

F. L. FULLER.  
METHOD OF MAKING TIME RECORDS OR PAY ROLLS FOR EMPLOYÉS.

No. 431,344.

Patented July 1, 1890.

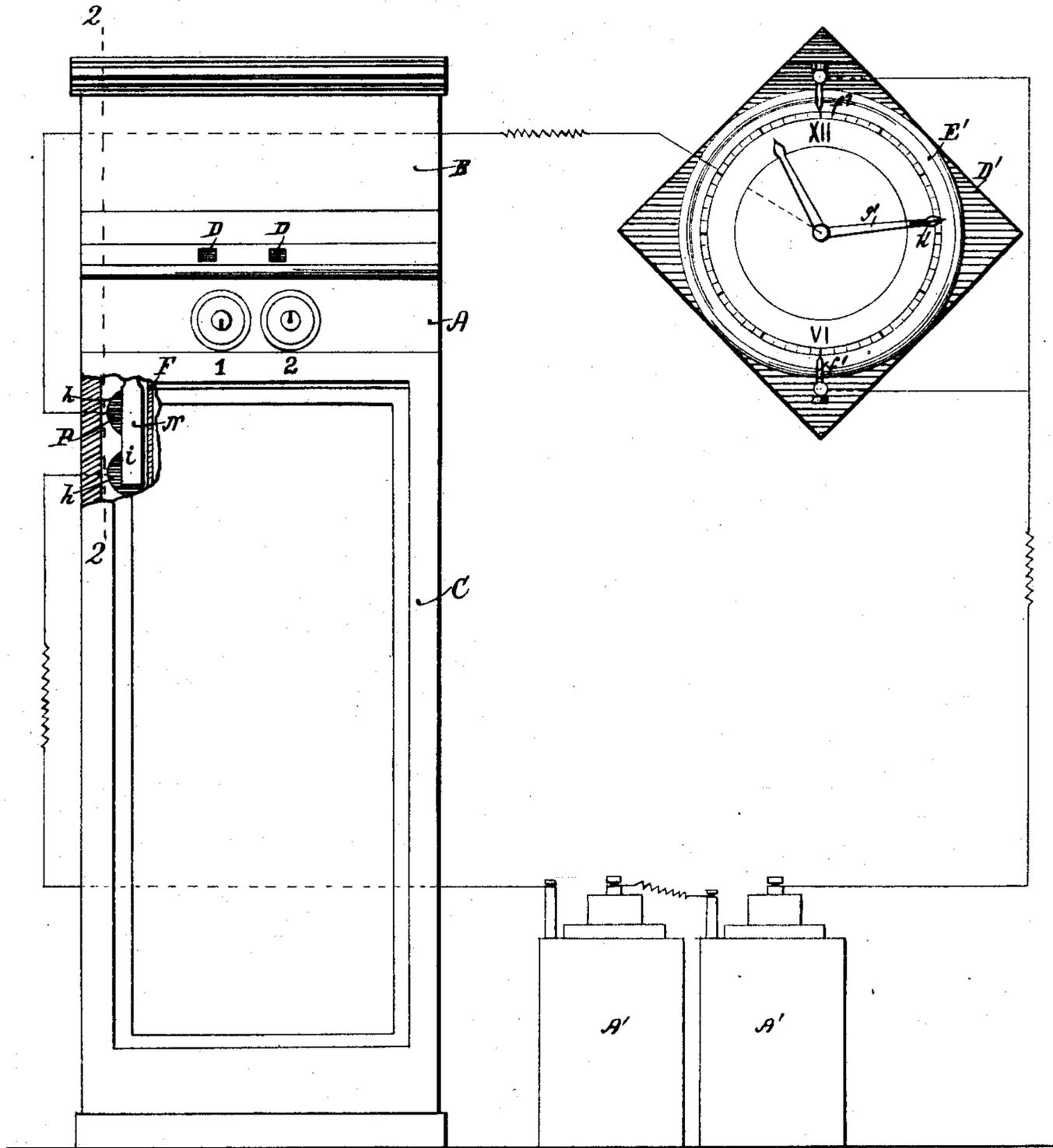


Fig. 1.

