J. D. NELSON.

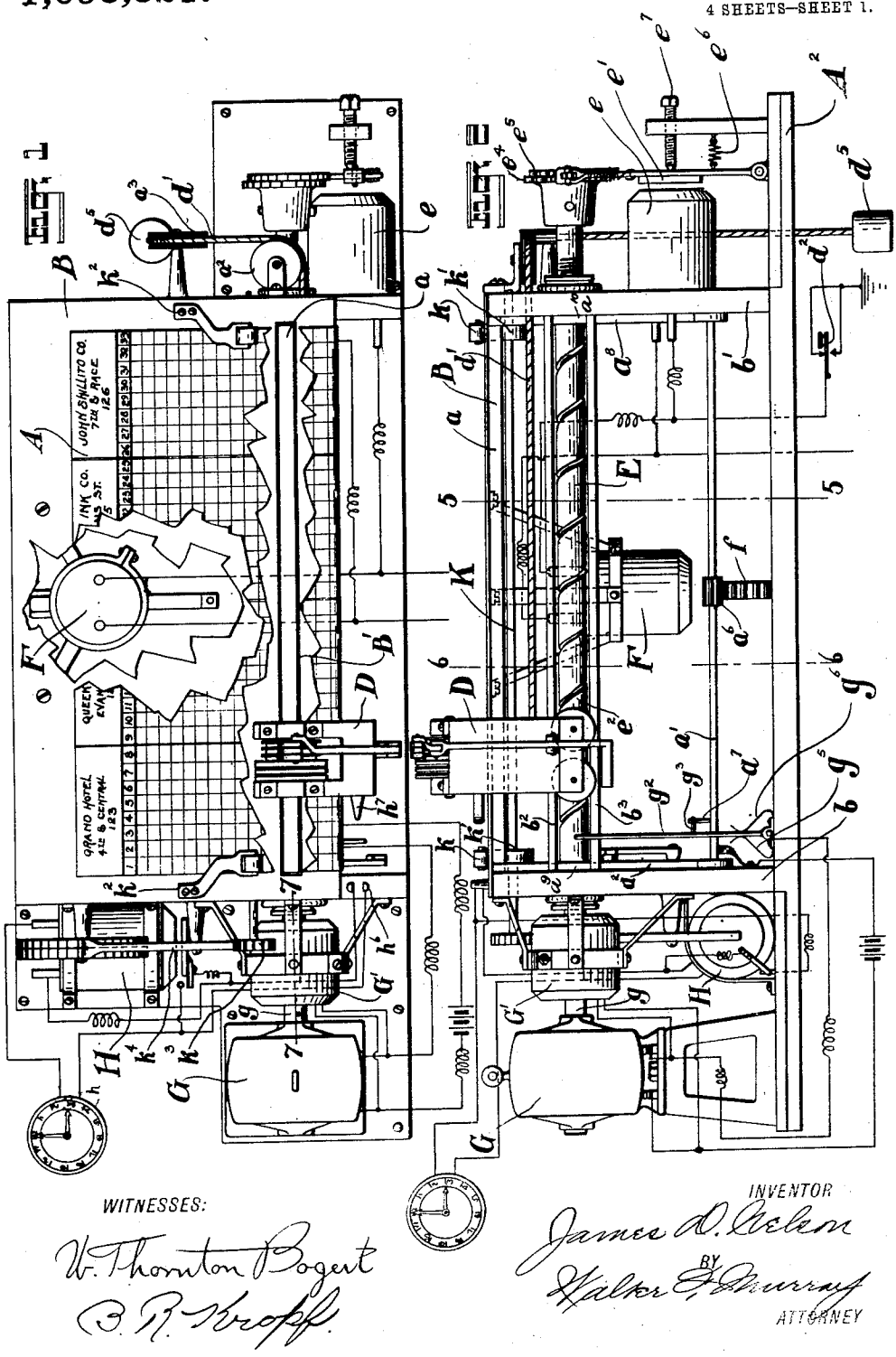
AUTOMATIC RECORDER FOR CALL BOXES AND FIRE ALARMS.

APPLICATION FILED JUNE 25, 1910.

1,098,521.

Patented June 2, 1914.

