only a few of the regular number of employees are working and it is not deemed advisable to change a workman's number. The numbers are arranged as shown in the first row on the dial, and the numbers on the continuous sheet of time-cards are made to correspond with said numbers. This method of arranging the numbers obviates the necessity of winding and unwinding the entire length of the continuous sheet.

In order to clearly and concisely explain the operation of this invention, it is deemed advisable to follow out the movements of one half of the machine only, inasmuch as the machine is made double and both halves are precisely alike in construction and operation.

The operation is as follows: The roll of paper, upon which the time-cards are previously printed either by the printing mechanism located in the recorder or some other suitable manner and means, is inserted into the machine by lifting the hinged top plate 72 of the traveling carriage and placing the main paper-holding drum in the position shown—that is, so that the time-cards carried thereon face the printing-wheels. The end of the paper, which is preferably blank for a short distance of its length, is then carried over the auxiliary roller 111, across the machine in front of the printing-wheels 26 and 27, between the paper-operating wheels 93 and 94, and secured to the paper-receiving drum 103. The end of the paper is secured to the paper-receiving drum so that the first time-card on the paper will be located at a point a little to one side of the printing-wheels—that is, when the operating-lever 143 is at zero on the dial the first time-card on the paper is one degree or space removed from the printing-wheels—so that when the operating-lever is

moved to cover number "1" on the dial the
 time-card No. 1 will be in proper position to
 receive an impression thereon. Presuming
 the paper bearing the time-cards thereon to
 5 be properly adjusted in the machine and the
 time set for the operation of the machine the
 morning of the first day of the week and the
 operating-lever 143 at zero, as shown in Fig.
 5, and that the workman who is about to op-
 10 erate the machine is known as "No. 175"
 and is about to commence his work, the
 workman turns the thumb-nut 144 on the op-
 erating-lever 143 until the indicator strikes
 the stop 150, which places the indicator over
 15 the word "In," which implies the time em-
 ployed. When the indicator rests on the word
 "In," the first column on the time-card
 marked "In" will always be brought in posi-
 20 tion to receive an impression therein from
 the printing-wheels. The workman then
 seizes the handle 159 and rotates it from right
 to left until he covers his designated num-
 ber, where he stops. When the operating-
 lever is rotated, it will impart rotary motion
 25 to the hollow shaft 83, inasmuch as it is se-
 cured thereto by means of the spring-arm
 146. When the hollow shaft is rotated, the
 bevel-gear 84, pinned thereto, will revolve
 and simultaneously revolve the bevel-gear
 30 85, mounted on the shaft 86, and upon which
 shaft is also mounted the gear 87, meshing
 with and driving the gear 88, in turn driving
 the elongated pinion 91, that is mounted on
 the shaft 92, carrying the paper-operating
 35 wheels 93. This system of gearing is so ar-
 ranged that when the operating-lever 143 is
 moved any number of spaces the pins on the
 periphery of the paper-operating wheels will
 have registered with an equal number of
 40 holes in the ends of the time-cards, so that
 the same number upon which the operating-
 lever rests on the dial will correspond with
 the number on the time-card that is in posi-
 45 tion to receive an impression from the print-
 ing-wheels. Thus it will be seen that when
 the workman has stopped the operating-lever
 over the number "175" time-card No. 175
 will have the "in" column in a position in
 50 front of the printing-wheels 26 and 27 to re-
 ceive an impression. The operator having
 found his number presses the handle 159 in-
 wardly as far as it will go, causing the conical
 head 162 on the end of the spindle 160 to en-
 55 ter the depression 126 in the dial 3. The in-
 ward thrust of the handle 159 will cause the
 operating-lever 143 to also be forced inwardly,
 which in turn will force the shaft 165, to which
 it is pinned, to receive an inward thrust, car-
 60 rying with it the disk 166, which will force
 the platen-hammer 167 against the paper
 bearing the time-cards thereon and in turn
 against the inking-ribbon and finally against
 the printing-wheels 26 and 27, when it will re-
 65 ceive an impression therein of the correct
 time, through the medium of the clock-oper-
 ating mechanism, in hours and minutes, of the
 said workman's entrance for the commence-

