

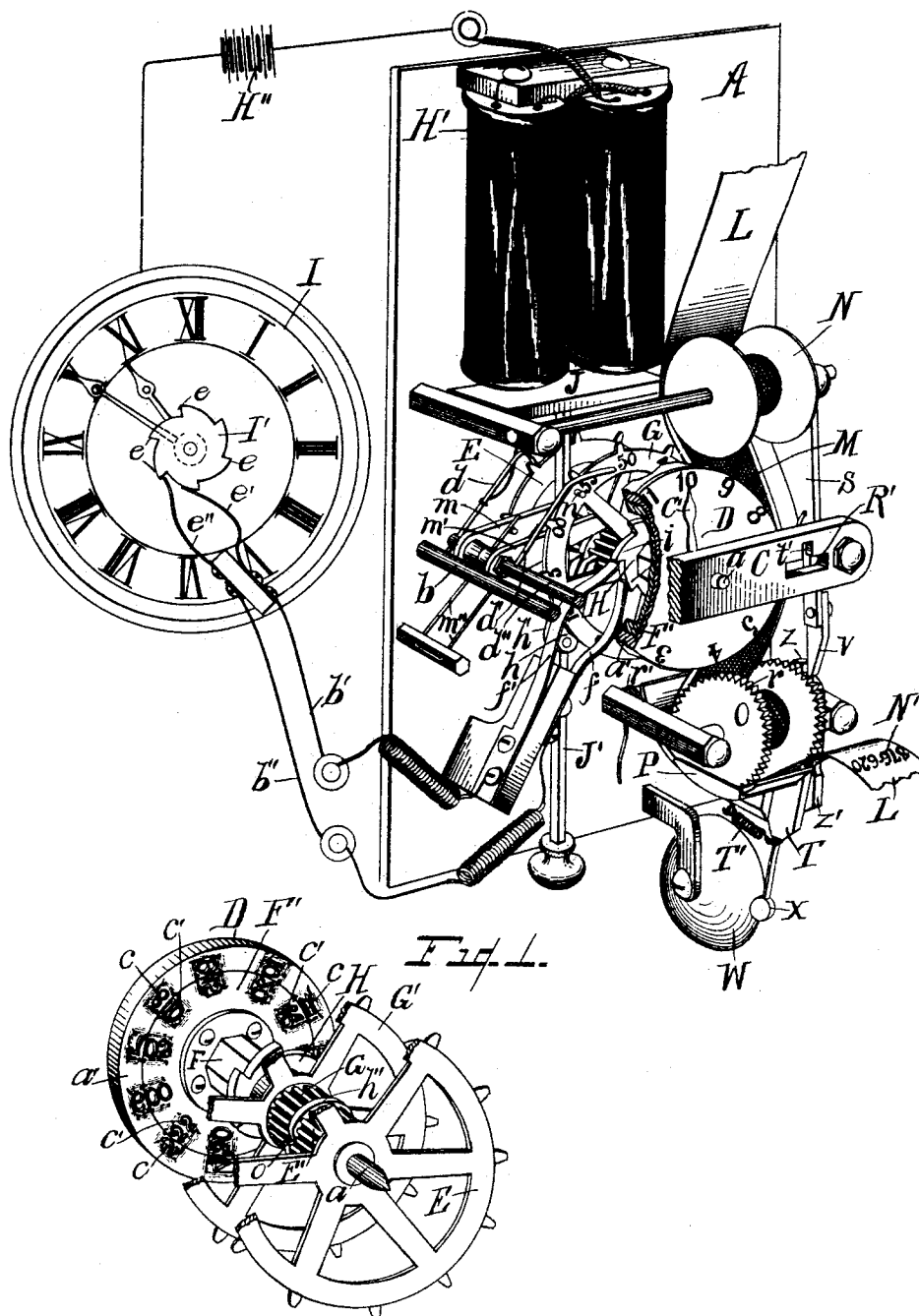
(No Model.)