4 SHEETS—SHEET 1.



WITNESSES:

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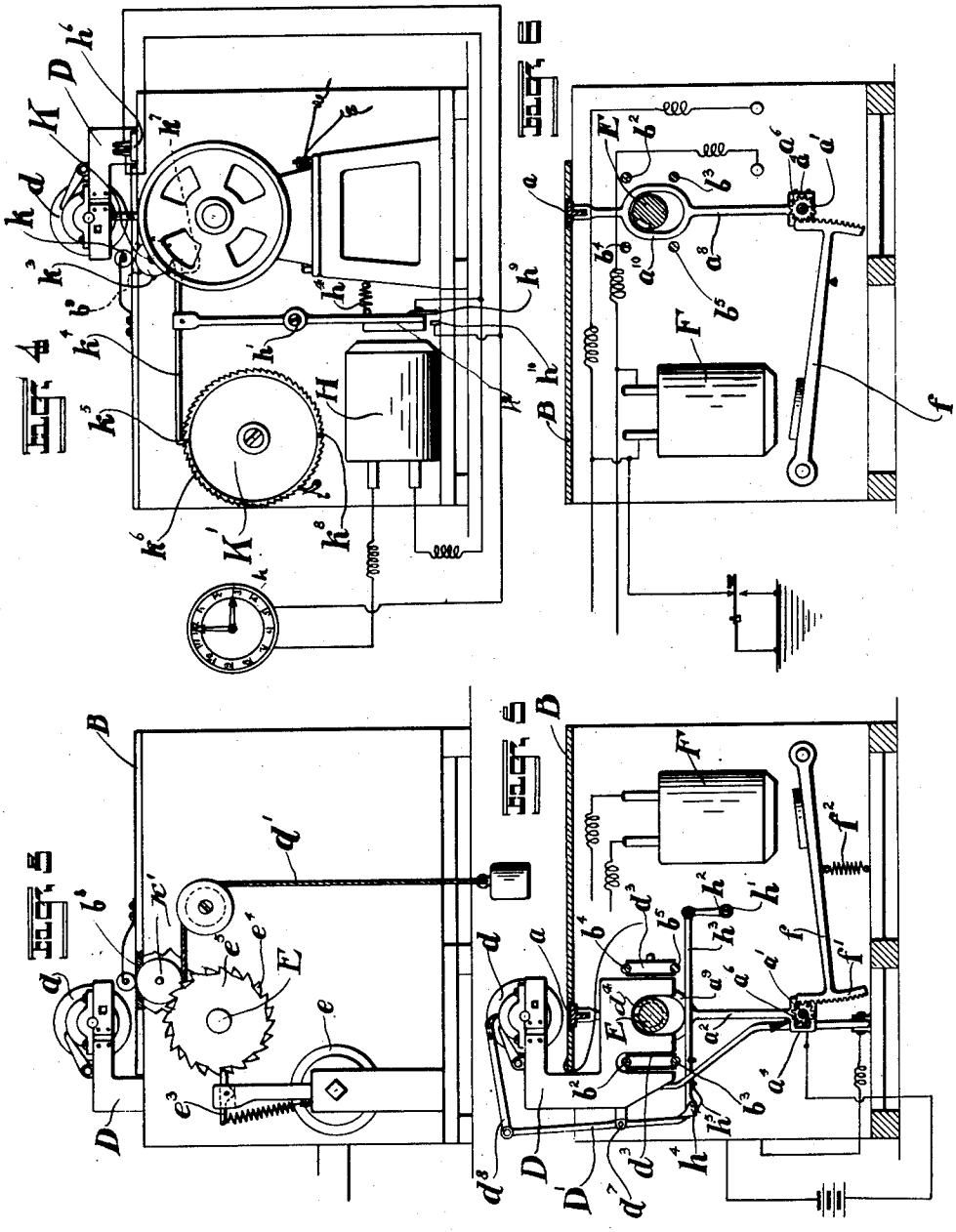
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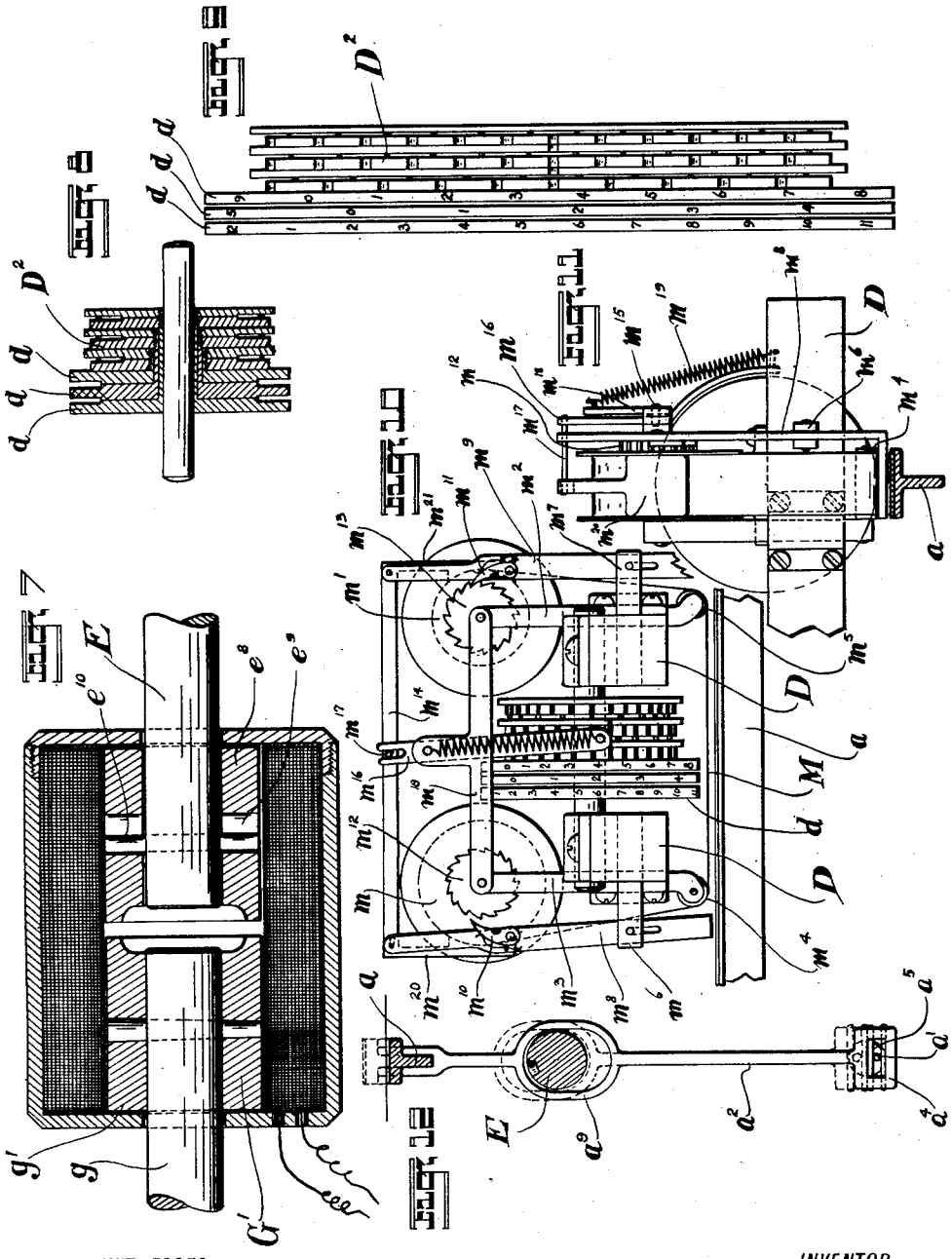