ment of his work. When the workman de-
 sires to absent himself from business, he will
 turn the thumb-nut 144 until the indicator 70
 thereon strikes the stop 151 and the indicator
 rests on the word "Out," which will cause the
 chain of gearing hereinbefore described to
 move sufficiently far to allow the time-card
 on the paper to have laterally moved the dis- 75
 tance of one column—that is, to the column
 marked "Out." He then rotates the operat-
 ing-lever and performs the same operations
 that were required when he commenced his 80
 work, whereupon the printing-wheels will
 have recorded the exact time of his departure
 from business. When the disk 166 forces the
 platen-hammer 167 against the paper and in
 turn against the printing-wheels, it simulta-
 neously moves the dog 168, which operates 85
 the bell-hammer, and when the dog is tripped
 by the disk the bell-hammer strikes the bell
 and notifies the workman that the machine
 has properly operated and recorded the time
 desired. If the workman desires to see the 90
 impression made on his time-card, he can do
 so after the impression has been made by ro-
 tating the operating-lever backward slowly
 until his time-card appears on the main pa-
 per-holding drum 105 directly in front of him 95
 through the glass window in the front of the
 machine. It is not essential that the work-
 man return the operating-lever 143 to zero
 after he has printed his "time," but can leave
 it on his number. The succeeding workman 100
 moving it to his number will place the proper
 time-card in position for an impression owing
 to the positive registering of the holes in the
 time-cards and the pins on the paper-operat-
 ing wheels. 105

Preferably at twelve o'clock each day the
 clock mechanism will have operated to move
 the vertically-traveling carriage upwardly,
 so that the space opposite "P. M." will be in
 a position to receive the impressions from the 110
 printing-wheels therein, and at twelve o'clock
 each night the clock mechanism will have
 moved the traveling carriage one space or de-
 gree farther upward, so that the succeeding-
 day letter will appear—for instance, "T," 115
 meaning Tuesday. This is accomplished by
 the clock mechanism rotating the shaft 21 once
 every hour, or twelve times in twelve hours.
 The bevel-gear 24 on the end of the shaft
 21 will make the same number of revolutions 120
 as said shaft, and meshing with the gear 36,
 which is in proportion of two to one, will ro-
 tate said gear 36 six times, revolving the shaft
 35 and the pinion 37 on the end thereof cor-
 respondingly, and the pinion 37 being in pro- 125
 portion of twelve to one will impart a half-
 revolution to the gear 39, so that the arm 43
 will every twelve hours be at a point to allow
 one of the teeth on the double pawl 44 to es-
 130 cape from contact with the escapement-wheel
 49 and the other tooth of the pawl to engage a
 tooth on the escapement-wheel. The escape-
 ment-wheel 49 is secured to the face of the
 spring-drum 55 and has seven teeth thereon, so

that each tooth of the double pawl will have engagement with each tooth of the escapement-wheel, and thereby move the vertically-traveling carriage upwardly fourteen distinct spaces, which carries it over Sunday. As each tooth of the double pawl escapes from a tooth on the escapement-wheel 49 the spring-drum will partially rotate the shaft 54 through the medium of the spring-actuated pawl 63, which engages with the disk 53, and cause the pinion 70 to force the rack 71, secured to the traveling carriage, upwardly equal to one space on the time-card. When the traveling carriage has reached the limit of its upward movement, the spring-actuated pawl will have been released from the disk 53, which carries the shaft 54 and the pinion 70 thereon, and allow the traveling carriage to descend to its lowest position. By referring to Fig. 13 the exact location of the printing-wheels 26 and 27 will be observed in dotted lines, when the traveling carriage is in its lowest position—that is, Monday a. m. and the time-card—in a position to receive an impression in their proper spaces.

The printing-wheels are operated by the clock mechanism through the medium of the shaft 21 and the bevel-gear 24 in proportion of two to one with the bevel-gear 25, whereby bevel-gear 25 will make one-half a revolution to each revolution of the bevel-gear 24, thereby allowing the printing-wheels to give the same time impression from both sides thereof.

This recorder as constructed and shown will record the time of four hundred employees, each man having a given number by which he is known. If only a few of the workmen should be employed during the week, then the numbers on the dials representing the men working are arranged as shown in Fig. 21—that is, they are removed from their consecutive positions and arranged to follow each other from the lowest to the highest number in each successive hole from zero. The time-cards on the continuous sheets are numbered in the same order as the rearranged numbers on the dials. By arranging the numbers as above described it will readily be seen that instead of operating the full length of the time-card sheets when workman No. 6 and workman No. 200 are employed it will only be necessary to operate the continuous time-card sheets the number of cards equal to the number of men employed.