2 Sheets—Sheet 1.

N. M. WATSON.
EMPLOYEE'S TIME RECORDER.

No. 515,805.

Patented Mar. 6, 1894.



WITNESSES
H. E. Wheeler,
E. K. Roemer.

Fig. 2.

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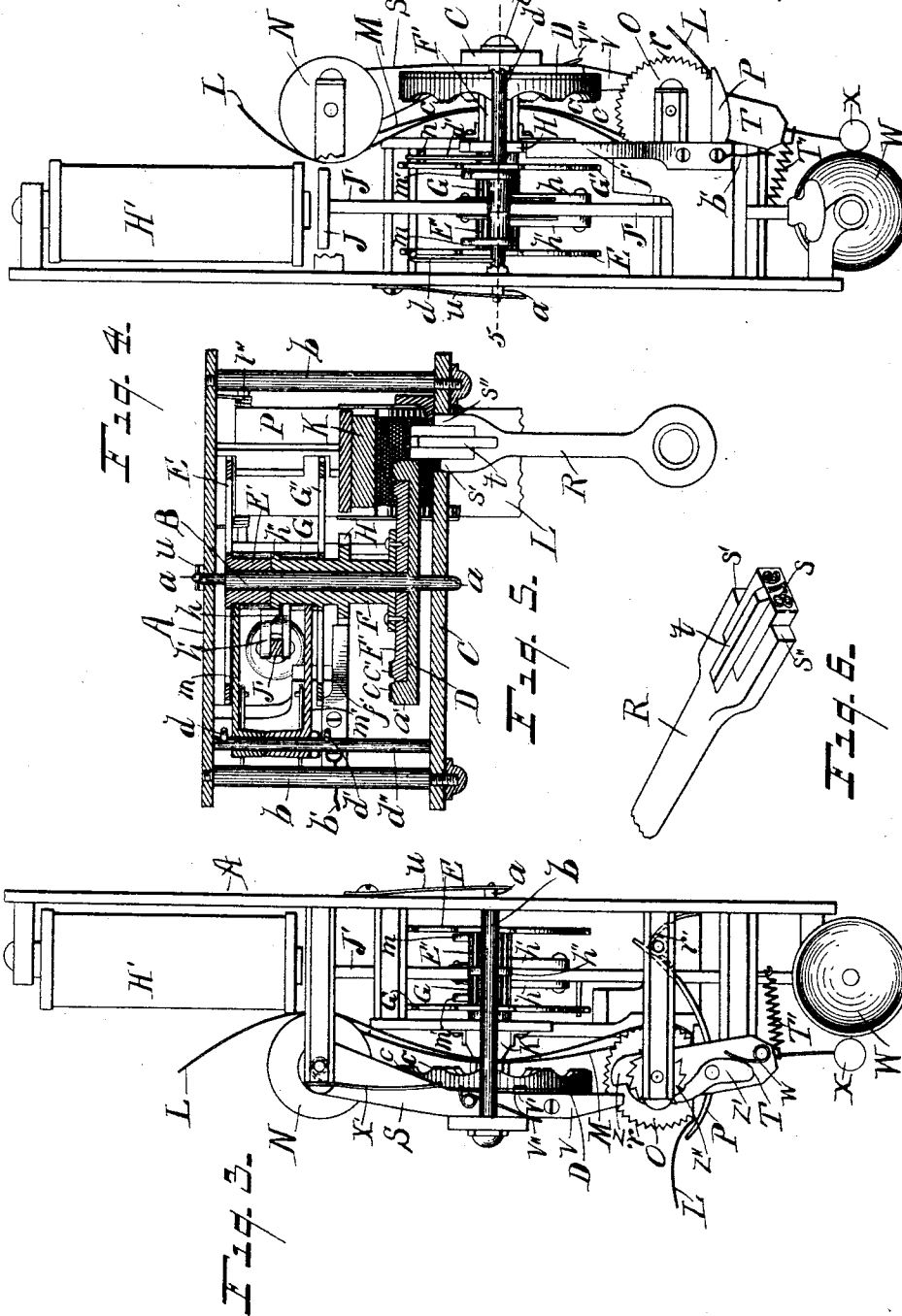
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UNITED STATES PATENT OFFICE.