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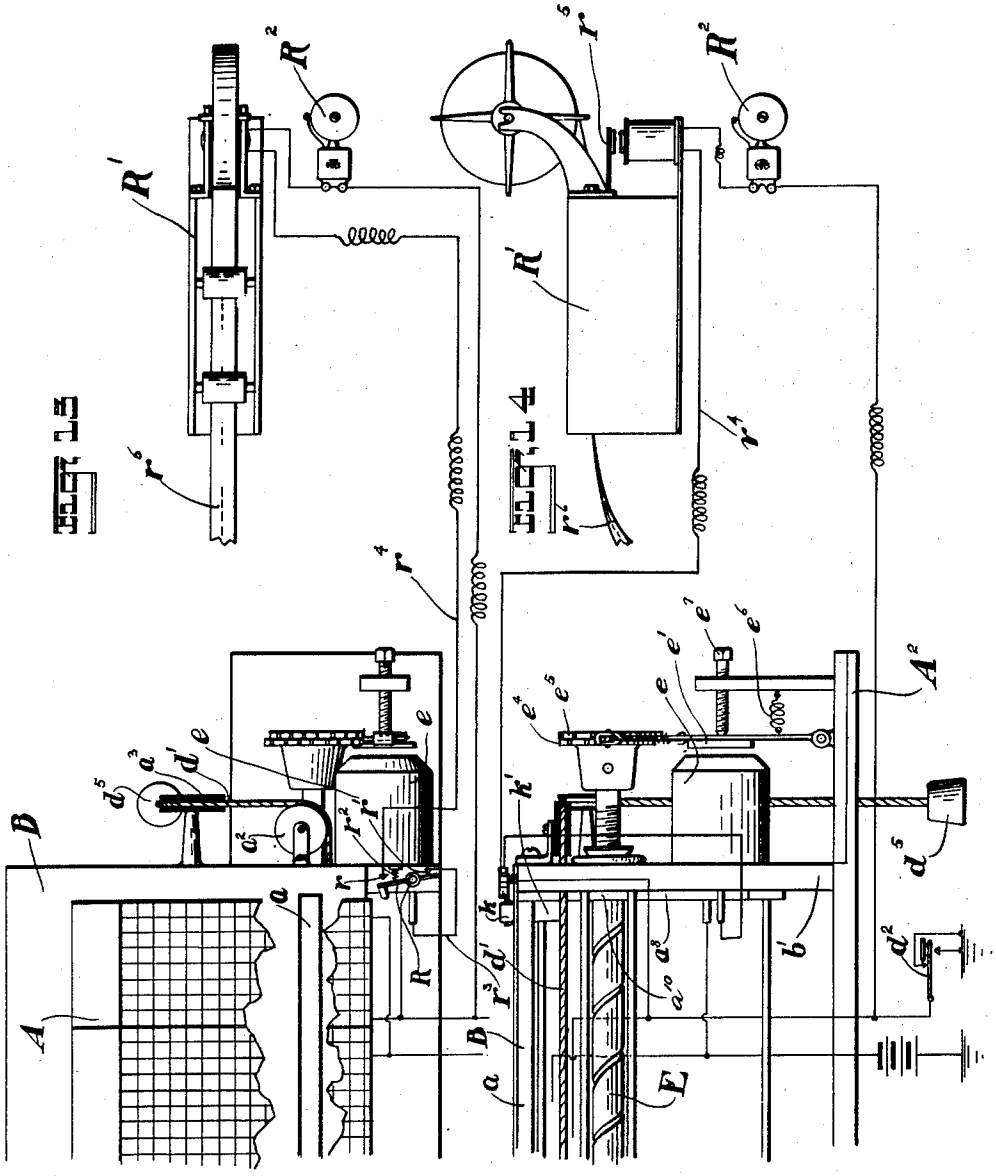
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UNITED STATES PATENT OFFICE.

