

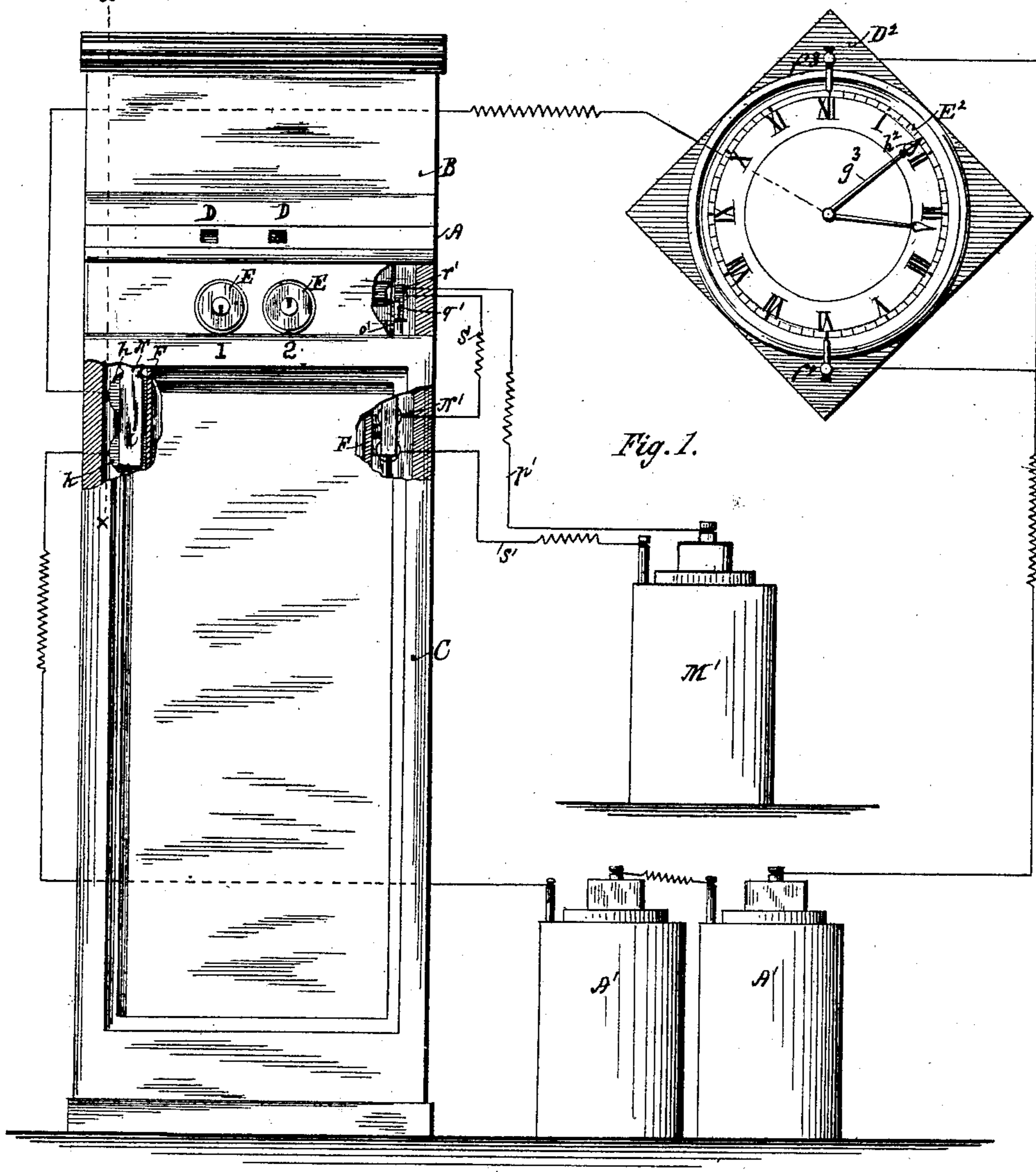
(No Model.)

6 Sheets—Sheet 1.

F. L. FULLER.  
WORKMAN'S TIME RECORDER.

No. 435,582.

Patented Sept. 2, 1890.



Witnesses  
Chas. F. Schmelz  
John S. Lynch

Inventor

Frederick L. Fuller

By his Attorney

S. Scholfield

(No Model.)

