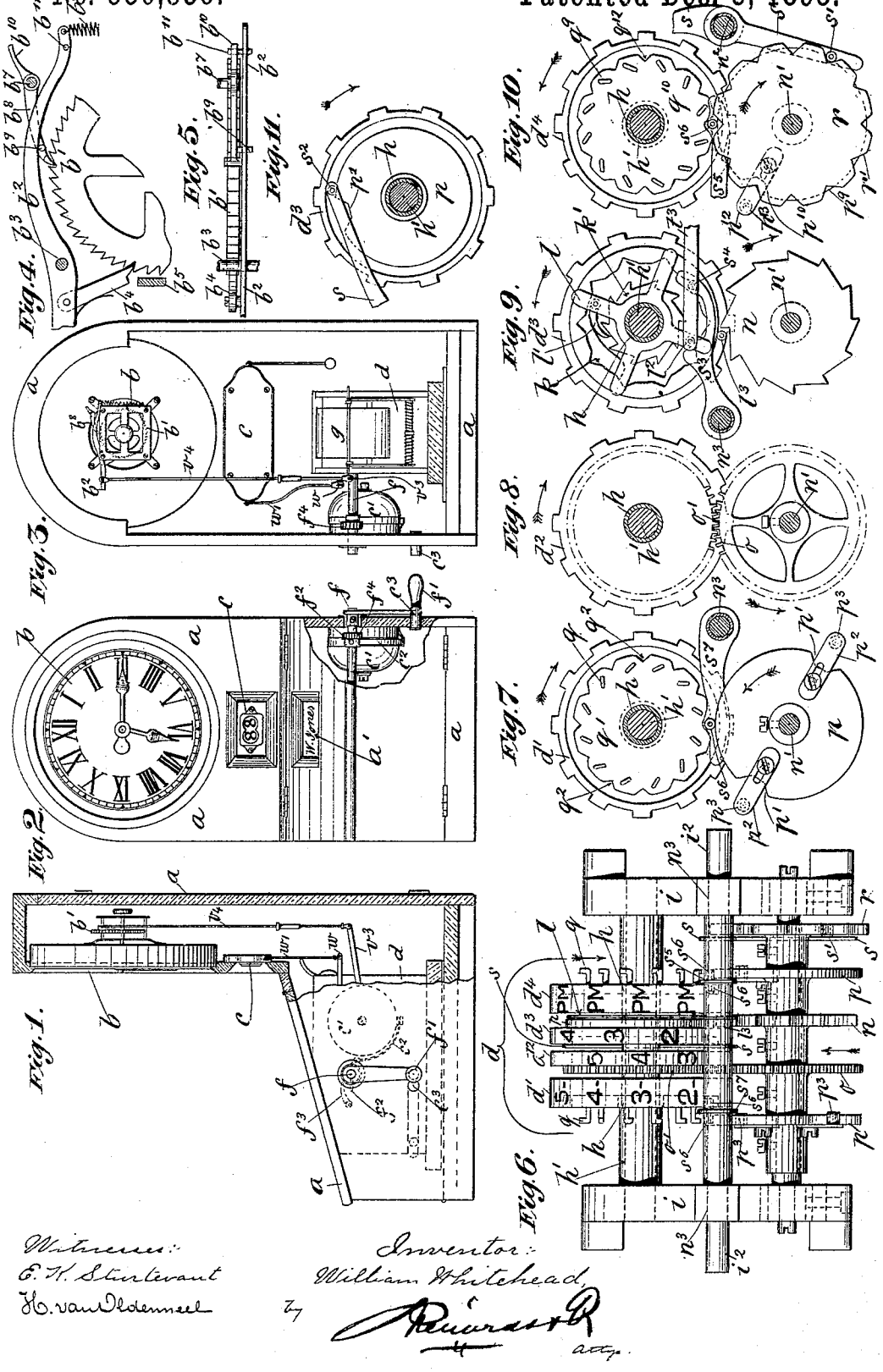
(No Model.) 4 Sheets—Sheet 1.

W. WHITEHEAD.

WORKMAN'S TIME RECORDER.

No. 550,856. Patented Dec. 3, 1895.



Witnesses:
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Atty.

(No Model.) 4 Sheets—Sheet 2.

W. WHITEHEAD.

WORKMAN'S TIME RECORDER.

No. 550,856. Patented Dec. 3, 1895.

Fig. 1a.