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AUTOMATIC RECORDER FOR CALL-BOXES AND FIRE-ALARMS.

1,098,521. Specification of Letters Patent. Patented June 2, 1914.

Application filed June 25, 1910. Serial No. 568,793.

To all whom it may concern:

Be it known that I, JAMES D. NELSON, a citizen of the United States of America, and resident of Cincinnati, county of Hamilton, State of Ohio, have invented certain new and useful Improvements in Automatic Recorders for Call-Boxes and Fire-Alarms, of which the following is a specification.

Heretofore it has been customary to have at the office, employees, whose duty it was to note the time of day at which each message was received, and to note the character of the message, and to mark the data upon a recording sheet.

The object of my invention is a device which will automatically and accurately mark upon a record sheet the time at which, and the box from which, a call is sent.

A further object is to provide means for automatically recording fire alarms. This object is attained by the means described in the specification, and illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of a recorder embodying my invention, the record sheet being shown broken out, to disclose underlying parts of the mechanism. Fig. 2 is a side elevation of the same. In Figs. 1 and 2 the device is shown as arranged for recording call box signals only. Fig. 3 is an end view taken from the right hand end of the device, as shown in Fig. 2. Fig. 4 is a view taken from the opposite end from Fig. 3. Fig. 5 is a sectional view taken upon line 5—5 of Fig. 2, looking toward the left. Fig. 6 is a sectional view taken upon line 6—6, looking toward the right of Fig. 2. Fig. 7 is an enlarged detail view taken upon line 7—7 of Fig. 1. Fig. 8 is a central sectional detail view of the printing mechanism. Fig. 9 is an enlarged elevation of the printing mechanism. Fig. 10 is a detail view of the time mechanism for moving the printing mechanism and its ribbon feed. Fig. 11 is an end view of the part shown in Fig. 10. Fig. 12 is a detail view of one of the arms for raising the platen which carries the paper against the printing cylinders. Fig. 13 and Fig. 14 are detail views of the right hand of the machine shown in Figs. 1 and 2, but provided with the fire alarm recording attachment.

I will give first a general description of the entire mechanism, without the fire alarm feature, then will describe the parts in detail, and will then describe the fire alarm mechanism.

The record sheet A rests upon a table B, above which a carriage D, which carries a synchronized printing mechanism d is reciprocally mounted. A normal pressure is exerted upon the carriage, tending to draw it toward the right, by means of a weighted cable d'. The carriage is held against reciprocation by means of a shaft E. The rotation of the shaft E permits the carriage to be moved step by step by the weight. A step by step rotation of the shaft E is effected by means of an electromagnet e, whose armature e' alternately releases and locks the shaft E, when the current is alternately broken and made by the operator's moving a key d^2 which is of the double contact type, the key normally bearing against one of the contacts, to keep the circuit closed, when it is not in use. The key is given a number of depressions, corresponding to the number of the box to be recorded, the operation bringing the carriage D opposite the point on the recording sheet, which indicates the box from which the call is being sent. The key is now released, the circuit thereby being closed and the platen a is raised by the armature f of a slow magnet F, which is in parallel with the faster magnet e. The armature f rotates the shaft a' of the platen, so as to cause the platen to be raised, to carry the recording sheet into contact with the printing mechanism. At the end of its said rotation, the shaft a' closes a switch in a circuit leading to motor G, which then rotates the shaft E, to return the carriage to its normal position at the left hand end of the table, to place it in position for being actuated by the next call. The printing mechanism is synchronized by a magnet H, whose armature is in circuit with an electric timing mechanism h. The magnet H likewise actuates the recording sheet periodically to move it, so as to present a clean surface to the printing mechanism. The elevation of the platen a likewise effects the feed of typewriter ribbon M, so as to present a fresh part thereof to the printing disks d.