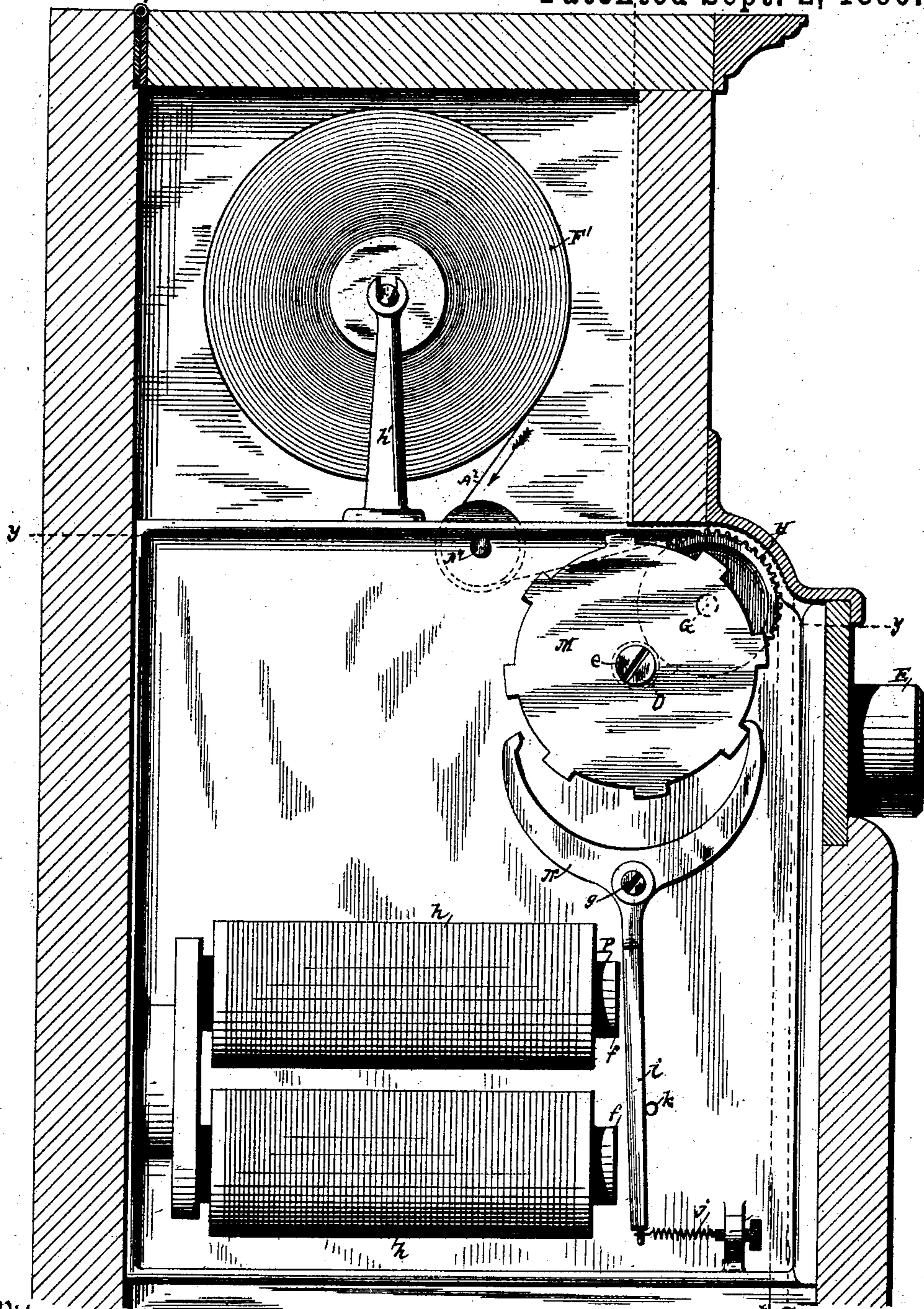
6 Sheets—Sheet 2.

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Witnesses  
Chas. F. Schmeck.  
John S. Lynch

Fig. 2.

By his Attorney

Inventor  
Frederick L. Fuller  
S. Scholfield

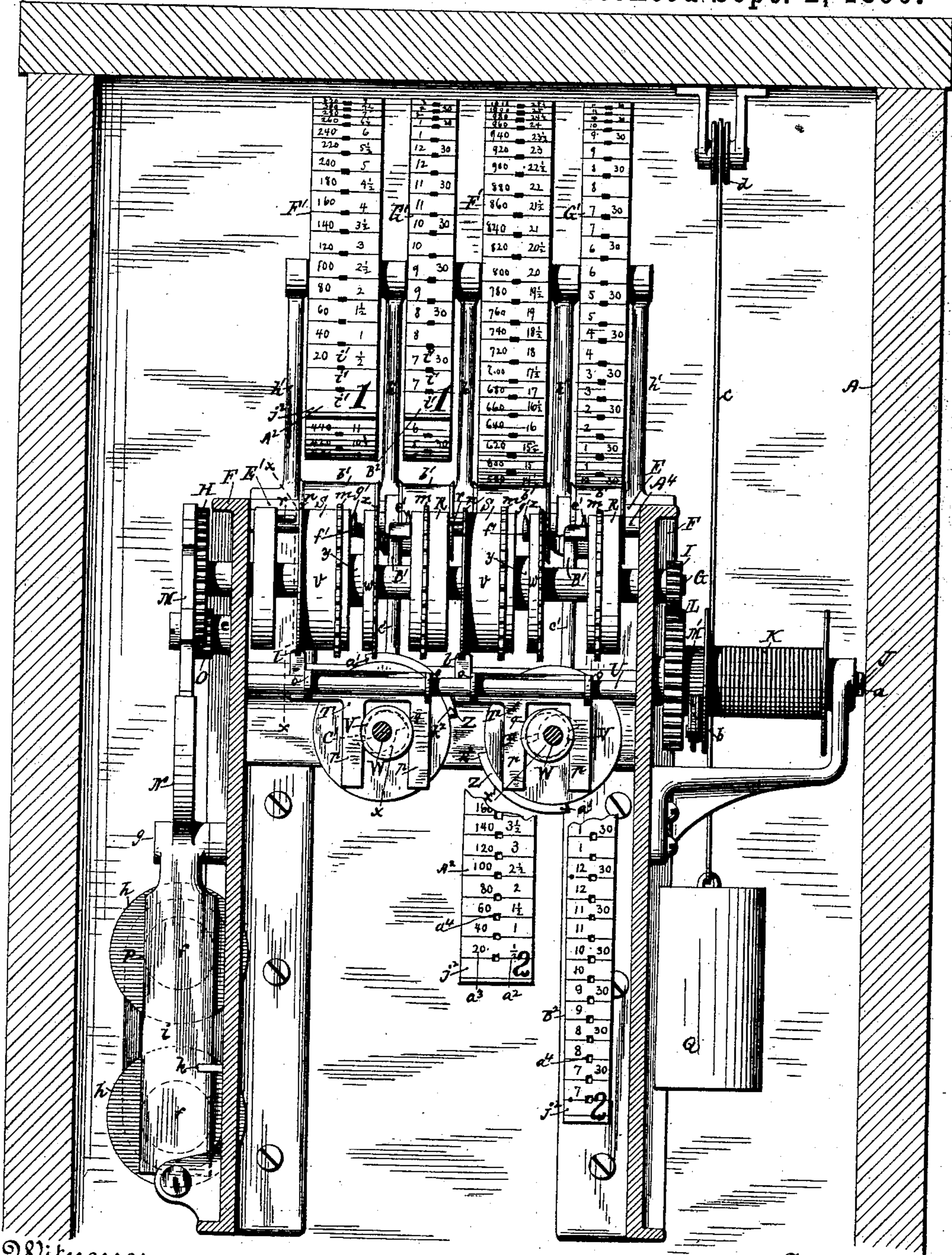
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Witnesses  
Chas. F. Schmelz  
John S. Lynch

Fig. 3.