Witnesses.

Samuel Scholfield  
Joseph J. Scholfield

Inventor.

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40	4.00	4
39	3.95	3 <sup>2</sup>
38	3.90	3
37	3.85	2 <sup>2</sup>
36	3.80	2
35	3.75	1 <sup>2</sup>
34	3.70	-1
33	3.65	12 <sup>2</sup>
32	3.60	-12
31	3.55	11 <sup>2</sup>
30	3.50	11
29	3.45	10 <sup>2</sup>
28	3.40	10
27	3.35	9 <sup>2</sup>
26	3.30	9
25	3.25	8 <sup>2</sup>
24	3.20	8
23	3.15	7 <sup>2</sup>
22	3.10	-7
21	3.05	6 <sup>2</sup>
20	3.00	6
19	2.95	5 <sup>2</sup>
18	2.90	5
17	2.85	4 <sup>2</sup>
16	2.80	4
15	2.75	3 <sup>2</sup>
14	2.70	3
13	2.65	2 <sup>2</sup>
12	2.60	2
11	2.55	1 <sup>2</sup>
10	2.50	1
9	2.45	12 <sup>2</sup>
8	2.40	12
7	2.35	11 <sup>2</sup>
6	2.30	11
5	2.25	10 <sup>2</sup>
4	2.20	10
3	2.15	9 <sup>2</sup>
2	2.10	9
1	2.05	8 <sup>2</sup>
0	2.00	8
39	1.95	7 <sup>2</sup>
38	1.90	7
37	1.85	6 <sup>2</sup>
36	1.80	6
35	1.75	5 <sup>2</sup>
34	1.70	5
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32	1.60	4
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30	1.50	3
29	1.45	2 <sup>2</sup>
28	1.40	2
27	1.35	1 <sup>2</sup>
26	1.30	1
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24	1.20	-12
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18	.90	9
17	.85	8 <sup>2</sup>
16	.80	8
15	.75	7 <sup>2</sup>
14	.70	7
13	.65	6 <sup>2</sup>
12	.60	6
11	.55	5 <sup>2</sup>
10	.50	5
9	.45	4 <sup>2</sup>
8	.40	4
7	.35	3 <sup>2</sup>
6	.30	3
5	.25	2 <sup>2</sup>
4	.20	2
3	.15	1 <sup>2</sup>
2	.10	1
1	.05	12 <sup>2</sup>
0	.00	12

Fig. 4.

Fig. 5.