I will describe now in detail the table, the

carriage, the means of mounting the carriage on the table, the platen, and the means of mounting it upon the table.

The table B is mounted between vertical end boards, b, b'.

Carriage D, as seen in Fig. 5, straddles the forward edge of the table top. The part of the carriage above the table supports the printing mechanism d, and the part of the carriage beneath the table top is provided with four wheels d^3, which engage horizontal longitudinal rods b^2 b^3 b^4 b^5, which are supported between the ends b b', and upon which the carriage D is reciprocated. Between the ends b b', shaft E is journaled and passes through a recess in the lower part of the carriage, which has a downwardly projecting pin d^4, which engages a spiral groove e^2, which is formed in the periphery of the shaft E, so that the carriage D can reciprocate upon the table only when the shaft E is free to rotate. Cable d', which carries the weight d^5 for normally drawing the table toward the right, passes over sheaves a^2 a^3, which are mounted upon the end b' of the table. The impression disks d of the printing mechanism are journaled in the carriage, and are connected to an electric timing mechanism, so that the numerals indicating the hour and minutes are successively brought into the printing position, above the platen a, by a means hereafter described.

The platen a is mounted in alinement with a slot B′ in the table top, and is supported at its ends upon vertical rods a^2 a^8, which have elliptical yokes a^9 and a^{10} to surround the shaft E, and at their lower ends have rings a^4, which engage cams a^5, which are secured upon the ends of the shaft a', which is journaled between the ends b b' of the table, so that the rotation of the shaft a' causes the cams a^5 to impart a vertical reciprocation to the rods a^2, to raise and lower the platen a, to carry the recording sheet A toward and from the printing disks d.

I will now describe the means whereby the man at the call box moves the carriage in the recording office to the point of the recording sheet, which indicates the box from which he is sending the message, and will then describe the means whereby this same movement of the man actuates the printing mechanism.

The movement of the carriage D is regulated by the rotation of the shaft E. The rotation of the shaft E is governed by the movement of the armature e' of the magnet e. Armature e' is swiveled at its lower end to the base A^2 and at its upper end has a pin e^3, which engages the staggered teeth of pinions e^4 e^5, which are secured upon the end of shaft E in a position such that when the armature is in contact with the magnet, pin e^3 is in alinement with pinions e^4, and when the armature is released from its magnet, pin e^3 is in alinement with pinion e^5. In the normal position of the key d^2, the circuit through the magnet e is complete and the armature will be held to the energized magnet. When the key d^2 is opened, the deënergized magnet allows the spring e^6 to draw the armature e' into contact with the stop pin e^7. Magnet e is made of rapid action, so that it follows every movement of the key d^2, therefore a certain number of the movements of the key d^2 will effect the same number of step by step movements of the shaft E, and will therefore permit a certain movement of the carriage D, so as to bring its printing cylinders to register with a certain part of the recording sheet.

The shaft a' is actuated to effect the movement of the platen, by the slow magnet F, in the following manner: Armature f of magnet F has at its free end a segment f' of a gear wheel, whose teeth engage pinion a^6, which is secured upon the shaft a'. Magnet F is in parallel on the same electric circuit which leads to the magnet e, so that when the key d^2 is in its normal position, magnet F is energized and holds the armature f in its uppermost position, and when the key d^2 opens the circuit, the spring f^2 carries the armature f to its lowermost position. The magnet F is made of so slow an action, that it does not become energized by the rapid closing of the circuit effected during the movement of the key d^2, but is energized only after the key comes to rest, after the sending of the message, thus the energized magnet raises the armature to its uppermost position, in which the cams a^5 are in a position intermediate between the highest and lowest position of the cams, so as to hold the platen a out of contact with the recording sheet. The uppermost position of the cams is reached during the upward movement of the armature, and passed before the armature has reached its uppermost position. The platen, therefore, is brought into contact with the recording sheet, so as to press it against the printing cylinder, before the armature has reached its uppermost position and drops back from this uppermost position, to permit the carriage being returned to its normal position, without the printed characters being blurred upon the sheet.