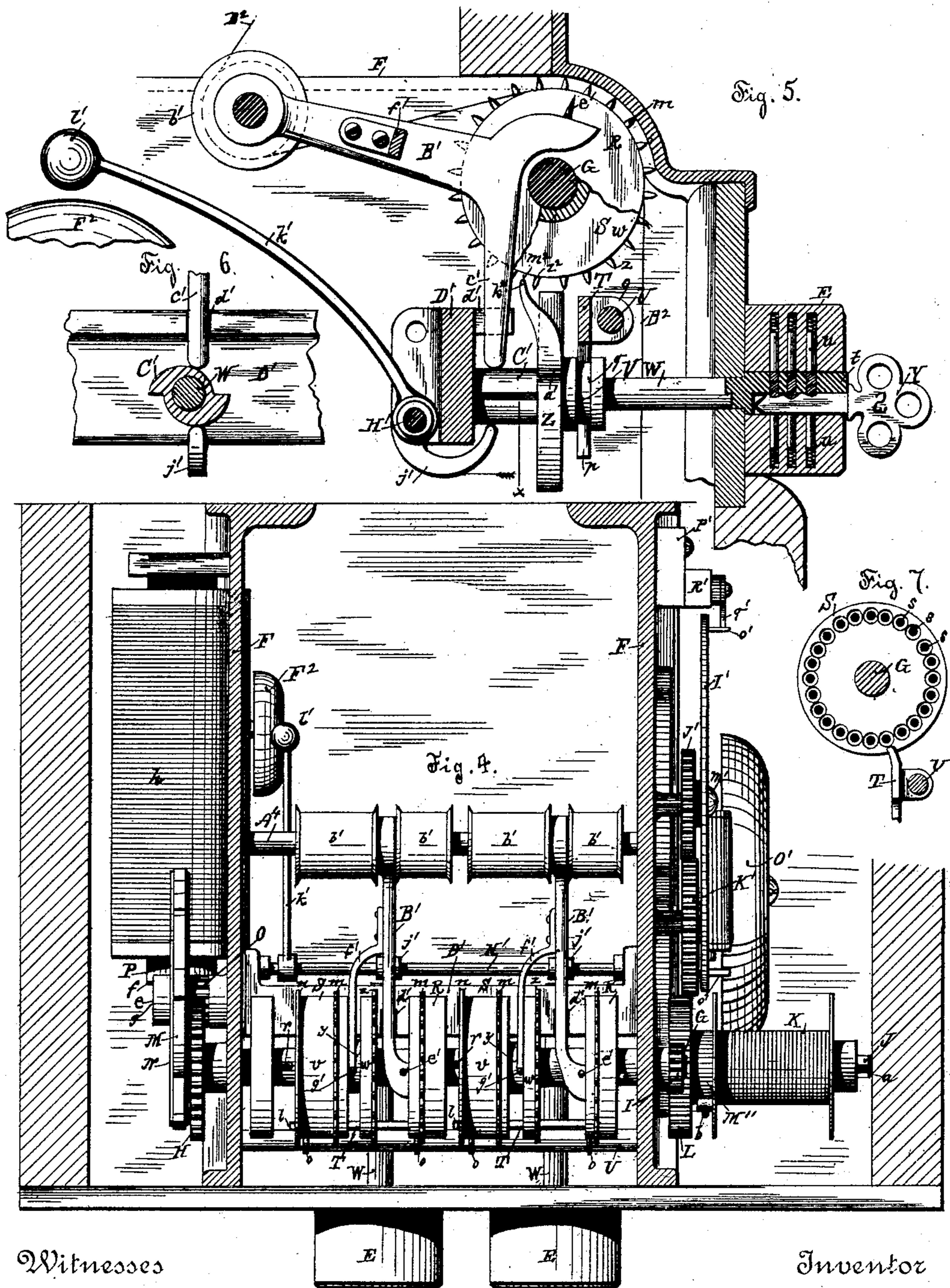
Inventor  
Frederick L. Fuller

By his Attorney S. Scholfield

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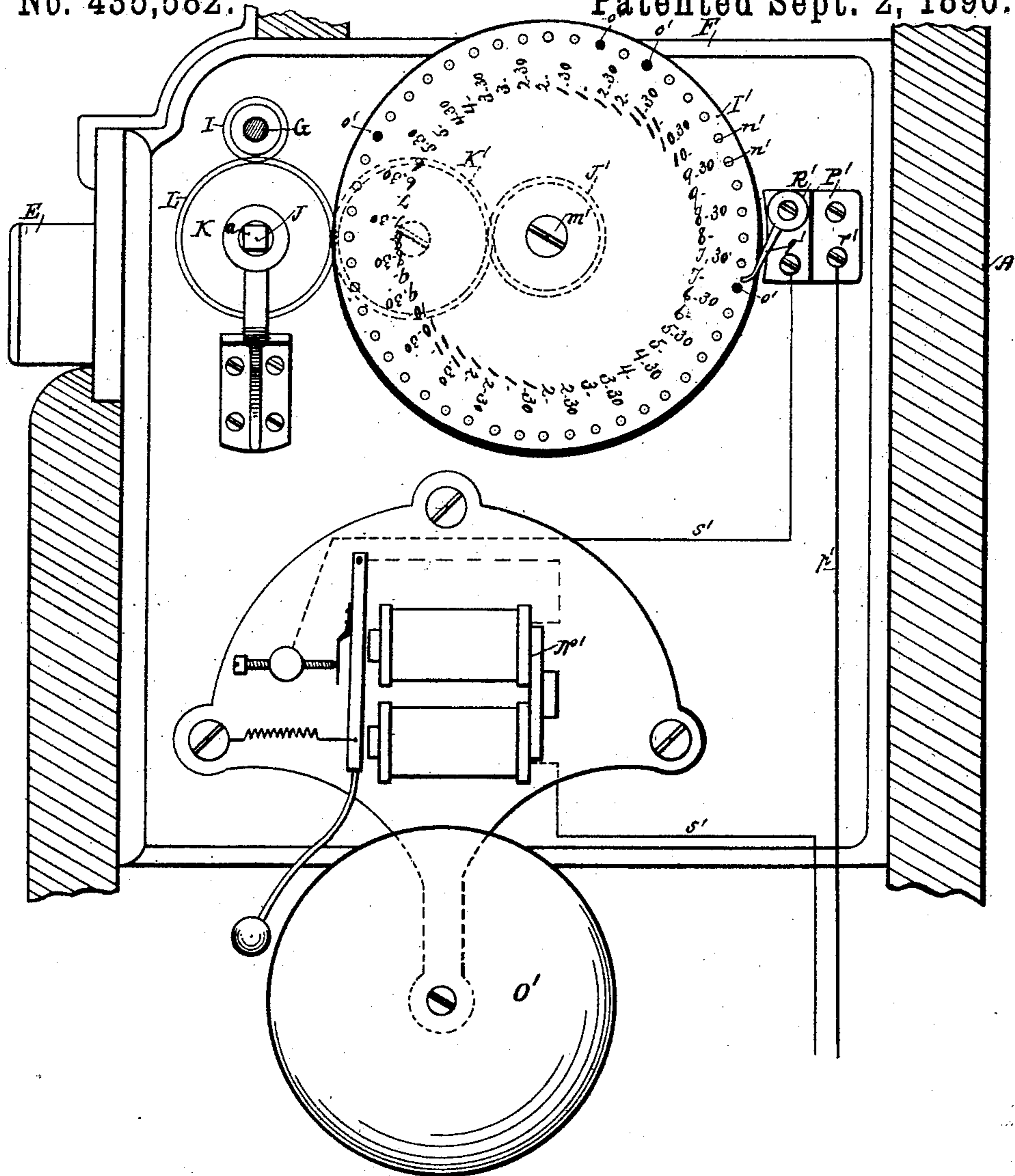


Fig. 8.

Witnesses.  
James W. Braman  
John S. Lynch

Inventor.  
Frederick L. Fuller  
per A. Schofield  
Attorney

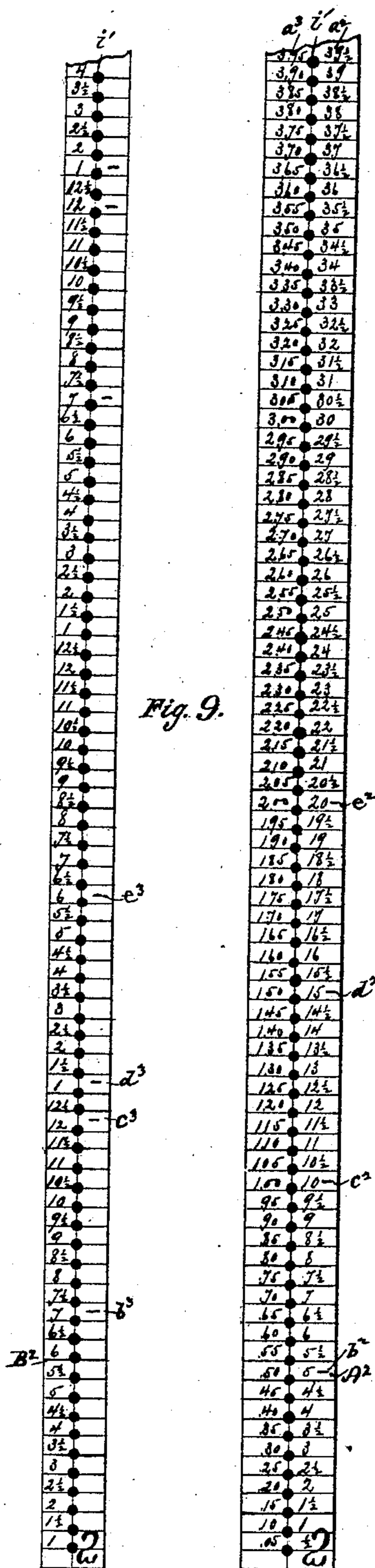
(No Model.)

6 Sheets—Sheet 6.

F. L. FULLER.  
WORKMAN'S TIME RECORDER.

No. 435,582.

Patented Sept. 2, 1890.



Witnesses.

James W. Beauman  
John S. Lynch

Inventor.

Fredrick L. Fuller  
per S. Scholfield  
Attorney

# UNITED STATES PATENT OFFICE.

FREDERICK L. FULLER, OF NORWICH, CONNECTICUT.

## WORKMAN'S TIME-RECORDER.

SPECIFICATION forming part of Letters Patent No. 435,582, dated September 2, 1890.

Application filed January 30, 1888. Serial No. 262,467. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK L. FULLER, a citizen of the United States, residing at Norwich, in the county of New London and State of Connecticut, have invented new and useful Improvements in Apparatus for Making a Time-Record or Pay-Roll for Employés, of which the following is a specification.