When it is necessary to use the recorder for day and night work, (see Fig. 21,) the change from day to night is made as follows: The indicator 219 is moved from the word "Day" to "Night" and the operating-lever 143 rotated until the handle 159 rests on the number "200" on the dial, when all the time-cards on the continuous sheets will have been wound onto the receiving-drums 103. The bolt 209 is removed from the end of the extension-bar 154, which releases the handle-carrying block 207, after which the said block is turned back

until it is at zero, the extension-bar raised, and the block secured thereto by the bolt 209, and the machine ready to be operated again. When this change is made, a new set of time-cards from "1" to "200" is ready to record night-work. When it is desired to resume the use of the day-cards, the handle-carrying block is placed at zero, removed from the extension-bar, and turned until it covers number "200," when it is secured to the extension-bar again and the machine is ready to record the time on the day-cards.

The intricate nature of the mechanism of this time-recorder has made it necessary to enter into a minute description of the details of construction, so that it can be readily comprehended. Of course it is obvious that many of the details of construction can be varied without in the least departing from the essential principles and features of the invention.

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

1. In a time-recorder, the combination of the clock-actuated vertically-traveling carriage carrying continuous sheets of paper having a series of numbered individual time-cards thereon, dials having numerals arranged spirally thereon, spirally-rotatable operating-handles, clock-actuated printing-wheels, means for operating the said continuous sheets of paper operatively connected with the spirally-rotatable handles in such manner that the numbers on the time-cards, when said time-cards are in position to receive an impression from the record-printing wheels, will correspond with the numbers on the dials indicated by the said spirally-rotatable handles, substantially as described and for the purpose set forth.

2. In a time-recorder, the combination of the clock-actuated vertically-traveling carriage carrying continuous sheets of paper having a series of numbers thereon, clock-actuated printing-wheels, spirally-rotatable handles, means for operating the continuous sheets of paper, operatively connected with the said spirally-rotatable handles, whereby the numbers indicated by the rotatable handles on the spiral dials will correspond with the numbers on the continuous sheets of paper that are in position to receive impressions from the record-printing wheels substantially as described and for the purpose set forth.

3. In a time-recorder, the combination of the vertically-traveling carriage carrying continuous sheets of paper adapted to travel backward and forward through the recorder in front of the record-printing wheels, the record-printing wheels, spirally-rotatable handles, means for operating the sheets of paper operatively connected with the spirally-rotatable handles and clock-actuated means for intermittently raising the traveling carriage whereby the continuous sheets of paper

receive a series of impressions from the record-printing wheels transversely thereon, substantially as described and for the purpose set forth.

5 4. In a time-recorder, the combination of the clock-actuated printing-wheels, the clock-actuated mechanism for intermittently and vertically raising the traveling carriage, said carriage carrying continuous sheets of paper
10 having a series of numbered individual time-cards thereon, spirally-rotatable handles, mechanism for operating the said continuous sheets of paper, operatively connected with the spirally-rotatable handles, dials having
15 spiral grooves adapted to receive the rotatable handles and numbers on said dials corresponding with numbers on the individual time-cards, whereby, through the medium of the spirally-rotatable handles, operatively
20 connected with the said paper-operating mechanism, each of the said numbered individual time-cards is separately placed in a position to receive an impression from the printing-wheels, substantially as described
25 and for the purpose set forth.

5. In a time-recorder, the combination of a transparent inclosing case, the clock-actuated traveling carriage, the clock-actuated record-printing wheels, the printing-cylinders, the
30 spirally-rotatable handles operatively connected with said parts, dials having numbers arranged spirally thereon and the rotatable handles adapted to ride in spiral channels or grooves on said dials substantially as described and for the purpose set forth.
35

6. In a time-recorder, the combination of the permanent base-plate, the transparent casing supported thereby, dials having numbers arranged spirally thereon and secured
40 to said casing, clock mechanism supported in said casing, a vertically-traveling carriage and record-printing wheels operatively connected with said clock mechanism, and spirally-rotatable handles operatively connected with
45 the paper-operating mechanism of the traveling carriage, substantially as described and for the purpose set forth.