I will now describe the means for returning the carriage D to its normal position at the left hand side of the table. This movement is effected by a reverse rotation of the shaft E, which is effected by motor G, whose shaft g, has its end journaled in a solenoid magnet G′, together with the end of the shaft E, as illustrated in Fig. 7. The shaft g has, within the casing of the magnet, an iron block g', and the shaft E has adjacent

thereto a block e^8, which has a slight reciprocation upon the end of the shaft E, by reason of the elongated hole e^9 for the pin e^{10} of the shaft E. Motor G and the solenoid magnet G′ are in an electric circuit, in which is located a switch, consisting of a rod g^2, which is swiveled upon the base A^2, and a pin g^3, which stands in the path of a pin a^7 upon the shaft a'. Just before the armature f reaches its uppermost position, it brings shaft a' to a position such as to cause the pin a^7 to contact with the pin g^3, and to complete the circuit through the motor G and the solenoid magnet G′, for the reason that one end of the wires lead to the shaft a', and the other end thereof lead to the rod g^2. The circuit being completed, the current flows through the motor G and the solenoid magnet G′, thereby energizing both, and causing the shaft g and E to be frictionally united by the solenoid magnet, and causing the motor G to rotate the shaft E, and to return the carriage D to its normal position. Carriage D just before it reaches its normal position contacts with rod g^2 and carries pin g^3 out of the path of pin g^7, against the pressure of springs g^5 and g^6.

I will now describe the means of synchronizing the printing mechanism and for periodically moving the record sheet. Magnet H has an armature h^a, which is pivoted upon an arm h', which is mounted rotatably in the end b of the frame. The arm h' has secured upon its inner end an arm h^2, which is pivoted in turn to a push rod h^3, upon whose end is pivoted a pawl h^4, which is held normally in an upward position, by means of a spring h^5 (see Fig. 5). The pawl h^4 stands in the path of a lever D′, which is pivoted at d^7. At the upper end of the lever D′ is pivoted an arm d^8, whose end is adapted to engage the ratchet wheels D^2 of the printing mechanism, and to advance them periodically, in a manner well known in cash registers, street car registers, etc., and, therefore, no specific description of the manner of engaging the arm d^8 with the printing wheels need be given.

Magnet H is in a normally closed circuit, so that the armature h is held normally in contact with the magnet. The circuit is broken by a timing mechanism periodically, for instance, every minute, which causes the armature to be drawn out of contact with the magnet by spring h^{11}. This retracts arm d^8, so as to draw it back over a ratchet wheel, and when the armature is again drawn to its magnet by the closing mechanism, the arm d^8 is carried forward, so as to feed the printing mechanism forward one minute. It is seen that the printing mechanism is in connection with the synchronizing mechanism, only when the carriage is at the left hand end of its travel, so that provision must be made to have the printing mechanism advanced, after it has made a trip away from its normal position, should the time mechanism have been actuated while the carriage was out of its normal position. This end is attained by having a means of breaking the circuit to the magnet H, should the time mechanism operate while the carriage is carried from its normal position, and to have it closed as soon as the carriage is returned to its normal position, so that the movement of the carriage from the normal to its printing position, and its return to the normal, causes the arm d^8 to execute one reciprocation for feeding the timing mechanism forward one step. The means of breaking the circuit when the carriage moves away from its normal position, consists of a switch h^6, which is placed in the circuit leading to the magnet H. This switch h^6 is placed upon the table, adjacent to the normal position of the carriage D, which has a plug h^7, which is adapted to pass between the contact points of the switch h^6 and to close the switch, when the carriage is in its normal position. Armature h^a has a contact point h^9, which in the closed position of the armature, contacts with the contact piece h^{10}. Contact points h^9 and h^{10} are connected with opposite wires of the circuit, leading to magnet H. Thus, when carriage D draws plug h^7 out of switch h^6, the circuit remains closed through contact points h^9 h^{10}, until it is broken by the timing mechanism. Then armature h^a being retracted by spring h^{11}, the circuit remains open until carriage D carries plug h^7 into the switch h^6. Then the circuit being closed armature h^a is drawn to the magnet and moves the arm d^8 and advances the timing mechanism. Thus should the timing mechanism operate during the abnormal positions of the carriage, the movement of the armature, which effects the forward feed of the printing disks, is suspended until the return of the carriage to its normal position, in which it is in connection with the timing mechanism. Since most trips of the carriage are accomplished in a minute or less, the printing disks keep practically correct time.