The object of my invention is to make by means of automatic mechanism a true record of the number of hours of labor performed by an employé from time to time or the amount of wages due for said labor; and my invention consists in a wheel, strip, band, or other instrumentality, upon which is notated a series of numbers in arithmetical progression, which will serve to represent the number of hours of labor performed by an employé from time to time or the amount of wages due for said labor, in combination with an escapement mechanism, which is operated at specified intervals of time, a clutch mechanism, by means of which the said notated instrumentality can be brought into operative connection with the said escapement mechanism or be disengaged therefrom by the employé, and means for moving the said notated instrumentality backward to correct the register of the same at the datum-line.

It also consists in the additional combination of a device for making a record upon the said notated instrumentality at those numbers in the series which serve to indicate the said number of hours of labor performed from time to time or the amount of wages due for said labor, and means for moving said device into contact with the said notated instrumentality to cause the proper record to be made upon the engagement or disengagement of the clutch mechanism by the employé; and it also consists in the additional combination of a lock and a removable key, which are adapted to lock the said clutch mechanism in its positions of engagement and disengagement.

It also consists in the additional combination of a bell, gong, or other auditory instrument whereby detective notice may be given of the full accomplishment of the engaging or disengaging movement by the employé to other persons in the same room, thus tending to prevent dishonesty in the employé; and it also consists in a primary electric circuit, which is closed at specified intervals of time

by means of a clock-movement and an escapement mechanism, which is operated at the closing of the said circuit, in combination with a secondary electric circuit, which is closed at specified intervals of time by the movement of the said escapement mechanism, a clutch mechanism to be operated by the employé, and a signaling device operated by the said secondary circuit and serving to notify the employé of the proper time for operating the said clutch mechanism.

Figure 1 is an elevation showing the clock and the electric connection to the apparatus. Fig. 2 represents a vertical section of the upper end of the holding-case, taken in the line  $xx$ , Fig. 1. Fig. 3 represents a section taken in the line  $xx$  of Fig. 2, showing a front view of a portion of the escapement mechanism. Fig. 4 represents a section taken in the line  $yy$  of Fig. 2, showing a plan view of the escapement mechanism. Fig. 5 is a detail section showing the lock mechanism. Fig. 6 is a detail section taken in the line  $X$  of Fig. 5. Fig. 7 is a detail section taken in the line  $xx$  of Fig. 3. Fig. 8 is an elevation showing the signaling mechanism in the secondary electric circuit. Fig. 9 represents the notated strips upon which the record is to be made.

In the accompanying drawings, A represents a case, which holds the apparatus. B and C are doors, by means of which access can be had to the interior of the case for the purpose of adjusting the registering and recording mechanism or for supplying the required notated wheels, strips, or bands to the apparatus. The front of the case is provided with openings D, through which the full number of hours worked by the employés can be read. A combination-lock E and key Y are also provided for each employé, by means of which that portion of the mechanism which is expressly set apart for the use of each employé may be either set in motion or stopped, as desired. The frame F is firmly secured within the case A, and is provided with bearings for the shaft G, upon one end of which is secured the gear H, and at the opposite end of the shaft is secured the pinion I.

Upon a short shaft J, which is squared at the end  $a$  to receive the socket of a winding-key, is secured the spool-drum K, upon the inner head of which is pivoted the spring-operated click  $b$ , and between the head of the drum K and the side of the frame F are

placed the gear L and the ratchet-wheel M'', which are secured to each other and arranged loosely upon the shaft J, the gear L being made to engage with the pinion I upon the shaft G. The cord *c*, which is securely fastened to and coiled around the drum K, passes upward over the pulley *d*, and is attached to the weight Q, which serves to impart a rotary movement in one direction to the drum K, and thence to the connected mechanism.

Upon a stud *e*, projecting from the frame F, is loosely held the escapement-wheel M, to which is attached the pinion O, which engages with the teeth of the gear H upon the shaft G, and upon a stud *g*, below the escapement-wheel M, is placed the escapement-lever N, each vibration of which will serve to allow the escapement-wheel to be moved through the space of one tooth by the action of the weight Q, transmitted through the gears I L and H O.

To the frame F is secured the electro-magnet P, the poles *f f* of which are arranged in close proximity to the side of the arm *i* of the escapement-lever N, so that when a current of electricity is sent through the surrounding coils *h h* of the magnet the said arm *i* will be drawn toward the magnet in opposition to the reverse action of the spring *j*, which is arranged to draw the said arm *i* of the lever N away from the magnet. A suitable stop *k* may be provided for the backward movement of the lever-arm *i*, in order to properly retain the same within the limit of the magnetic action, and when the magnet P is connected with a suitable battery A' the closing and breaking of the circuit will cause the vibration of the escapement-lever N and the consequent intermittent rotary movement of the shaft G in the direction of the pull of the weight Q upon the same.

Upon the shaft G are firmly secured the wheels R R, adjacent to which are placed the loose wheels S S, the said wheels R and S being provided circumferentially with spur-teeth *m*, which are adapted to enter corresponding holes made in certain notated strips or bands, which are hereinafter described. The wheels SS may be provided with a flange *n*, which is held in the notch *l*, made in the guides T, the said guides being arranged to slide upon the fixed rod U, and are held upon the said rod by means of the perforated ears *o o*. The pendent limbs *p p* of the guide T are held in the groove *q* of the eccentric or cam V, which is upon the shaft W, so that upon the rotation of the shaft W a reciprocating movement will be imparted to the wheel S in the line of the axis of the shaft G.