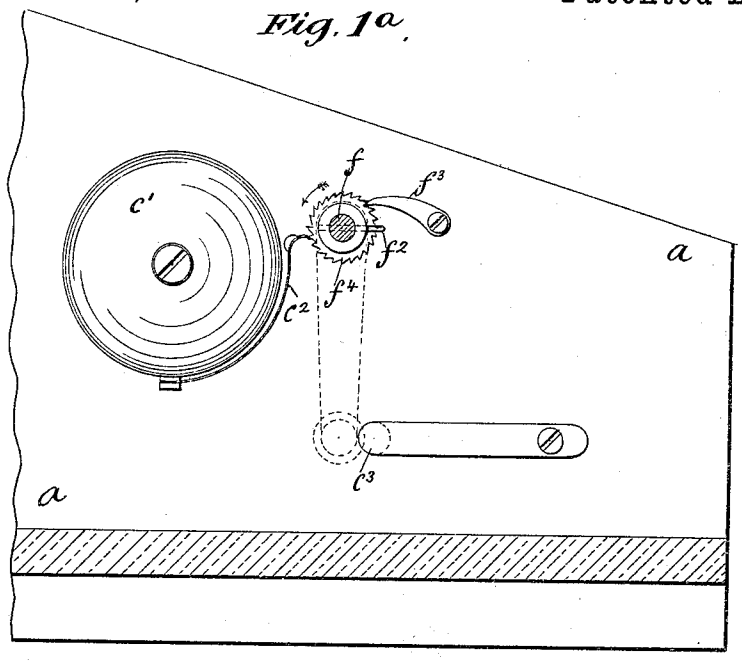


Fig. 12a

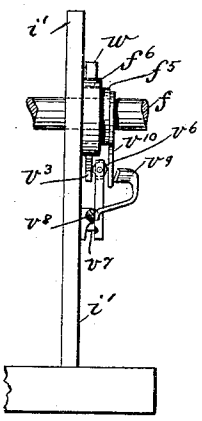
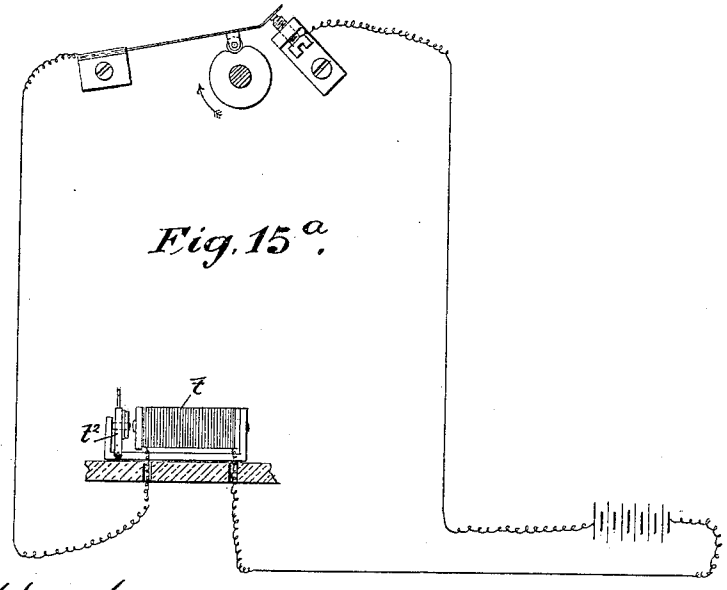


Fig. 15a.



Attest
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(No Model.) 4 Sheets—Sheet 3.

W. WHITEHEAD.

WORKMAN'S TIME RECORDER.

No. 550,856. Patented Dec. 3, 1895.

Fig. 13.

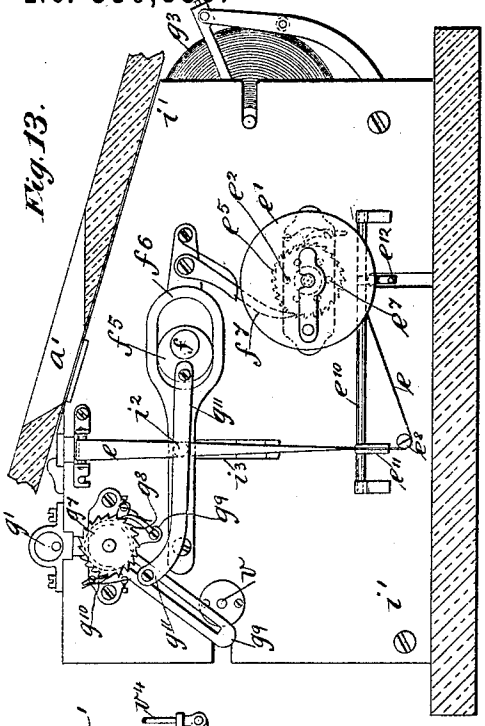


Fig. 15.