7. In a time-recorder, the combination of the clock-actuated vertically-traveling carriage carrying the paper having a series of
50 numbered individual time-cards thereon, spirally-rotatable handles, the paper-operating mechanism of said traveling carriage operatively connected with the spirally-rotatable handles, whereby each numbered individual time-card is placed in position to receive an impression from the record-printing wheels, substantially as described, and for the purpose set forth.
55

8. In a time-recorder, the combination of the clock-actuated, intermittent vertically-traveling carriage carrying therewith the continuous sheets of paper having numbered individual time-cards thereon, spring-actuated
60 paper-holding drums, paper-receiving drums, the paper-operating wheels having pins on the

peripheries thereof adapted to register with holes in the paper, the paper-operating wheels, spirally-rotatable handles operatively connected with the operating-wheels, whereby
70 the paper is drawn through the machine for the purpose set forth.

9. In a time-recorder, the combination of the vertically-traveling carriage comprising two hinged top plates and a bottom plate,
75 spring-actuated paper-drums, paper-receiving drums, paper-operating wheels, spring-belts connecting the paper-operating wheels and the paper-receiving drums, the elongated pinions carried on the shafts of the paper-
80 operating wheels, spirally-rotatable handles and said elongated pinions operatively connected with the spirally-rotatable handles, whereby the paper is drawn through the machine, substantially as described and for the
85 purpose set forth.

10. In a time-recorder, the combination of the vertically-traveling carriage having the paper-holding drums, the paper-receiving drums and the paper-operating wheels mounted
90 thereon, spring-belts connecting the paper-operating wheels and the paper-receiving drums, elongated pinions carried on the shafts of the paper-operating wheels, gears in mesh with said elongated pinions, said
95 gears in mesh with gears mounted on vertical shafts, said shafts having bevel-gears thereon, said bevel-gears in mesh with bevel-gears mounted on horizontal hollow shafts, spirally-rotatable handles and said horizontal
100 hollow shafts operatively connected with the spirally-rotatable handles whereby the paper is drawn through the machine, substantially as described and for the purpose set forth.
105

11. In a time-recorder, a spring-drum having an escapement-wheel secured thereto, and alternately held and released by a double pawl, said pawl operatively connected with
110 the clock mechanism by suitable intermediate means, a spring-actuated pawl secured to the face of the escapement-wheel, a rigid shaft having a bearing in the spring-drum shaft, a hollow shaft mounted on said rigid shaft that carries a disk having a pin on its face,
115 a fixed collar with a lug thereon secured to the rigid shaft, a pin in one end of the spring-actuated pawl adapted to engage the pin on the face of the disk, and a tooth on the spring-actuated pawl which rides on the periphery
120 of the fixed collar, and said lug on the fixed collar adapted to release the pin on the disk, for the purpose described.

12. In a time-recorder, the clock-actuated vertical shaft, a bevel-gear on the lower end
125 thereof, a gear driven thereby, a horizontal shaft driven by said gears, an adjustable cam-faced gear driven by a pinion on the horizontal shaft, a depression and a projection on the face of said cam, a double pawl operated
130 by said cam and in engagement with an escapement-wheel secured to a spring-drum, the

spring-drum mounted on a hollow square-headed shaft, having a ratchet thereon, a pawl in engagement with said ratchet to prevent backward rotation of the said spring-drums for the purpose described.

13. In a time-recorder, the combination of the clock-actuated vertically-traveling carriage, the continuous sheets of paper, the paper-holding drums, the auxiliary paper-guiding rollers, the paper-receiving drums, and the paper-operating wheels mounted thereon, the paper-holding drums having square-headed shafts extending therethrough, spiral springs having one of their ends attached to said shafts and the other ends attached to the drums, whereby the unwinding of the paper places the spring under tension for automatically rewinding said paper, for the purpose described.

14. In a time-recorder, the clock-actuated vertically-traveling carriage, the paper-operating wheels, the auxiliary paper-guiding rollers, the paper holding and receiving drums adapted to carry continuous sheets of paper having numbered individual time-cards thereon, and holes arranged longitudinally along the edges thereof, pins on the operating-wheels adapted to register with said holes in the paper and the paper-operating wheels operatively connected with rotatable handles, substantially as described and for the purpose set forth.