Upon the side of the wheel R adjacent to the wheel S is placed the clutch-pin *r*, which is adapted to enter either of the holes *s*, which are arranged in circular series at the side of the wheel S, and which in number correspond to the number of the spur-teeth *m* in the periphery of the said wheel, so that when the shaft W and eccentric V are in the position

shown at *x*, Fig. 3, the clutch-pin *r* will be out of engagement with either of the holes *s*; but when the shaft and eccentric are caused to make a semi-revolution to the position shown at *x'* the clutch-pin *r* will be caused to engage with one of the holes *s*, so that the subsequent intermittent movement of the wheel R will be imparted to the engaged wheel S, and upon the completion of the revolution of the shaft W and the eccentric V by turning the key Y the wheel S will be moved out of engagement with the pin *r*, and will then cease to partake of the intermittent movement of the said wheel. The shaft W is operatively connected with the cylinder *t* of the combination-lock E, which is provided with the locking-wires *u* at opposite sides of the said cylinder, so that the key Y can be withdrawn and the said cylinder locked at each semi-revolution of the shaft W, the said locking-wires being so arranged relatively to the eccentric or cam V upon the shaft W that when the cylinder *t* is locked in one direction the wheel S and clutch-pin *r* will be in engagement and when locked in the opposite position will be out of engagement with each other.

The wheel S may be made in two parts *v* and *w*, which are connected by the hub *y*, the periphery of the part *w* being provided with a circular series of spur-teeth *z*, equal in number to that of the series *m* upon the part *v*, the said spurs *z* being adapted to engage with the cam Z upon the shaft W, which cam in its revolution with the shaft to which it is attached will cause the backward movement of the wheel S for the space of one tooth, and the cam Z is preferably arranged so that when the wheel S and the clutch-pin *v* are disengaged the said wheel will be locked against further movement in either direction by means of the rear portion *a'* of the said cam.

Upon a fixed rod A', extending from end to end of the frame, are placed the loose rollers *b'* and the loosely-held levers B', which are provided with the downwardly-extending projections *c'*, resting upon the two-leaved cam C', which is secured to the shaft W, and the levers B' are held against lateral movement by means of the notches *d'* in the guide-bar D', which forms one of the longitudinal ties of the frame.

At the outer end of the levers B' adjacent to the side of the wheel R is fixed the sharpened upright pin *e'*, and to the side of the levers B' are secured the arms *f'*, which extend into the space between the portions *v* and *w* of the wheel S, and upon the forward end of the arm *f'* is placed the upwardly-projecting pin *g'*. Upon a tie-bar E', at the upper portion of the frame, are placed the standards *h' h'*, which serve to support certain rolls of paper or other material F', upon which are notated a series of numbers in arithmetical progression, which serve to represent the full number of hours of labor performed by an employé or the amount due for

said labor, and also rolls of paper or other material  $G'$ , upon which are notated the numbers which represent the consecutive hours and the allowed fractions of hours of working-time, the said strips being provided longitudinally with a series of perforations  $i'$ , which serve to receive the spur-teeth  $m$  of the wheels  $R$  and  $S$ .

Upon the rock-shaft  $H'$ , which may extend from end to end of the machine, are secured the arms  $j'$ , which rest against the surface of the cams  $C'$ , and at one end of the shaft  $H'$  is placed the arm  $k'$ , provided at its outer end with the weight  $l'$ , which, upon the turning of the cam  $C'$  by means of the key  $Y$ , will strike the bell  $F^2$  after being first raised from its normal position by the primary movement of the cam. Thus a detective auditory signal will be given to persons in the same room upon the proper turning of the key at commencing and leaving off work, which will tend to prevent the employé from tampering with the apparatus for the purpose of deception.

In order to provide a signaling device which will serve to notify the employé of the proper time for turning his key in the lock when commencing and leaving off work, so that the full number of working-hours will be registered and recorded, I provide a wheel  $I'$ , which is held loosely upon a stud  $m'$ , and operatively connected with the spur-gear  $L$  upon the winding-shaft  $J$  by means of the gear  $J'$ , attached to the back of the wheel  $I'$  and the intermediate gear  $K'$ , the teeth of the said gears  $L$  and  $J'$  being so proportioned and divided that the wheel  $I'$  will make its revolution in twenty-four hours. The face of the wheel  $I'$  is graduated into hours and suitable fractions of an hour and provided with the holes  $n'$ , in some of which are placed the contact-pins  $o'$ , as hereinafter described.

Upon the outer side of the end frame  $F$ , Fig. 8, is secured the plate  $P'$  of insulating material, to which is attached the insulated metal plate  $R'$ , and to the said plate  $R'$  is attached the contact-spring  $q'$ , by means of which electrical contact is made with the contact-pins  $o'$  upon the revolution of the wheel  $I'$ . The connecting-wire  $p'$  of the secondary electrical circuit leads from the battery  $M'$  to the screw  $r'$ , by means of which electrical connection is made to the metal frame of the machine, and thence to the contact-pins  $o'$  in the wheel  $I'$ , and from the spring  $q'$ , which engages with the contact-pins  $o'$ , connection is made to the coils of the electric magnet  $N'$  of the electric bell  $O'$  by means of the wire  $s'$ , the said wire continuing from the magnet  $N'$  to the battery  $M'$ , thus completing the electrical circuit. The pins  $o'$  are so set in the wheel  $I'$  that one of the said pins will come into contact with the spring  $q'$  at the proper time for commencing work and another at the proper time for leaving off work, so that notice will be given to the employé by the ringing of the electric bell  $O'$  of the

proper time for turning the lock in order to secure a full record of the whole number of hours of labor to be performed in each day, and in a working-day of ten hours the contact-pins  $o'$  may be so set that the bell  $O'$  will be rung at the hours of seven, twelve, one, and six, thus requiring that the movement of the wheel  $S$  into engagement or disengagement with the pin  $r$  be made before the hours of seven and one and after the hours of twelve and six, in order to receive full pay for ten hours' work.