NELSON M. WATSON, OF DETROIT, MICHIGAN, ASSIGNOR TO THE DETROIT
TIME REGISTER COMPANY, OF SAME PLACE.

EMPLOYÉ'S TIME-RECORDER.

SPECIFICATION forming part of Letters Patent No. 515,805, dated March 6, 1894.

Application filed July 17, 1893. Serial No. 480,694. (No model.)

To all whom it may concern:

Be it known that I, NELSON M. WATSON, a citizen of the United States, residing at Detroit, in the county of Wayne, State of Michigan, have invented certain new and useful Improvements in Employés' Time-Recorders; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in employés' time recorders, and consists in a certain construction and arrangement of parts as hereinafter fully set forth, the essential features of which being pointed out particularly in the claims.

The object of the invention is to provide simple and effective means for correctly recording the time of each employé in any place of business, so as to indicate at what hour or fraction of hour they began work. This object is attained by the construction illustrated in the accompanying drawings, in which—

Figure 1 is a general perspective view of the operative mechanism of my improved device, a portion of the type bearing disks being broken away to show arrangement of parts beyond. Fig. 2 is a detail in perspective of the type bearing disks and a portion of their driving mechanism, two of the wheels of which are partially broken away to more clearly show the construction and arrangement of parts. Fig. 3 is a side elevation of the device. Fig. 4 is a like view looking at the opposite side from Fig. 3. Fig. 5 is a horizontal section on line 5—5 of Fig. 4. Fig. 6 is a perspective of the operator's key, the stem being broken away.

Referring to the letters and figures of reference, A designates a suitable metal base upon which the mechanism is mounted.

B designates the main shaft which is journaled at its inner end in said base, its outer end being journaled in the cross piece C, which is supported by the side posts b. Said shaft while being rotative, is also provided with the long journals a at each end to pro-

vide for the longitudinal reciprocation thereof. Fixed on the outer end of said shaft adjacent to the cross piece C, is a disk D, having a circular right angle flange a' around its outer edge which extends from the rear face of said disk and carries on its vertical face raised numeral characters c, from one to twelve, arranged the proper distance apart and on a line with the radius of the disk. Which construction is more clearly shown in Figs. 2 and 5. Also fixed upon the shaft B near its inner end is an escape wheel E, adapted to be restrained by a detent d, and having a ratchet wheel E', formed on the extended hub thereof.

F designates a rotary sleeve which is mounted on the shaft B, between the disk D and the hub of wheel E. This sleeve has, secured to its outer end, a disk F' which is adapted to lie within the circular flange a' of disk D and revolve therein. Said disk F' having raised numeral characters c' on its vertical face representing the minutes of an hour, arranged in tables of five, and which stand flush with the face of the characters c on disk D, and register therewith. The sleeve F is provided on its inner end with a ratchet wheel G, and fixed on said sleeve between said ratchet and the disk F is a trip wheel G' and notched contact disk H.

Mounted on the base A is an electro-magnet H' included with a source of electricity H'' in a normally open circuit, in which is located a clock mechanism I, carrying on the arbor of the minute hand, a contact disk I' having peripheral teeth e, as shown in Fig. 1. Also located in said circuit is the time recording mechanism which is connected with said magnet through the metal base A.

That portion of the circuit between the clock and the recording mechanism is composed of two limbs b' and b''. The ends of said limbs at the clock are provided with spring terminals e' and e'', respectively, that are successively brought into contact with the projections e of the disk I', as said disk is rotated by the clock mechanism; the other ends of said limbs having like terminals f, f' that successively engage the projections i of the contact disk H mounted on the rotary sleeve F, as said disk is rotated by said sleeve. By

which means the circuit is intermittently closed and opened as and for the purpose hereinafter specified.