15. In a time-recorder, the combination of the clock-actuated record-printing wheels, the clock-actuated vertically-traveling carriage, the paper-operating mechanism operatively connected with the spirally-rotatable handles, the rotatable handles connected with horizontal hollow shafts, shafts extending longitudinally through said hollow shafts, disks on the inner ends of said shafts, spring-operated platen-hammers resting against said disks, and said platen-hammers adapted to force the paper in contact with the record-printing wheels when the rotatable handles are given an inward thrust, substantially as described and for the purpose set forth.

16. In a time-recorder, the combination of the traveling carriage, hollow shafts mounted on the supporting-frames that are secured to the permanent base-plate, bevel-gears carried on said hollow shafts and operatively connected with the vertically-traveling carriage, standards loosely journaled on the outer ends, said hollow shafts, operating-levers pivoted to said standards, spring-arms adjustably secured to the operating-levers and rigidly attached to the ends of the hollow shafts, extension-handles carried by the operating-levers, spring-cushioned spindles carried by said handles, rollers on said spindles adapted to ride in the spiral channels or grooves on the dials, shafts pivoted to said operating-levers that extend longitudinally through the hollow shafts, disks attached to the inner ends of said shafts and platen-hammers resting

against said disks, substantially as described and for the purpose set forth.

17. In a time-recorder, the traveling carriage, the operating-levers, operatively connected therewith, spring-arms having one of their ends rigidly secured to the hollow shafts, the other ends adjustably secured to the operating-levers, extension-handles carried by the operating-levers, spring-cushioned spindles in said handles, rollers near the inner ends of said spindles adapted to ride in the spiral channels or grooves on the dials, and conical heads on the spindles adapted to enter the depressions in the dials, substantially as described and for the purpose set forth.

18. In a time-recorder, the operating-levers, having dials thereon bearing the words "In" and "Out," a thumb-nut journaled in said operating-levers having indicators thereon, pins eccentrically carried on the inner ends of said thumb-nuts which engage in slots in the lower ends of the spring-arms, whereby the extreme positions of said eccentric-pins will through the medium of the operatively-connected parts change the columns in the numbered individual time-cards, substantially as described and for the purpose set forth.

19. In a time-recorder, the hollow shafts, the operating-levers, pivoted to standards journaled on the hollow shafts, extension-handles carried by the operating-levers, and provided with spindles having rollers thereon that ride in the channels or grooves in the dials, substantially as described and for the purpose set forth.

20. In a time-recorder, the combination of a spring-drum having an escapement-wheel secured thereto that is intermittently released by a double pawl operatively connected with clock-actuated mechanism, a spring-pawl secured to the face of the escapement-wheel and provided with a pin in one end thereof, a disk mounted on a hollow horizontal shaft, a pin located on the face of said disk and adapted to engage the pin on the spring-pawl, whereby the said disk is rotated by the escapement-wheel, substantially as described and for the purpose set forth.

21. In a time-recorder, the combination of a spring-drum having an escapement-wheel secured thereto and a spring-actuated pawl carried thereby, a pin on said pawl engaging a pin on a disk mounted on a hollow shaft, having a fixed shaft extending longitudinally therethrough, a collar on the fixed shaft having a lug thereon which engages a tooth on the spring-actuated pawl, said lug and tooth operating to release the pawl-pin from the disk-pin, substantially as described and for the purpose set forth.

22. In a time-recorder, the combination of the permanent base-plate, vertical standards secured thereto, clock mechanism mounted in framework on the tops of said standards, the record-printing wheels, a clock-actuated

vertical shaft adapted to operate the record-printing wheels, a horizontal shaft carried by a supporting-frame secured to the base-plate, a gear on said horizontal shaft driven by a gear on the clock-actuated shaft, a pinion on one end of said horizontal shaft, a gear driven by said pinion, a cam secured to said pinion-operated gear, a double pawl operated by said cam, a spring-drum having an escapement-wheel secured thereto and adapted to engage the double pawl, means for locking and unlocking the escapement-wheel with a horizontal shaft carrying a pinion adapted to engage a rack on the vertically-traveling carriage and all of said parts operatively connected with the clock mechanism whereby the vertically-traveling carriage is intermittently raised, substantially as described and for the purpose set forth.