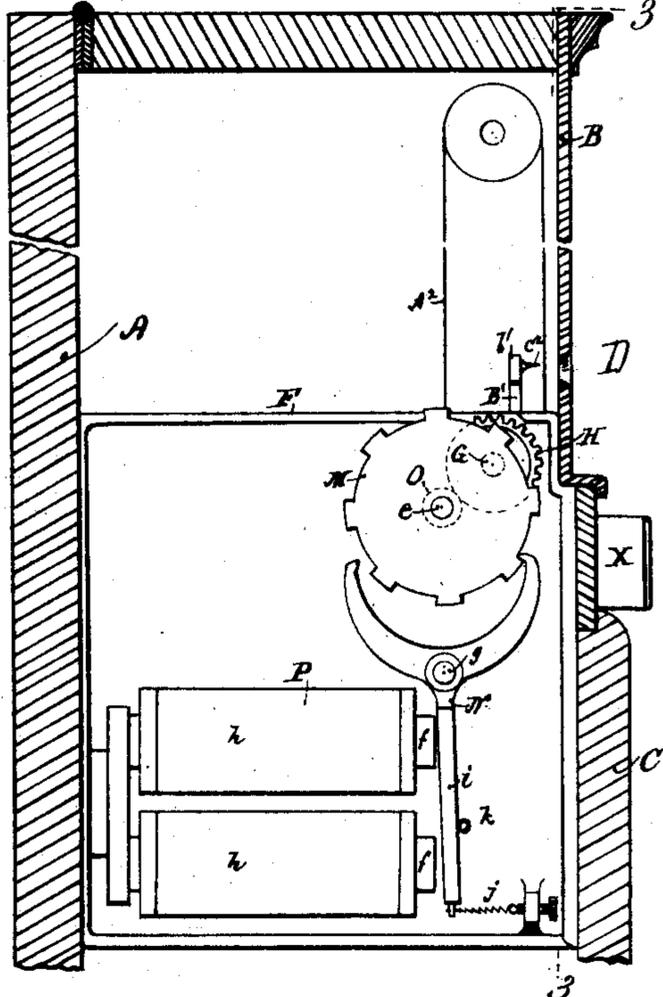


Fig. 2.

Witnesses.  
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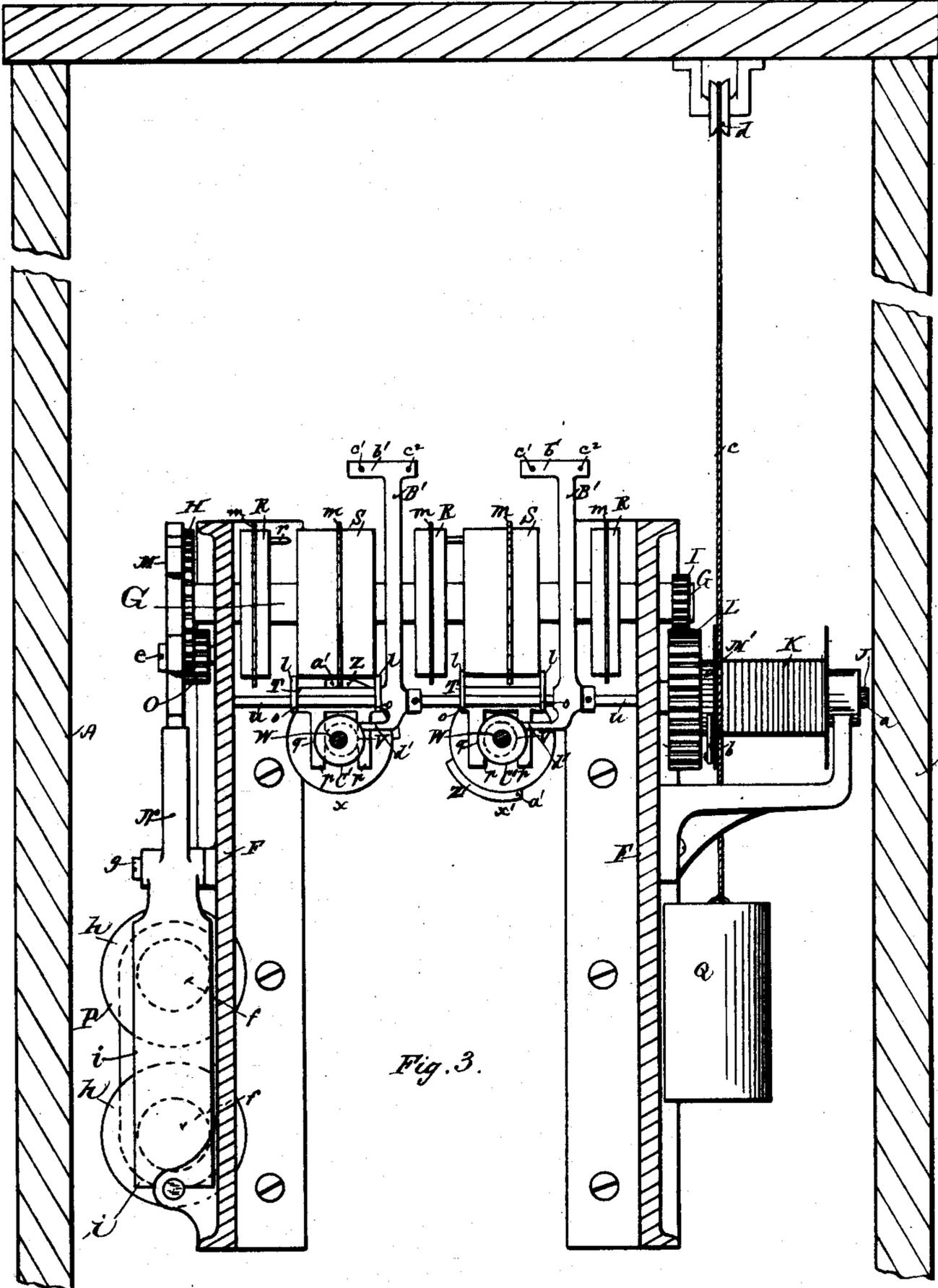