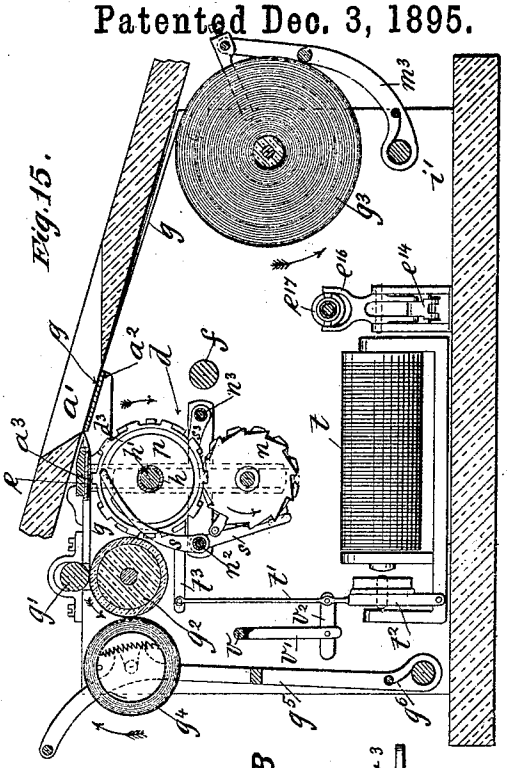


Fig. 12.

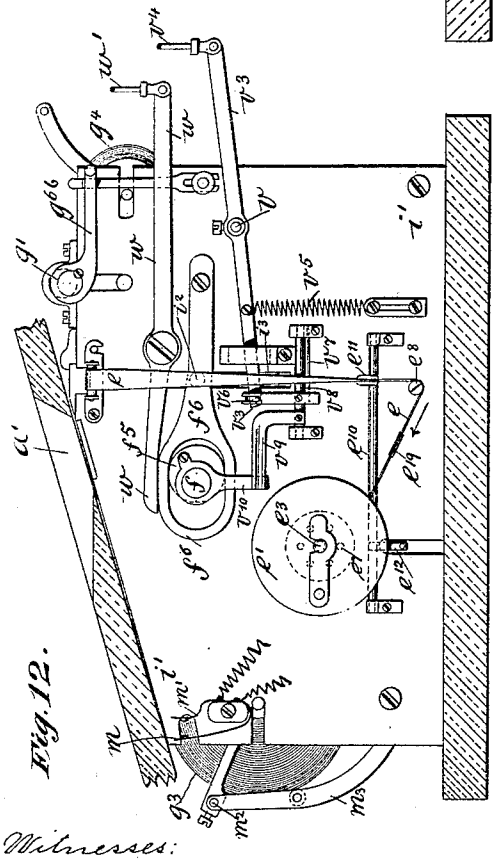
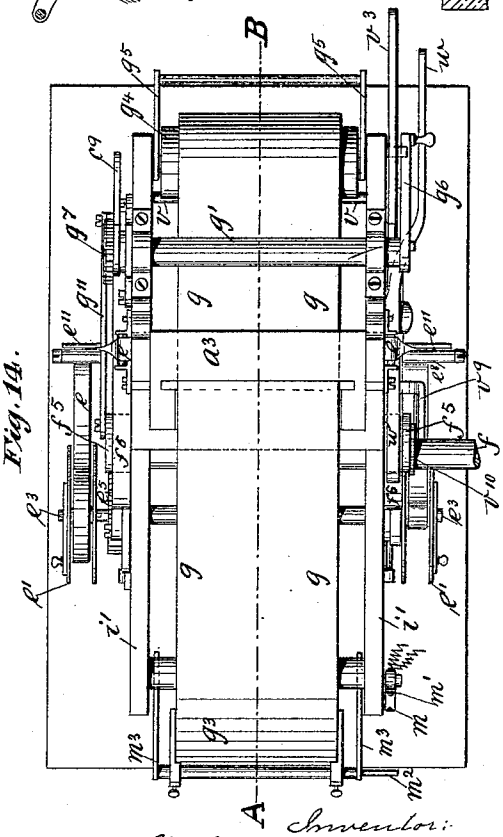


Fig. 14.



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(No Model.)