23. In a time-recorder, an escapement-wheel, a clock-actuated gear having a cam adjustably secured to the face thereof, a projection and a depression diametrically opposite each other on the operating-face of the cam, a double pawl operated by said cam to alternately release and engage the teeth of the escapement-wheel, substantially as described and for the purpose set forth.

24. In a time-recorder, an escapement-wheel, a clock-actuated gear having a cam adjustably secured thereto, a double pawl which rides on the irregular face of said cam, teeth on the double pawl that alternately engage with the escapement-wheel, the double pawl adjustably secured to the supporting-frame, and a spring secured to the pawl and the supporting-frame which operates to hold said pawl in contact with the irregular face of the cam, substantially as described and for the purpose set forth.

25. In a time-recorder, an escapement-wheel, the clock-actuated vertical shaft, the horizontal shaft driven thereby, a pinion on said horizontal shaft, a gear driven by said pinion and an adjustable cam secured to said pinion-operated gear, a projection and a depression on said cam, adapted to keep the teeth of the pawl alternately in engagement with the escapement-wheel, a spring-drum for rotating the escapement-wheel and traveling carriage adapted to receive an intermittent upward movement by the operation of said parts, substantially as described and for the purpose set forth.

26. In a time-recorder, the clock-actuated gear 39 having an adjustable cam secured thereto, said gear and cam loosely mounted on a spindle, a projection and a depression on the operating-face of said cam and means for adjusting said cam to the gear, substantially as described and for the purpose set forth.

27. In a time-recorder, the clock-actuated gear 39 loosely mounted on a fixed spindle, a cam loosely carried on said spindle, and secured to the gear 39 by means of a set-screw

fastened to the gear and traveling in a slot in the cam, graduations on the face of the gear and an indicator on the set-screw, said parts adapted to be adjusted at a given time for operating the traveling carriage, substantially as described and for the purpose set forth.

28. In a time-recorder, the combination of the clock-actuated vertically-traveling carriage, a rack secured thereto, a piston-rod attached to said rack and extending through a cylinder secured to the permanent base-plate, a piston-head on the piston-rod adapted to cushion in the cylinder when the traveling carriage drops, substantially as described and for the purpose set forth.

29. In a time-recorder, the combination of the traveling carriage, the permanent base-plate, the vertical standards secured thereto, adjustable arms carried by collars sliding on said standards, and held thereon by set-screws, vertical shafts supported by the traveling carriage, and carrying bobbins loosely mounted thereon, inking-ribbons passing through the machine in front of the record-printing wheels and alternately wound and unwound on said bobbins that are supported by the adjustable arms on the vertical standards, pins in the ends of said supporting-arms which travel in splines or grooves in the vertical bobbin-shafts, substantially as described and for the purpose set forth.

30. In a time-recorder, the combination of the vertically-traveling carriage carrying continuous sheets of paper having individual time-cards thereon and operatively connected with the rotatable handles, printing-cylinders carrying impression-plates of and for the time cards and said printing-cylinders operatively connected with the rotatable handles, substantially as described and for the purpose set forth.

31. In a time-recorder, the printing-cylinders operatively connected with the rotatable handles, and adapted to carry on the peripheries thereof, impression-plates of and for the time-cards, whereby the continuous sheets of paper will receive impressions from said printing-cylinder plates, substantially as described and for the purpose set forth.

32. In a time-recorder, the spirally-grooved printing-cylinders adapted to travel vertically on supporting-rods, fixed pins adapted to ride in said spiral grooves whereby the cylinders are operated to bring the impression-plates consecutively in contact with the continuous sheets of paper, substantially as described and for the purpose set forth.

33. In a time-recorder, spiral dials having spiral channels thereon, a rotatable handle adapted to travel in said spiral channels, said handles removably secured to the extension-bars of the paper-operating levers whereby the handles can be shifted independently of the paper-operating levers, for the purpose set forth.

34. In a time-recorder, the rotatable operating-levers, extension-bars attached thereto, removable handle-carrying blocks on said extension-bars, and means for adjustably securing the blocks to the extension-bars for the purpose set forth.

for the rotatable handles and a plurality of removable disks having numbers thereon, arranged in said spiral channels for the purpose described.

JOSEPH GARDAM.

Witnesses:

J. W. A. GARDAM,
R. R. OLNHAUSEN.

35. In a time-recorder, dials having spiral ribs thereon which form guiding-channels