The recording sheet is moved forward periodically, for instance, every half hour, by the armature h, through the following mechanism:—The table top B has slots b^8 b^9 (see Figs. 3 and 4) at its ends, above and below which are mounted rollers k k', (see Fig. 2) which bear upon the paper. The two rollers k are mounted at the outer end of spring arms k^2, and perform the function simply of holding the paper in contact with the actuating rollers k', which are mounted upon an actuating shaft K, which is journaled in the end standards b b' of the table, and which carries upon its outer end a pin-

ion k^8, which engages an arm k^4, which is secured upon the upper end of the armature h. The arm k^4 has at one end a downwardly projecting detent k^5, which engages teeth k^6 upon a wheel K'. The teeth k^6 are made of a depth such that the end k^5 of the arm is upheld, so as to keep the opposite end k^7 normally out of contact with the pinion k^3, but at intervals, upon the periphery of the wheel K', there are deep notches k^8, which are made of a depth such that when the detent k^5 drops into the notch, it permits the end k^7 to be brought into contact with the teeth of the pinion k^3. In operation, each reciprocation of the armature causes the wheel K' to be advanced one step, so that if the armature be reciprocated every minute, and there be thirty teeth k^6 between the notches k^8, the arm k^4 will be brought into contact with the pinion k^3 every thirty minutes, so as to cause a rotation of the shaft K and feeding forward of the sheet A, one step every thirty minutes.

For printing the numerals upon the record sheet, the printing disks d are supplied with a ribbon M (see Figs. 10 and 11), which is mounted upon rolls m m', which in turn are journaled upon standards m^2 m^3, which are secured to the carriage D and carry at their lower ends rolls m^4 m^5, over which the ribbon is fed from one roll m to the other m'.

The means for effecting an automatic feed of the ribbon are as follows:—The carriage D has outwardly projecting arms m^6 m^7, upon which are mounted sliding arms m^8 m^9, which carry pawls m^{10} m^{11}, which are adapted to engage ratchet wheels m^{12} m^{13}, which are secured upon the ends of the shafts of the rolls m m'. The upper ends of the arms m^8 m^9 are connected by a rod m^{14}, which is pivoted to said arms and has downturned ends m^{20} m^{21}, which stand adjacent to the rolls m m'. Pivoted at m^{15} (see Fig. 11) is a retracting arm m^{16}, which is slotted at its upper end to straddle a pin m^{17}, upon the arm m^{14}. The standards m^2 m^3 are connected by a cross-rod m^{18}, between the upper end of which and the lower end of the arm m^{17} is a spring m^{19}.

In operation, the raising of the platen a causes it to engage the ends of the arms m^8 m^9, thereby raising them and causing the one of the pawls m^{10} m^{11}, which happens to be in engagement with its ratchet wheel m^{12} m^{13}, to rotate its roll and to thereby feed the ribbon onto it. When one of the rolls m m' become filled with the ribbon, this causes the roll to contact one of the arms m^{20} or m^{21} to carry the arm m^{14} toward the side of the full roll, slowly, until the arm m^{16} has passed the central position, at which time the spring m^{19} will draw the arm m^{16} rapidly to its extreme position upon the side of the filled roll, thereby shifting the pawl, which has just been in engagement with its ratchet, out of engagement therewith, and carrying the opposite pawl into engagement with its ratchet, so that upon the succeeding elevations of the platen a, the opposite roll will be rotated, thereby feeding the ribbon onto that roll, until it has been filled so as to shift the arm m^{14} to disengage the ratchet from said roll.

I will now describe the attchment for recording fire alarms, sent from a combined call and fire alarm box: I accomplish this by having the fire alarm consist of a number of strokes greater than the number of strokes for any of the call boxes on the circuit, and having a switch on the recorder which is struck by the carriage D, after it is past the recording sheet, to put the fire alarm recorder into circuit. The number of strokes given for a fire alarm is greater than the number given for any call box, because, were this not the case, a fire alarm would be sent each time the box bearing the greatest number was recorded. This switch and the electric circuits for the fire alarm recorder are illustrated in Figs. 13 and 14.

Adjacent to magnet e, I mount a switch R and two contact points r r'. The switch R is held by a spring r^2 normally in contact with the contact point r', which is connected by wire r^3 with the magnet e. The contact point r is connected by wire r^4 with an electrical tape register R', which may be of any well known form, such as the Gamewell or the Greeley registers, and an alarm bell R^2. When the carriage contacts with the switch R, it carries the switch into contact with the contact point r, thereby sending the current through the fire alarm register, both to indicate the fire alarm message upon the tape r^6, by operation of the needle bearing armature r^5, and to cause the bell R^2 to ring to send in the audible alarm. After the fire alarm has been given, the closing of the key d^2 permits the slow magnet F to raise the armature f' to rotate shaft a', to close the switch a^7 g^3, and to complete the circuit to the motor G, thereupon to rotate the shaft E and return the carriage D to its normal position.