4 Sheets—Sheet 4.

W. WHITEHEAD.

WORKMAN'S TIME RECORDER.

No. 550,856. Patented Dec. 3, 1895.

Fig. 16.

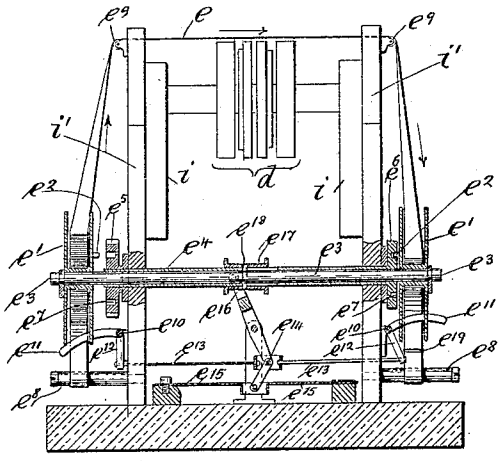
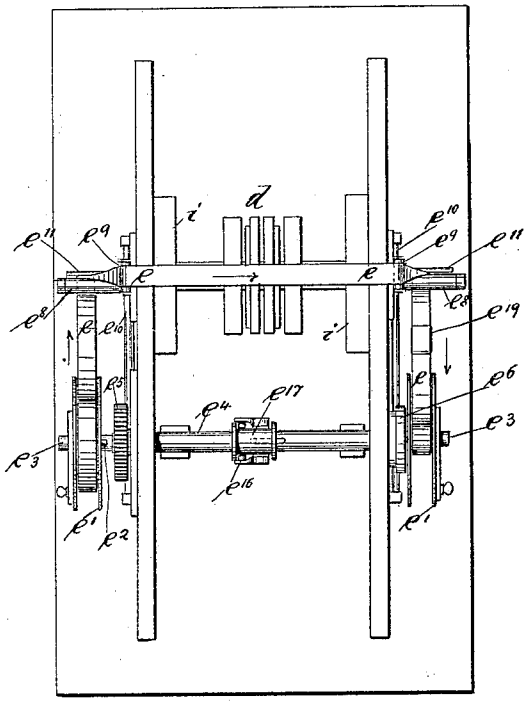


Fig. 17.



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UNITED STATES PATENT OFFICE.

WILLIAM WHITEHEAD, OF MANCHESTER, ENGLAND.

WORKMAN'S TIME-RECORDER.

SPECIFICATION forming part of Letters Patent No. 550,856, dated December 3, 1895.

Application filed August 22, 1894. Serial No. 521,000. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM WHITEHEAD, a subject of the Queen of Great Britain, residing at Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Workmen's Time-Recorders, of which the following is a specification.

This invention relates to improvements in apparatus whereby the time of arrival or departure of workmen or clerks in places of business or that of trains at or from stations or signal-boxes or at other points or that of ships passing others or points or that of callers at offices or other places and the like time can be recorded automatically and accurately to the minute and such record readily examined and filed, part of which improvements are also applicable for stamping the time of arrival or delivery of documents and the like.

The present invention has for its object to simplify the construction and render more positive and reliable the working of the said apparatus by dispensing almost entirely with springs and reducing friction, and embodies, first, means for controlling the action of the secondary clock; secondly, improved type-wheels and mechanism for actuating the same; thirdly, an improved inking device, and lastly, improved means for giving the paper strip a straight course and facilities for filing. I attain these objects by the mechanism illustrated in the accompanying three sheets of drawings, in which—

Figures 1, 1ª, and 2, Sheet I, are respectively a side view showing the casing in section and exposing the signal apparatus, and a front view, partly in section; and Fig. 3, a back view with door removed of a complete apparatus for checking and recording workmen's time and for other similar purposes. Figs. 4 and 5 are respectively a side view and plan of a portion of the secondary clock. Fig. 6 is an end view of the time-stamp. Fig. 7 shows the left side of the hour type-wheel; Fig. 8, the left side of the minute tens-wheel; Fig. 9, the right side of the minute units-wheel; Fig. 10, the right side of the A. M. and P. M. wheel in connection with the respective disks and wheels. Fig. 11 shows the left side of the minute units-wheel. Figs. 12 and 13, Sheet II, are side views, Fig. 14 a plan, and Fig. 15 a longitudinal section at line A B of Fig. 14, of the time-stamp and accessory mechanism. Fig. 12ª shows an end view of the right-hand frame side, showing the locking-lever and adjusting parts. Fig. 15ª shows a diagram of the connection between the primary clock and the magnet of the apparatus. Fig. 16, Sheet III, is a cross-section, and Fig. 17 a plan, of the inking device.