The electro-magnet has an armature J provided with a depending plunger J', to opposite sides of which are pivoted the pawls *h*, *h'* that are adapted to engage, respectively, the ratchet wheels E' and G, so that, as the plunger J' is raised, by the magnet attracting its armature J, said pawls engage and rotate said ratchets. The actuation of the ratchet G by the pawls *h*, turns the sleeve F, and causes a partial rotation of the disk F', the contact disk H and the trip-wheel G' which are mounted on said sleeve. Pawl *h'* does not have continual engagement with its ratchet E', but rides upon a ring *h''* on ratchet G, which ring is provided with a single notch *o* (see Fig. 2) into which pawl *h'* drops each time the ratchet G shall have made one complete revolution, when, by the succeeding actuation of said plunger, said pawl will actuate ratchet E', turning the shaft B, and causing a rotation of the hour disk D, the distance of one-twelfth of its circumference, at which time the escape wheel E is made free to rotate by the raising of the detent *d*, which is accomplished by means of a pin *n* shown in Fig. 1, that projects from wheel G, and engages and raises the free end of an arm *d'*, which projects from a rock-shaft *d''* to which said detent is also attached, thereby actuating said shaft to raise said detent from the teeth in said wheel E, when it is revolved by the action of the pawl *h'*, the distance of the space between its peripheral teeth, and is arrested from further forward movement by said detent engaging its succeeding tooth. The ratchets E' and G are held from backward movement after each rotation, by the dogs *m*, *m'*, which are pivoted on the shaft *d''*, and engage said ratchets, respectively, being held in contact therewith by means of the spring *m''*.

The energizing of the electro-magnet so as to actuate the recording mechanism occurs through the closing of the circuit between the clock and said mechanism, through the limbs *b'*, *b''*, of said circuit, as shown in Fig. 1, in which view the parts are shown in the position of "open circuit," as limb *b'* is broken at the spring terminal *f'*, and limb *b''* at the spring terminal *e''*. In which position of parts, as the disk I' is rotated by the arbor of the minute hand of the clock, the spring *e'* will slip from the curved tooth or point *e* thereof upon which it bears, and said point will pass into contact with the spring *e''*, thereby establishing a circuit through line *b''*, the disk H, the metal base and magnet. Thus energized, the magnet attracts its armature J and raises the plunger J', whereby pawl *h* is caused to engage the ratchet G and rotate the sleeve F, turning the disk F', and causing such rotation of the disk H, as to carry the point *i* thereon, which is in contact with the spring *f*, free from said spring and into contact with the spring *f'*, thereby breaking the

circuit through line *b''*, when the armature will fall, placing said parts in position for a succeeding operation. In which position they remain until a further rotation of the disk I' on the arbor of the clock hand, carries one of its points *e* into contact with the spring *e'*, when the circuit will be closed through the line *b'*, and the magnet energized to again rotate the disk F' carrying the minute numerals thereon, and turn the contact disk H so as to carry one of its points *i* free from the spring *f'*, and bring another one into contact with the spring *f*, thus again opening the circuit in which position it remains until closed by the rotation of the disk I', and so on the circuit is alternately closed and opened in reciprocal succession through the lines *b'*, *b''*.

In the construction shown, the arrangement is such that the circuit is closed at intervals of five minutes, and the minute numerals *c'* on the disk F', are arranged in twelve divisions of equal distance apart, and in tables of five from .00 to .55, so that at each closing of the circuit, the disk F' is moved ahead five minutes, thereby bringing each of its numerals in succession to register with the hour numerals on the disk D, and when said disk F' shall have moved twelve times to complete the hour, the pawl *h'* will rotate disk D one point to indicate the succeeding hour. For instance, starting with the hour disk at 9, and the .00 on the minute disk registering therewith, the next closing of the circuit will rotate disk F' so as to bring numeral 5 thereon to register with 9 on the disk D, thus indicating 9.05, and so on each succeeding five minutes, disk F' is rotated one space by the closing of the circuit until the eleventh operation indicates 9.55, when the pawl *h'* will drop into the notch *o* and engage the ratchet E', so that at the next closing of the circuit, the hour disk will also be revolved one space to indicate ten o'clock, and so on the operation continues for each succeeding hour.