Fig. 3.

Witnesses.  
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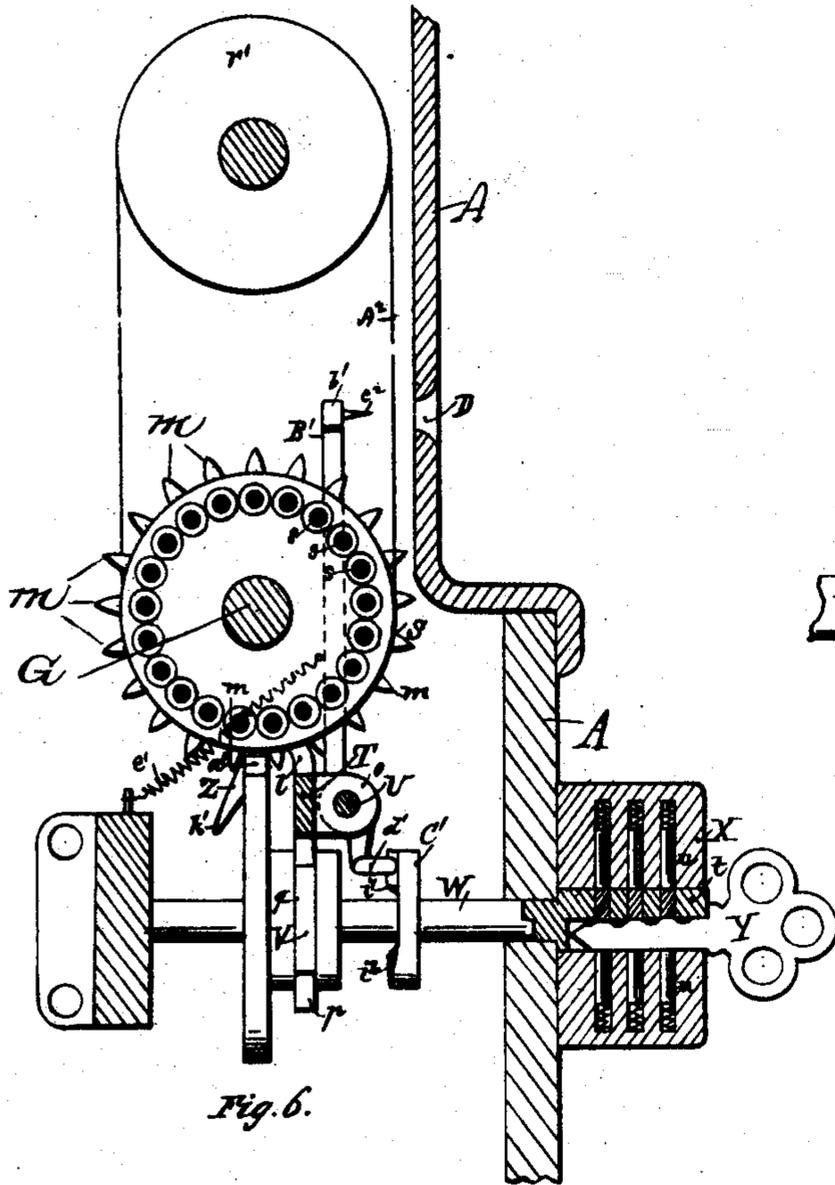


Fig. 6.