Similar letters refer to similar parts throughout the several views.

In carrying out my invention and referring to Figs. 1, 2, and 3, Sheet I, a is the casing of the apparatus, formed with a recording-slot a' and containing the secondary clock b, the counter c, the time-stamp d, its accessory mechanism, and the signal-bell c'.

f is the main shaft of the apparatus, furnished with a handle f', by means of which and suitable connections hereinafter described the time-stamp d is raised and lowered, the counter c and bell c' are operated, and the inking-ribbon e and the paper strip g moved intermittently. The counter c serves to indicate the number of turns of the handle f', and the bell c' as a check against improper use of the apparatus, giving a signal on every revolution of the main shaft f by a pin f^2 thereon depressing a spring-blade c^2, having attached the bell-hammer, while a pawl f^3 and ratchet f^4 prevent the handle f' being turned in the wrong direction, and a spring-stop c^3 confines its movement to one revolution.

The secondary clock b is controlled by a primary clock, (not shown,) which may be that of a works or other place, as the case may be.

The secondary clock consists of a minute-wheel b', with sixty teeth fixed upon the minute-hand spindle. The main lever b^2 is adapted to rock upon a stud b^3 and is furnished at one side of its fulcrum with a pawl b^4 under the influence of a spring, which pawl engages the minute-wheel b' and is limited in its stroke by abutting against a bar b^5 and thus prevented from overshooting. The lever b^2 on the other side of its fulcrum is placed under the influence of a spring b^6, which brings it back to its normal position. On one of the frame-studs b^7 of the secondary clock is employed loosely a pawl b^8, riding on the minute-wheel b' and having a stud b^9 on its

side, upon which rests the spring end of the main lever b^2, which, when upon it, retains the pawl b^4 in the teeth of the wheel b' and thus prevents the same from rotating backward.

To insure the pawl b^8 engaging the teeth of the minute-wheel b' when required, a pin b^{11} is fixed on the spring end of the pawl-lever b^2, which at the end of the downward movement of the pawl b^4 comes into contact with an extension b^{10} on the pawl b^8, thus making its action certain.

The secondary clock comprises other wheels and pinions, which convert the time from minutes to hours, similar as in an ordinary clock.

Near one end of the outer frame i' is employed a rocking shaft v, formed between the frame side i', with an arm v', (see Fig. 15,) connected to the lever t' by means of a link v^2. To one end of the shaft v is fixed a double-armed intermediate lever v^3, (see Figs. 12 and 14,) one arm of which is connected to the main lever b^2 of the secondary clock by means of the rod v^4, and the other arm placed under the influence of the spring v^5, rendered adjustable. A locking-lever v^6, also under the influence of a spring v^7, acts when the time-stamp d is in use, in order to prevent its type changing and to be released the moment the operation of stamping is completed. The locking-lever v^6 is fixed upon a rocking shaft v^8, suitably mounted at the frame side i' and having attached a lever v^9, the free end of which is so shaped as to be in the path of an arm v^{10}, fixed to and rotating with the cam f^5, an arbor of which arm when the apparatus is not in use pushes the said lever outward, and thereby keeps the locking-lever v^6 clear of the intermediate lever v^3.

The numbers and letters of the time-stamp d—*i. e.*, on the type-wheels d' d^2 d^3 d^4, (see Fig. 6)—are not inverted, as heretofore, but formed to print through the paper strip g, the inking-ribbon e being above the paper strip g (see Fig. 15, Sheet II) and type-wheels d' d^2 d^3 d^4 raised against the latter; or the ribbon e may be dispensed with and the numbers or letters embossed through the paper strip g. This arrangement enables me to give the paper strip g a straight course through the apparatus and the printed or embossed matter to face the operator. The said type-wheels comprise (see Fig. 6, Sheet I) a minute units-wheel d^3, with numbers "0" to "9," a minute tens-wheel d^2, with numbers "1" to "5" twice and two blank spaces, an hour-wheel d', with numbers "1" to "12," and, lastly, a meridian-wheel d^4, with six A. M.'s occupying one half and six P. M.'s occupying the other half of the periphery. The said type-wheels are positioned in successive order, the minute units-wheel d^3 being fixed upon a sleeve h and the others, d', d^2, and d^4, mounted loosely thereon, and the sleeve h loosely upon a spindle h', carried by the stamp-frame i. The minute units-wheel d^3 has internally ten V-shaped recesses k, (see Fig. 9,) and secured to its side concentric with the said recesses a ratchet-wheel k', having ten teeth.