To provide for recording the time of the arrival of each employé, a platen K is located back of the registering numerals on the disks F' and D, and adjacent thereto, and passing over said platen is a strip of paper L, upon which lies an inked ribbon M that passes between said paper and the numerals upon said disks, the ends of said ribbon being wound upon the spools N and O. The lower end of the paper strip is received by a curved guide P and turned outward under the ratchet disks *r* of the spool O. Said guide is hinged at its rear edge and is held upward against said ratchets by the tension of the spring *r'*, whereby the teeth of said ratchets are caused to engage said paper and feed it along as they are rotated.

R designates the key of the employé, which is provided with numeral characters *s* on the end thereof indicating the employé's number, and with the lateral shoulders *s'* and *s''*. This key is adapted to be entered in a key-hole R' in the cross-piece C, and is provided with a

longitudinal rib *t* on its upper face, adapted to be received in a corresponding slot *t'* leading from the upper edge of the key-hole, which insures the key being always entered in the proper manner.

The arrangement of the parts is such, that, when the key is inserted in the key-hole, its end bearing the numerals will pass the outer edge of the disk D, and extend said numerals into line with the numerals of the disks D and F', and so as to register therewith, when the shoulder *s'* on said key will engage the edge of disk D and carry said disks inward, so as to cause the registering numerals thereon and on the end of the key to impinge against the ribbon M lying upon the paper over the platen K, thereby printing the numerals of the disks and key upon said paper. The shaft B slides longitudinally upon its journals *a* to permit of this movement of said disks, and is returned when the key is withdrawn by the spring *u* bearing against the inner end thereof. The printing of the characters carried by the key and disks, upon the strip of paper L, indicates at what time the employé having a certain number, reported for duty, as illustrated by the characters N' on the strip L, shown in Fig. 1, which indicates that employé 876, inserted his key in the register at 6.20, and so each employé is recorded together with the time his key is inserted in the instrument, making a complete record of the time he reports for duty. The intermittent closing of the circuit by the time mechanism, and the consequent rotation of the numeral bearing disks D, F', keeps said disks in accord with the clock so that the time of the insertion of a key will be correctly recorded during any hour of the day, the arrangement of the parts being such that the numerals on the disks D, F', indicating the current time as shown by the hands on the clock dial, shall be always opposite the key-hole opening R' so that the insertion of the key will print said time upon the tape, with the number of the key.

To provide for feeding the paper and ribbon along for each printing operation, an arm S is pivoted to the spindle of spool N, and depends in the rear of the key-hole R' so that a portion of the edge thereof extends over said opening as shown in Fig. 1. Pivoted to the lower end of said arm, is a dog *v*, the lower end of which is free to swing inward, but which is restrained from outward movement by a lug *v'* projecting from the arm S which engages the upper end thereof, making a hinge joint by which the dog *v* is connected to said arm, said dog being retained in its normal position by a spring *v''*. Loosely mounted on the spindle of the spool O, is an arm T having on its upper end a nose *z* which extends into the path of the dog *v*, and carrying a pawl *z'* pivoted to the lower end thereof and adapted to engage a ratchet wheel *z''* fast on the spindle of the spool O, said pawl being held in engagement with said ratchet