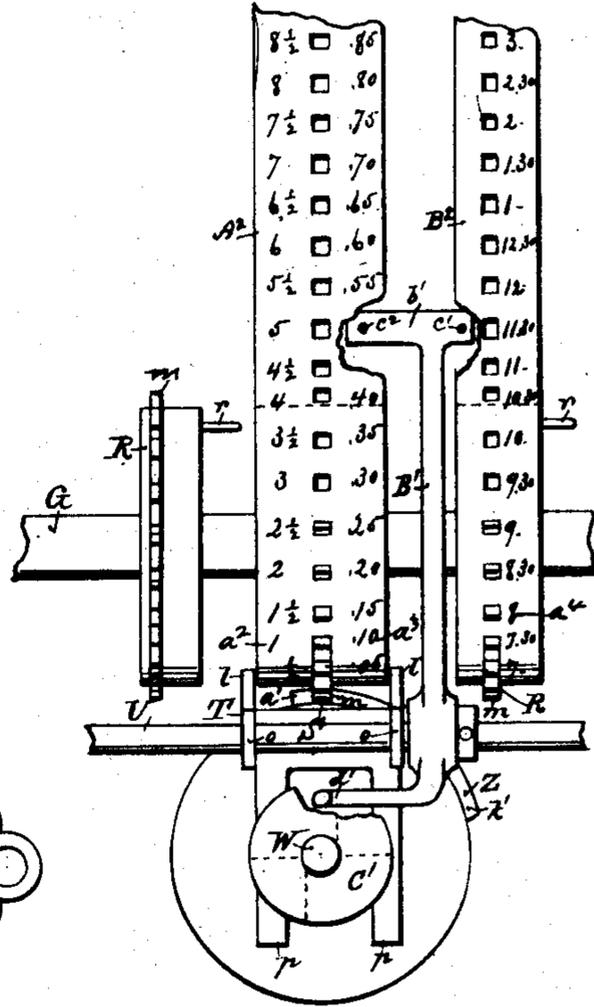


Fig. 7.

Witnesses.

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# UNITED STATES PATENT OFFICE.

FREDERICK L. FULLER, OF NORWICH, CONNECTICUT.

METHOD OF MAKING TIME-RECORDS OR PAY-ROLLS FOR EMPLOYÉS.

SPECIFICATION forming part of Letters Patent No. 431,344, dated July 1, 1890.

Application filed January 16, 1888. Serial No. 260,951. (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 a new and useful Improved Method of Making a Time-Record or Pay-Roll for Employés, of which the following is a specification.

The object of my invention is to provide a practical method for correctly registering or recording the working-time of employés by means of an instrumentality upon which is notated a series of numbers in arithmetical progression, which will serve to represent the full number of hours of labor performed or amount of wages due; and it consists in moving the said instrumentality forward intermittently while the employé is at work, and also moving the said instrumentality backward at each consecutive time of working, in order to correct the erroneous register of the said notated instrumentality at the datum-line, due to a necessary excess of forward movement when complying with the practical requirements of factories and workshops.

Figure 1 is an elevation showing the electrical connection with the escapement mechanism, a portion of the front of the holding-case being broken away in order to show the connection of the battery-wires to the electromagnet. Fig. 2 represents a detail vertical section of the upper end portion of the holding-case, taken in the line 2 2 of Fig. 1. Fig. 3 represents a section taken in the line 3 3 of Fig. 2, enlarged, showing a front view of a portion of the automatically-operated mechanism. Fig. 4 represents a record-strip upon which is printed a series of numbers in arithmetical progression, which will serve to indicate the number of hours of labor performed by an employé, and also a parallel series of numbers showing the amount of wages due for said labor performed. Fig. 5 represents a record-strip upon which is printed a repeating series of numbers which serve to represent the consecutive hours of clock-time. Fig. 6 represents an enlarged detail section showing the mechanism which serves to make a record upon the strip shown in Fig. 4 of the hours of labor performed or wages due, and also to move the said record-strip backward to correct the register at the

datum-line. Fig. 7 shows a front view of the said mechanism with the record-strip and one of the operating-cams broken away to show the concealed parts.