Upon the sleeve h is mounted loosely a four-armed lever l, carrying a pawl l' under the influence of a spring, which pawl engages the ratchet-wheel k', and also a roller l^2, acting upon a locking-lever s^3, to be described, which controls the latter. On the side of the minute units-wheel d^3, near its periphery, is a roller l^3, which engages a ratchet-wheel n, having twelve teeth and fixed upon a governing-shaft n', positioned below the said type-wheels and mounted in the stamp-frame i. Upon this shaft is also fixed a toothed wheel o, (see Fig. 8,) gearing into a wheel o', of equal diameter, fixed to one side of the minute tens-wheel d^2, and a cam-disk p, also mounted an shaft or arbor n', (see Fig. 7,) having two recesses p' and two arms p^2, each furnished with a roller p^3, which act upon twelve pins or teeth q, carried by a disk q', fixed into a cavity on the side of the hour type-wheel d' and having on its periphery twelve V-shaped recesses q^2.

Upon the governing-shaft n' is fixed a second disk p^9, (see Fig. 10,) having one recess p^{10} and one arm p^{12}, furnished with a roller p^{13}, which act upon twelve recesses q^{12} and twelve pins or teeth q^9 of a disk q^{10}, fixed in a cavity to the side of the meridian-wheel d^4 for the purpose of governing it. A third disk r, fixed upon the governing-shaft n', has twelve V-shaped recesses r', which serve to lock the whole of the said type-wheels in position each time a change takes place.

In connection with the disk r and the minute units-wheel d^3 is employed to rock upon a stud n^2 a two-armed locking-lever s, each arm of which is furnished with a roller s' and s^2, respectively, (see also Fig. 15,) s' being adapted to drop into the V-shaped recesses r' of the disk r and the other, s^2, to ride upon a disk p, fixed in a cavity at the side of the minute units-wheel d^3, (see Fig. 11,) having one recess p' only on its periphery, into which the roller s^2 drops once each revolution of the minute units-wheel d^3 the moment a change takes place in the position of the type-wheels, allowing the other roller, s', to rise out of the V-shaped recess r' of the disk r. Opposite to the locking-lever s are employed to rock upon another stud, n^3, three other locking-levers s^3, s^5, s^7, one of which (the minute units-wheel lever s^3) carries at its free end one roller s^4 and the other (the hour and meridian wheels levers s^5, s^7) two rollers s^6 s^6, each one being adapted to engage the V-shaped recesses q^2 in the side of its respective type-wheel and the other to ride upon the periphery of the disk p, so as to keep the type-wheels in their relative position locked.

The stamp-frame i is formed with pivots i^2, adapted to slide vertically in slots i^3, formed in the outer frame i', and pass into levers f^6, pivoted to the frame i', and operated upon by a cam f^5, fixed on the main shaft f.

If desirable, the type-wheels described may

be increased in diameter, so as to permit of having the whole of the days of a month on the periphery, in which case the numbers on the other wheels described would be doubled, as will be readily understood.

The time-stamp inking device consists of two spools e' e', (see Sheets II and III,) having each a pin e^2 on the inner side, mounted loosely upon each end of a shaft e^3, passing through a tubular spindle e^4, mounted in the frame i' of the apparatus. To one end of this tubular spindle e^4 is secured a ratchet-wheel e^5 and to the other end a precisely-similar ratchet wheel or disk e^6, of similar diameter, each having a number of holes e^7 in its side adapted to engage alternately the pins e^2 of the aforesaid spools. One of the cam-levers f^6 (see Fig. 13, Sheet II) has attached at its free end a pawl f^7 under the influence of a spring which engages and rotates the ratchet-wheel e^5 on the spool-shaft e^3 intermittently.