by a spring *w*. With which arrangement, as the key is inserted in the key-hole, the shoulder *s''* of said key engages the arm S, and swings it inward causing the dog *v* thereon to engage the nose *z* of the arm T, and turn said arm upon its pivot swinging its lower end outward against the action of the spring T' attached thereto, and causing the pawl *z'* thereon to rotate the ratchet wheel *z''*, thereby rotating the spool O to wind the ribbon thereon, and at the same time feeding the paper along by the rotation of the toothed disks *r*. When the arm S, by the inward thrust of the key has been carried a certain distance, the dog *v* will slip past the nose of the arm T, when the resistance of the spring T' to the entrance of the key will be suddenly removed, causing said key to plunge inward with considerable impact and carry its numerals and those on the time disks against the platen with such force as to cause a clear and sharp printing of their characters upon the strip L, at which time the spring T' drawing backward, the lower end of the arm T causes the hammer *x* depending therefrom to strike the bell W. As the key is withdrawn, the spring *x'* returns the arm S, the lower end of the dog *v* swinging upward in passing back over the nose *z*, and is restored by its spring *v''*, when the parts are in position for another operation.

It will be seen on referring to Fig. 1, that hour numerals are placed upon the outer face of the disk D, and minute numerals on the rim of wheel G. These numerals that are in line with the hand C', indicate the hour and minutes, and enable the reading of the time without reference to the clock. It will also be seen that the plunger J' is provided with a depending knob to enable said plunger to be actuated by hand for the purpose of setting the instrument when desired.

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

1. In a time recorder, the combination with an intermittent circuit closer and an electro-magnet located with a source of electricity in a normally open circuit, of the rotary disks adapted to rotate independently and carrying printing characters on their vertical faces, said disks being so mounted as to reciprocate horizontally, and mechanism in connection with said electro-magnet for rotating said disks.

2. In a time recorder, the combination with an intermittent circuit closer and an electro-magnet included with a source of electricity in a normally open circuit, of the character bearing disks adapted to reciprocate horizontally and being capable of independent rotation, and means in connection with said electro-magnet for rotating said disks on the closing of the circuit, and means for opening said circuit when said disks shall have been rotated.

3. In a time recorder, the combination of

the printing key, the rotary and reciprocal disks having printing characters on their vertical faces, said disks being so mounted that by the operation of inserting the key they are actuated to print in unison with said key, and means for rotating said disks intermittently.

4. In a time recorder, the combination of the rotary and reciprocal disks having printing characters on their vertical faces and adapted to rotate independently one within the other, means for reciprocating said disks in the direction of their vertical faces, the independent ratchets connected respectively with said disks, the pawls engaging said ratchets, and the vertically reciprocal plunger for actuating said pawls.

5. In a time recorder, the combination of an intermittent circuit closer, and an electromagnet included with a source of electricity in a normally open circuit, the independently rotative disks having printing characters on their vertical faces, the rotary contact on the arbor of one of said disks, the two limbs of the circuit connecting said circuit closer with said rotary contact in such manner as to effect an alternate closing of the circuit through each of said limbs.

6. In a time recorder, the combination of the independently rotative disks having printing characters on the vertical faces thereof and adapted to reciprocate in unison, means for rotating said disks intermittently, the platen adjacent to the characters on said disks, the key carrying printing characters, said key being adapted to impinge upon said platen

and to engage and carry said disks into contact therewith so that the characters on said disks shall align with the characters on the key.

7. In a time recorder, the combination of the rotary disks having printing characters on their vertical faces and adapted to reciprocate horizontally in the direction of said characters, the platen adjacent to the characters on said disks, the key having printing characters on its end, said key being adapted to engage said disks so as to bring the characters thereon into alignment with the characters on the disks, and actuate said disks to cause their printing characters together with the characters on the key to impinge upon the platen.

8. In a time recorder, the combination of the reciprocal printing disks, the key adapted to engage said disks and having printing characters that register with the characters thereon, the ribbon and tape and mechanism for feeding the same, and means for operating said feed mechanism by the act of inserting the key, whereby the force applied to said key to thrust it by the point of operating the feed, carries its printing characters and those on said disks with impact against said ribbon and tape.

In testimony whereof I affix my signature in presence of two witnesses.

NELSON M. WATSON.

Witnesses:

E. S. WHEELER,
E. K. ROEMER.