In the accompanying drawings, A represents a case adapted to contain the operative mechanism of the apparatus. The case may be provided with hinged doors B and C, by means of which access can be had to the interior of the case for the purpose of adjusting the registering or recording mechanism or for supplying the notated wheels, strips, or bands to the apparatus. The front of the case is provided with openings D, through which the number of hours worked by the employé can be read, the said opening being made at the datum-line of the said notated instrumentality. A series of combination-locks corresponding in number with said openings are provided, and keys for the same, one lock and key for each employé, by means of which that portion of the mechanism expressly set apart for the use of such employé may be either set in motion or stopped, as desired.

The frame F of the operative mechanism is firmly secured within the case A, and is provided with bearings for the shaft G, upon one projecting 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 *ff* 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 to limit 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 making 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 printed strips or bands, which are hereinafter described. The loose wheels S S may be held between the projecting ears *ll* of the guide T, which is arranged to slide upon the fixed rod *u*, the said guide being 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 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 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 may be operatively connected with the cylinder *t* of the combination-lock

X, 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 upon the shaft W that when the cylinder *t* is locked in one position 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 spurs *m* at the lower side of the wheel S 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 *r* are disengaged the said wheel will be locked against further movement in either direction by means of the rear portion *a'* of the cam.

Upon the rod *u* are loosely held the levers B' B', which may be provided at their upper ends with the cross-bar *b'*, provided with the puncturing-pins *c' c'*, which serve to make the desired record upon the bands or strips A<sup>2</sup> B<sup>2</sup>, or either of the same, and the said levers B' B' are operated from the shaft W by means of the cam C', which is preferably made to act upon the arm *d'* of the lever B' twice during the revolution of the shaft W. The levers B' are drawn backward, so as to bear against the face of the cam C', by means of springs *e'*.

Referring to Fig. 4, A<sup>2</sup> represents a strip of paper or other suitable material, upon which is printed or marked in arithmetical progression a series of numbers *a<sup>2</sup> a<sup>2</sup> a<sup>2</sup>*, 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 pay-roll according to my invention by means of the strip A<sup>2</sup>, I distinctly notate or mark on said strip at the number in the series which is equal to 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<sup>2</sup>* by the mark *b<sup>2</sup>*, 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<sup>2</sup>* will serve to indicate that the sum of ten hour's labor had been then performed, and for the ensuing day the marks *d<sup>2</sup>* and *e<sup>2</sup>* 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 employés.

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 of 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 or leaves off his work in each day, and for this purpose I provide a strip  $B^2$ , having a repeated series of numbers  $a^5$ , which serve to represent the hours and the allowed fractions of hours of clock-time and make a notation mark or perforation, as  $b^3$ ,  $c^3$ ,  $d^3$ ,  $e^3$ , 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 the strip  $A^2$  was commenced and completed. The strips  $A^2$  and  $B^2$  are preferably provided with the series of perforations  $a^4$ , 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, as shown in Figs. 2 and 6, 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.

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.