In connection with the spools e' e' is employed the inking-ribbon e, which passes over two rollers e^8 e^8 at the bottom and two e^9 e^9 at the top of the frame i' and is wound from one spool e' onto the other alternately. At each frame side i' is employed a rocking shaft e^{10}, having near one end a split lever e^{11}, through which the inking-ribbon e passes, and near the other end a lever e^{12}, connected by means of two rods e^{13} to a toggle-joint e^{14}, the lower end of which is jointed to a spring e^{15} and the upper end being formed with a fork e^{16}, adapted to engage a collar e^{17}, capable of sliding upon the tubular spindle e^4 and connected to the spool-shaft e^3 in the latter by means of a pin e^{18} passing through a slot in the tubular spindle e^4. The inking-ribbon e near each end is furnished with a projection e^{19}, (see also Fig. 12,) which when the ribbon e is nearly wound off one spool comes into contact with and raises the split lever e^{11} on the respective side. This causes the position of the toggle-joint e^{14} to be reversed through the medium of the respective rocking shaft e^{10}, lever e^{12}, rods e^{13}, and spring e^{15}, and the spool-shaft e^3 to be moved longitudinally in the tubular spindle e^4, so as to bring the spool unwound and out of gear in gear with the disk e^6 or ratchet-wheel e^5, as the case may be, and thereby reverse the travel of the inking-ribbon e.

The paper strip g (see Fig. 15, Sheet II) is drawn by means of a pair of rollers g' g^2 from a roll g^3, mounted in the outer frame i', passing in a straight line over a recording-plate a^2 and between a padded impression-bar a^3 and the time-stamp d through the said drawing-rollers onto a filing-roller g^4, carried by levers g^5 under the influence of a spring g^6, and kept in contact with the drawing-roller g^2.

The pressure-roller g' is mounted eccentrically and under the control of a lever g^6, (see Figs. 12 and 13,) while the other roller, g^2, is covered with rubber and actuated by a ratchet-wheel g^7 (see Fig. 13) and a pawl g^8, carried by a lever g^9, a stationary pawl g^{10} being employed to prevent the roller, g^2, moving backward. The pawl-lever g^9 is connected by a rod g^{11} to a crank-pin carried by one of the cams f^5 f^5.

Motion is imparted to the minute-units type-wheel d^3 from the magnet t (see Figs. 9 and 15) by means of a lever t', one end of which is fixed to the armature t^2 and the other end by means of a link t^3 to the four-armed lever l.

The counter c is operated by means of a rocking lever w, pivoted to the outer frame i', one end of which bears against the cam-lever f^6, and the other being connected to the counter c by means of the rod w'. For the purpose of indicating when the roll of paper has been nearly exhausted, springs m m' are so placed that on the roll being nearly exhausted an extension m^2 on the tension-lever m^3 comes into contact with the spring m and brings the same against the spring m', thus closing the circuit and ringing an electric bell suitably placed.

The mechanical part of the apparatus is operated as follows: The workman or other person using the apparatus for the purpose of recording his time of arrival or departure writes or stamps his number or name, as the case may be, or when used in signal-boxes the signal-man records the particulars of the passing trains, or when used on shipboard the man on watch records the passing of other ships or points or other matter of interest through the recording-slot a' onto the strip of paper g below the same, and afterward imparts one turn to the handle f'. The first half of the revolution of the main shaft f removes the particulars from underneath the slot a' to the stamp d by means of the feeding-gear previously described, in the meantime positioning for action the locking-lever v^6 on the intermediate lever v^3, registering the number on the counter c.

The second half of the revolution of the main shaft f raises the stamp d and causes an impression, rings the signal-bell c', and finally unlocks the intermediate lever v^3 and brings all moving parts to their normal position.

The action of the type-wheels in conjunction with the secondary clock b is as follows: In the primary clock (not shown) is an electric circuit-closer. The electrical circuit from a battery or other electric source is closed by the circuit-closer of the primary clock at predetermined intervals, in the present instance every minute. The current passing around the electric magnet t attracts the armature t^2, and the connections between the same and the four-armed lever l of the minute units-wheel d^3 sets the pawl l' back in position, as shown in Fig. 9, against the tension of spring v^5 through the intermediate lever v^3, shaft v, arm v', and link v^2, the backlash of the pawl l' being for the purpose of admitting of the unlocking of the minute units-wheel locking-lever s^3. This action has moved the secondary clock one minute. After the

circuit has been broken by the primary clock the spring v^5 is free to act. Should, however, the apparatus be in use at the time of the current passing, the locking-lever v^6 will prevent the spring v^5 moving the intermediate lever v^3 until the operator has finished. On the minute units-wheel d^3 completing one revolution the roller l^3 comes in contact with the ratchet-wheel n on the governing-shaft n', carrying it one division, and thus the minute tens-wheel d^2, through the spur-wheels o o', one division. At the same time the rocking-lever roller s^2, which rides on the disk p, falls into the recess p', which allows the other roller, s', of the lever s to leave the recess r' in the disk r. Every sixth movement of the minute tens-wheel d^2 the hour-wheel d' is moved one division by one of the arms p^2 on the disk p coming into contact with one of the pins q on the hour-wheel d'. At the same time the roller s^6 on the lever s^7 drops into recess p' on the disk p, and a precisely-similar roller s^6 on the opposite side of the lever s^7 drops out of one of the V-shaped recesses q^2, thus allowing one division, while otherwise the hour-wheel d' is locked in position. The meridian-wheel d^4 is moved in an exactly-similar manner except that it moves only one division in two hours, its disk p having only one arm p^2 and one recess p'.