Referring to Fig. 9,  $A^2$  represents a strip of paper or other suitable material, upon which is printed or marked in arithmetical progression a series of numbers  $a^2$ , which will serve to represent the succeeding half-hours of labor to be performed from time to time, the said strip being preferably extended so as to include the full number of working half-hours in a week, which at ten working-hours per day would amount to one hundred and twenty half-hours, or, if preferred, each quarter-hour of labor can be represented in like manner, thus requiring a progressive series of two hundred and forty numbers to include the full number of quarter-hours' labor in a week, and in forming a specific time-record or payroll according to my invention by means of the strip  $A^2$ , I distinctly mark or notate on said strip at the number in the series which is equal to the sum of the number of hours worked by the employé whose record of time or wages is to be kept. Thus the first half-day's work of the employé may be indicated upon the series  $a^2$  by the mark  $b^2$ , which may be made by means of a pen or pencil or by means of a puncturing pin or punch opposite the figure "5," which serves to indicate the number of hours of labor then performed, and for the afternoon of the same day the mark  $c^2$  will serve to indicate that the sum of ten hours' labor had been then performed, and for the ensuing day the marks  $d^2$  and  $e^2$  will serve to show the number of hours of labor performed up to the time of making the said record, and so on for the succeeding days to the end of the week, when the last mark made will serve to show the full number of hours of labor performed during the week for which wages are to be paid the employé.

Instead of providing the strip  $A^2$  with a series of numbers  $a^2$  in arithmetical progression, which represent the hours of labor performed, a series of numbers  $a^3$ , which will serve to represent the full amount of wages due, may be employed, as shown, the calculation being made in this instance for the half-hours at the rate of ten cents per hour. Then the record-marks  $b^2$ ,  $c^2$ ,  $d^2$ , and  $e^2$  will serve to record the amount of wages earned by the employé up to the time that the said record was made, and both the series  $a^2$  and  $a^3$  can be employed upon the same strip, if desired, thus making a single record of the number of hours of labor performed and the amount of wages due.

It is also in many cases desirable to make a record of the allowed clock-time when the employé commences and leaves off his work in each day, and for this purpose I provide a strip  $B^2$ , having a repeated series of numbers which serve to represent the hours and the allowed fractions of hours of clock-time, and make a notation mark or perforation, as  $b^3$ ,  $c^3$ ,  $d^3$ , and  $e^3$  at the time of commencing or leaving off work, so that upon inspection of the strip  $B^2$  it can be readily determined at what hour of each day the work recorded upon strip  $A^2$  was commenced and completed. The strips  $A^2$  and  $B^2$  are preferably provided with the series of perforations  $i'$ , which are adapted to receive the spurs  $m$  of the wheels R and S, thus securing the positive movement of the strips  $A^2$  and  $B^2$  with the said wheels. In practice the opposite ends of the record-strips may be united, so as to form endless bands; or the said strips may be held upon the periphery of a wheel of suitable diameter, so that the proper series of numbers will be presented for record at the said periphery; or the record-strips may be printed alternately upon a continuous coil of paper, as shown at  $F'$  and  $G'$ , and be fed therefrom over the wheels S and R, as required; and in order to properly identify the record strip or strips with a specified employé I preferably place designating numbers or letters upon the holding-case in close proximity to the lock, as shown in Fig. 1, and also mark the same designating number or letter upon the record-strips and upon the key to the lock, the said employé being also known by said number or letter upon the books of account kept of his services.

The strips  $A^2$  and  $B^2$ , which form the left-hand rolls  $F'$  and  $G'$ , respectively, are shown in Fig. 3 with the commencement ends  $j^2$  of the same in a position ready for being drawn downward under the rollers  $b'$ , and thence to the periphery of the spur-wheels S and R, and in the case of the right-hand rolls  $F'$  and  $G'$  of the same figure the said strips  $A^2$  and  $B^2$  are represented as having been brought down under the rollers  $b'$  and broken away at the spur-wheels S and R, also showing the broken-off commencement ends  $j^2$  of the said strips below the registering and recording mechanism, and an edge view of the strip  $B^2$ , which passes over the spur-wheel R, is shown in Fig. 5, the spurs  $m$  of the said wheel passing through the perforations  $i'$  in the said strip, thus serving to draw the strip, as required, from the roll  $G'$ .

Upon the electrically-insulated dial  $E^2$  of the clock  $D^2$  are placed the pins  $f^2$  and  $f^3$ , which are located at the figures VI and XII of the dial, and to the minute-hand  $g^3$ , I attach a spring  $h^2$ , which will touch the said pins, and thus form a closed circuit from the galvanic battery  $A'$  through the coils of the magnet P, which will operate to draw the arm  $i$  of the escapement-lever N to the face of the magnet, thus causing the release of

one tooth of the escapement-wheel M, and as the minute-hand  $g^3$  is carried forward by the clock-movement the spring  $h^2$  will be released from engagement with the pin  $f^2$ , thus breaking the circuit and causing the release of the arm  $i$  of the escapement-lever N from the magnet P, thus allowing the escapement-wheel M to complete its peripheral movement for the space of one tooth, which corresponds to the movement of the wheel R, through the space between one of the spurs  $m$  and the next adjoining spur, thus carrying the connected strip  $B^2$  forward for a distance equal to the distance between the adjoining figures of the series, and in case the wheel S is in engagement with its engaging-pin  $r$  the said wheel S will have the same movement as the wheel R, and the strip or band  $A^2$  will be brought forward for one space, as in the case of the strip  $B^2$ ; and at the time of the engagement of the spring  $h^2$  of the minute-hand with the pin  $f^3$  of the dial a similar forward movement for one space will be produced in the strips  $A^2$  and  $B^2$ , and at every succeeding half-hour the same degree of movement will be produced by means of the described escapement mechanism.