In carrying out my improved method of forming a time-record or pay-roll for employés I arrange the strips  $A^2$  and  $B^2$  upon the spurs  $m$  of the wheels R and S, as shown in Figs. 6 and 7, and preferably join the ends of the strips to form a band, which may pass around a tightening-roller  $r'$ . Upon the electrically-insulated dial  $E'$  of the clock  $D'$  are placed the pins  $f'$  and  $f^2$ , which are located at the numerals VI and XII of the dial, and to the minute-hand  $g'$ , I attach a spring  $h'$ , 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  $g'$  is carried forward by the clock-movement the spring  $h'$  will be released from engagement with the pin  $f'$ , thus breaking the circuit and causing the release of the arm  $i$  of the escapement-lever N from the magnets 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 wheels R through the space between one of the spurs  $m$  to the next adjoining spur, thus carrying the connected strip or band  $B^2$  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  $r$  then the said wheel S will have the same movement as the wheels R, and the strip or band  $A^2$  will be brought forward for one space, as in the case of the strip or band  $B^2$ ; and at the time of the engagement of the spring  $h'$  of the minute-hand with the pin  $f^2$  of the dial a similar forward movement for one space will be produced in the strips or bands  $A^2$  and  $B^2$ , and for every succeeding half-hour a similar movement will be produced by means of the described escapement mechanism. The wheel R may be preferably operated at intervals of every half-hour, both day and night; but the wheel S is to be only operated by the said 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 or band  $A^2$  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 or band  $B^2$  will serve to record the time of commencing and leaving off work, and such record can be made upon the strips or bands  $A^2$  and  $B^2$  by means of the puncturing-pins  $c'$   $c^2$  of the lever  $B'$ , 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  $i'$  of the cam  $C'$  to cause the pins  $c'$   $c^2$  to be thrown forward to puncture the strips or bands  $A^2$   $B^2$  at the datum-line of the same, the said pins being withdrawn by the action of the spring  $e'$  prior to the completion of the said semi-revolution of the shaft W, and when the employé inserts his key Y for the purpose of turning off the wheel S from engagement with the pin  $r$  the action of the inclined face  $i^2$  of the cam  $C'$  will cause the pins  $c'$   $c^2$  to be again brought forward to perforate the strips  $A^2$   $B^2$  at the datum-line, which is preferably made opposite to the sight-opening D of the holding-case. The time of commencing and leav-

ing off work and the number of hours worked will be thus recorded, and at the end of the week the last record made will show on the strip or band A<sup>2</sup> the full number of hours worked during the week or the full amount of wages due, and the strip or band B<sup>2</sup> will show the clock-time in which each day's work was commenced and ended, thus making a proper time-record for a pay-roll.

10 In practice it is desirable that each employé be made to move his strip or band wheel S into engagement a few minutes 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 between the time of commencing and leaving off work, which must be corrected by means of a retrograde movement of the strip or band A<sup>2</sup> for one space, and I prefer to make the retrograde movement at the time of leaving off work; and to that end I employ the cam Z, the projecting forward end *k'* of which strikes back of an advanced spur *m* of the wheel S, so that as soon as the wheel S has been released from the pin *r* the said cam Z will cause the reversed movement of the said wheel for the space of one spur, thus correcting the register of the strip or band A<sup>2</sup>, so that the proper figures to represent the full number of hours of labor performed or amount of wages due will be correctly registered at the datum-line; but the cam Z can be made to move the wheel S backward at the time of commencing work, if desired.

I claim as my invention—

40 1. The improved method of making a time-record or pay-roll for employés, which consists in moving an instrumentality upon which is notated a series of numbers in arithmetical progression, which will serve to represent the full number of hours of labor performed or amount of wages due, intermittingly forward at specified intervals of time

while the employé is at work, and also moving the said instrumentality backward at each consecutive time of working in order to correct the register upon the said notated instrumentality of the number of hours of labor performed or amount of wages due. 50

2. The improved method of making a time-record or pay-roll for employés, which consists in moving an instrumentality upon which is notated a series of numbers in arithmetical progression, which will serve to represent the full number of hours of labor performed or amount of wages due, intermittingly forward at specified intervals of time while the employé is at work, and moving the said instrumentality backward at each consecutive time of working to correctly register the true number of hours of labor performed or the amount of wages due and making a record upon the said notated instrumentality at the series number which serves to denote the said number of hours of labor performed or amount of wages due. 65 70

3. The improved method of making a time-record or pay-roll for employés, which consists in moving a strip or band upon which are indicated the consecutive hours of clock-time intermittingly forward at specified intervals of time, and also moving an instrumentality upon which is notated a series of numbers in arithmetical progression, which will serve to represent the full number of hours of labor performed or amount of wages due, intermittingly forward at specified intervals of time while the employé is at work, and also moving the said notated instrumentality backward at each consecutive time of working to correctly register the true number of hours of labor performed or the amount of wages due, and also making a record upon the clock-time strip or band at the time of commencing or leaving off work. 75 80 85

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Witnesses:

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