The time-stamp and its mechanism, described in connection with a clock and suitable casing, can also be used for stamping the time of arrival and delivery of documents and the like onto the same.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In apparatus for checking and recording workmen's time and the like, in combination with the minute wheel of the clock b, the pawl lever b^2 under spring tension, the pawl b^4 thereon, the back pawl b^8, and the pin b^{11} on the pawl lever in the path of a rearward extension on said back pawl and the intermediate lever v^3 of the stamp under influence of spring v^5, substantially as described.

2. In apparatus for checking and recording workmen's time and for other similar purposes, the minute units wheel d^3 having on one side a roller l^3, internal V shaped recesses k, a ratchet wheel k', a lever l having reciprocal motion imparted with a pawl l', roller l^2, and on the other side a disk p having one recess p' in combination with a governing shaft n' carrying a ratchet wheel n, a spur wheel o in gear with a spur wheel o' on the minute tens wheel d^2, a disk p with two recesses p' and two arms p^2, a disk p with one recess p' and one arm p^2 and a locking disk r with twelve recesses r', the pawl l' being adapted to move the minute units wheel d^3 always one division, the roller l^3 to move the ratchet wheel n one tooth at each revolution and carry with it the disks p, p, and spur wheel o, all substantially as set forth.

3. In apparatus for checking and recording workmen's time and for other similar purposes, in combination with the minute units wheel d^3 and lever l the locking lever s^3 having at its free end a roller s^4 adapted to engage the V shaped recesses k and the roller l^2 on the lever l to press on the lever s^3 and to lock it in position until a change in the position of the type wheels of the stamp d is to take place, all substantially as set forth.

4. In apparatus for checking and recording workmen's time and for other similar purposes, in combination with the hour type wheel d', the meridian wheel d^4 and their disks p, p, respectively, the locking levers s^7, s^5, having each two rollers s^6, one being adapted to engage one of the V shaped recesses q^2 and retain the type wheels d' and d^4 in position while riding on the periphery of the disk p and the other to engage the recess p' during the time the roller p^3 of the arm p^2 comes into contact with one of the pins q on the hour type wheel d' and meridian wheel d^4 for the purpose of turning the same, substantially as set forth.

5. In apparatus for checking and recording workmen's time and for other similar purposes, in combination with the minute units wheel d^3 and the governing shaft locking wheel r, a double armed lever s the roller s^2 of one arm being adapted to ride upon the periphery of the minute units wheel disk p, while the roller s' of the other arm engages one of the V-shaped recesses r' of the locking disk r and is allowed to leave the same when the other roller s^2 meets with and falls into the recess p' of the disk p for the purpose of locking the governing shaft n in position at all times except once during the revolution of the minute units type wheel d^3, substantially as set forth.

6. In apparatus for checking and recording workmen's time and for other similar purposes, in combination with a time stamp d, mechanism for automatically reversing an inking ribbon e suitably guided and consisting of the spool e', e', having pins e^2 and fixed upon a shaft e^3 mounted inside a hollow spindle e^4 having at one end a ratchet wheel e^5 and at the other a similar ratchet wheel or disk e^6, each being formed with holes e^7 caused to alternately engage the pins e^2 of the spools e', e', by means of a toggle-joint e^{14} under the influence of a spring e^{15} and connected by means of rods e^{13} to the rocking shaft e^{10} each having a split lever e^{11} through which the inking ribbon e passes, the latter carrying a projection e^{19} which comes into contact with the said split lever when the ribbon is nearly unwound on one side and causes, through the shaft e^{10} and rods e^{13}, the toggle-joint e^{14} to change its position and couple the full spool with the hollow spindle e^4, while the empty one is uncoupled, substantially as set forth.

In witness whereof I have hereunto set my hand in presence of two witnesses.

WILLIAM WHITEHEAD.

Witnesses:
FERD. BOPHARDT,
STANLEY E. BRAMALL.