What I claim is:—

1. In a recorder for call boxes, the combination of a support for a record sheet, a carriage, ways adjacent to the support adapted to guide the carriage over the support, printing mechanism mounted upon the carriage and adapted to print upon a record sheet that is carried by the support, a timing mechanism means for synchronizing the printing mechanism with the timing mechanism, a call box, and means for reciprocating the carriage and adapted to be actuated from the call box.

2. In a recorder for call boxes, the combination of a support for a record sheet, a carriage, ways adjacent to the support adapted to guide the carriage over the support, printing mechanism mounted upon the carriage and adapted to print upon a record sheet that is carried by the support, a timing mechanism means for synchronizing the printing mechanism out of operative engagenism, means for automatically feeding the record sheet across the support, a call box and means for reciprocating the carriage, said means being adapted to be actuated from the call box.

3. A recorder for call boxes comprising, a record sheet supporting table, a carriage mounted to move along the table, printing mechanism mounted on the carriage, a time clock for actuating the printing mechanism, means for moving the carriage to a recording position and for thereby moving the printing mechanism out of operative engagement with the time clock, and means for returning the carriage to its normal position after a record has been made.

4. In a recorder for call boxes, the combination of a time printing mechanism, means for feeding said mechanism from a normal position to a printing position, a platen adapted to carry a record sheet into contact with the printing mechanism, and a means for returning the printing mechanism to its normal position and adapted to be actuated by the movement of the platen.

5. In a recorder for call boxes, the combination of a table adapted to support a record sheet, a carriage adapted to be reciprocated across the table, a printing mechanism mounted upon the carriage, means for moving the carriage from a non-printing position to a printing position, a quick acting magnet adapted to actuate the carriage moving means in a step by step movement, a platen mounted adjacent to the table and adapted to carry the record sheet into contact with the printing mechanism, and a slow acting magnet adapted to actuate the platen and mounted in circuit with the quick acting magnet.

6. In a recorder for call boxes, the combination of a table adapted to support a record sheet, printing mechanism adapted to be reciprocated across the table, a platen mounted adjacent to the table, arms supporting the platen, a shaft engaging the arms and adapted when rotated to raise the arms to carry the platen to the printing position, a motor adapted to return the carriage to its normal non-printing position, a switch adapted to close the circuit to the motor, and means for actuating the switch by the rotation of the shaft which actuates the platen.

7. In a recorder for call boxes, the combination of a carriage, printing disks mounted on the carriage, means for moving the carriage from a normal non-printing position to a printing position and back to the normal position, a clock mechanism, electric means controlled thereby for actuating the printing disks in synchronism therewith, a plug located upon the carriage for opening the actuating circuit of the electric means, when the carriage is moved to the printing position, and for closing the circuit when the carriage is moved to the normal position.

8. In a recorder for call boxes, the combination of a carriage adapted to be moved from a normal non-printing position to a printing position and back to the normal position, a time printing mechanism on the carriage, a magnet located in a normally closed circuit, means for periodically breaking the circuit, means for carrying the armature out of contact with the magnet when the circuit is broken, means for connecting the armature with the printing mechanism, a contact point adapted to be contacted by the armature in its closed position, said contact point and the armature being shunted on the closed circuit, a switch in the closed circuit adjacent the carriage, and a plug carried by the carriage and adapted to close the switch in the normal position of the carriage, and to open it when the carriage is moved from the normal position.

9. In a recorder for call boxes, a carriage having relatively movable type located thereon, a support for a record strip across which said carriage is movable, means for moving the carriage laterally across the support to different positions relatively of the strip, located on the support, a clock mechanism, means controlled thereby for setting the type and means actuated by the carriage for rendering the type setting means inoperative during the lateral motion of the carriage and for causing the type setting means to complete an operation, instituted by the clock mechanism during the lateral motion of the carriage, after the carriage has returned to the normal position.

10. In a recorder for call boxes, a carriage, type wheels for indicating the time mounted thereon, a support for a recording sheet across which the carriage is movable, a clock mechanism, means actuated by the clock mechanism for moving the type wheels synchronously with the clock mechanism, means for moving the carriage laterally across the support and for rendering the wheel moving means inoperative, and means controlled by the carriage for actuating the wheel moving means to synchronize the wheels with the clock mechanism.

11. A recorder for call boxes comprising, a support for a record sheet, a carriage movable across the support, time indicating

type wheels mounted on the carriage, means for moving the carriage to different positions across the support, a clock mechanism, wheel setting means controlled by the clock mechanism for actuating the type wheels, means for rendering the wheel setting means inoperative during the motion of the carriage, and for synchronizing the type wheels with the clock mechanism after the carriage has returned to the normal position, and means for causing the type wheels to make a record on a sheet located on the support.

JAMES D. NELSON.

Witnesses:
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C. H. BARTH.