The wheel R may be operated at intervals of every half-hour both day and night; but the wheel S is to be only operated by the said escapement mechanism when thrown into engagement with the pin  $r$  by means of the key Y or other suitable device, which engagement is to be effected by the employé at the time of commencing work, and the same is to be disengaged at the time of leaving off work, so that the strip  $A^2$  will serve to record the whole number of hours of labor performed from time to time during the week, or amount of wages due, while the strip  $B^2$  will serve to record the time of commencing and leaving off work, and said record can be made upon the strips  $A^2$  and  $B^2$  by means of the puncturing-pins  $g'$  and  $e'$  of the lever  $B'$  and its arm  $f'$ , which upon the semi-revolution of the shaft W for the engagement of the wheel S with the pin  $r$  at the time of commencing work will be acted upon by the inclined face of the cam  $C'$  to cause the pins  $g'$  and  $e'$  to be thrown upward to puncture the strips  $A^2$   $B^2$  at the datum-line of the same, the said pins being withdrawn from the strips upon the continued movement of the cam  $C'$  by the weight of the arm  $B'$  prior to the completion of the said semi-revolution of the shaft W. The employé, having thus set his individual time-record strip in operative connection with the escapement mechanism, withdraws his key from the lock and proceeds to his work, and after the automatic ringing of the electric bell  $O'$ , by means of which due notice is given to the employé of the proper time for leaving off work, the said employé again inserts his key for the purpose of turning off the wheel S from engagement with the pin  $r$ , the action of the inclined face of the cam  $C'$  causing the pins  $g'$

*e'* to be again carried upward to perforate the strips  $A^2 B^2$  at the datum-line, which is preferably made opposite the sight-opening D of the holding-case. The time of commencing and leaving off work will be thus recorded, and at the end of the week the last record made will show on the strip  $A^2$  the number of hours worked during the week or the amount of wages due, and the strip  $B^2$  will show the clock-time at which each day's work was commenced and ended, thus making a proper time-record for a pay-roll.

In practice it is desirable that the employé be made to move his strip-wheel S into engagement a few moments before the hour of commencing work, and to cause the disengagement of the same within a few minutes after the hour for leaving off work, in order that each employé will be compelled to be present during the full number of hours of working-time; but under the conditions above stated there will occur an excess of movement in the escapement mechanism between the time of commencing and leaving off work, which excess of movement must be corrected by means of a retrograde movement of the strip  $A^2$  for one space, and this retrograde movement can be made either at the time of commencing or leaving off work, and to that end I employ the cam Z, the projecting forward end  $k^2$  of which enters the space  $m^2$  in front of the advanced tooth  $z^2$  of the portion  $w$  of the wheel S, so that as soon as the wheel S has been released from the pin  $r$  the said cam will cause the reversed movement of the wheel S for the space of one spur, thus correcting the register of the strip  $A^2$ , so that the proper figures to represent the number of hours of labor performed or amount of wages due will be correctly registered at the datum-line.

I claim as my invention—

1. In combination, an instrumentality upon which is notated a series of numbers in arithmetical progression, which will serve to represent the number of hours of labor performed by an employé from time to time or the amount of wages due for said labor, an escapement mechanism which is operated at specified intervals of time, a clutch mechanism by means of which the said notated instrumentality can be brought into operative connection with the said escapement mechanism or be disengaged therefrom by the employé, and means, substantially as described, for moving the said notated instrumentality backward to correct the register of the same at the datum-line.

2. In combination, an instrumentality upon which is notated a series of numbers in arithmetical progression, which will serve to represent the number of hours of labor performed by an employé from time to time or the amount of wages due for said labor, an escapement mechanism which is operated at specified intervals of time, a clutch mechanism by means of which the said notated in-

strumentality can be brought into operative connection with the said escapement mechanism or be disengaged therefrom by the employé, and a lock provided with a removable key by means of which the said clutch mechanism can be securely locked by the employé in its positions of engagement or disengagement, substantially as described.

3. In combination, an instrumentality upon which is notated a series of numbers in arithmetical progression, which will serve to represent the number of hours of labor performed by an employé from time to time or the amount of wages due for said labor, an escapement mechanism which is operated at specified intervals of time, a clutch mechanism by means of which the said notated instrumentality can be brought into operative connection with the said escapement mechanism or be disengaged therefrom by the employé, and a signaling-bell, by means of which detective notice may be given of the proper accomplishment of the required engaging or disengaging movement of the clutch mechanism, substantially as described.

4. In combination, an instrumentality upon which is notated a series of numbers in arithmetical progression, which will serve to represent the number of hours of labor performed by an employé from time to time or the amount of wages due for said labor, an escapement mechanism which is operated at specified intervals of time, a clutch mechanism by means of which the said notated instrumentality can be brought into operative connection with the said escapement mechanism or be disengaged therefrom by the employé, a pin for making a record upon the said notated instrumentality at the numbers which serve to indicate the said number of hours of labor performed from time to time or amount of wages due for said labor, and means, substantially as described, for moving said pin into contact with said notated instrumentality to cause the proper record to be made upon the engagement or disengagement of the clutch mechanism by the employé.

5. In combination, a primary electric circuit which is closed at specified intervals of time by means of a clock-movement, an escapement mechanism which is operated at the closing of the said circuit, a secondary electric circuit which is closed at specified intervals of time by the movement of the said escapement mechanism, a clutch mechanism to be operated by the employé, and a signaling-bell operated by the closing of the said secondary circuit and serving to notify the employé of the proper time for operating the said clutch mechanism, substantially as described.

FREDERICK L. FULLER.

Witnesses:

SOCRATES SCHOLFIELD,  
JOHN S. LYNCH.