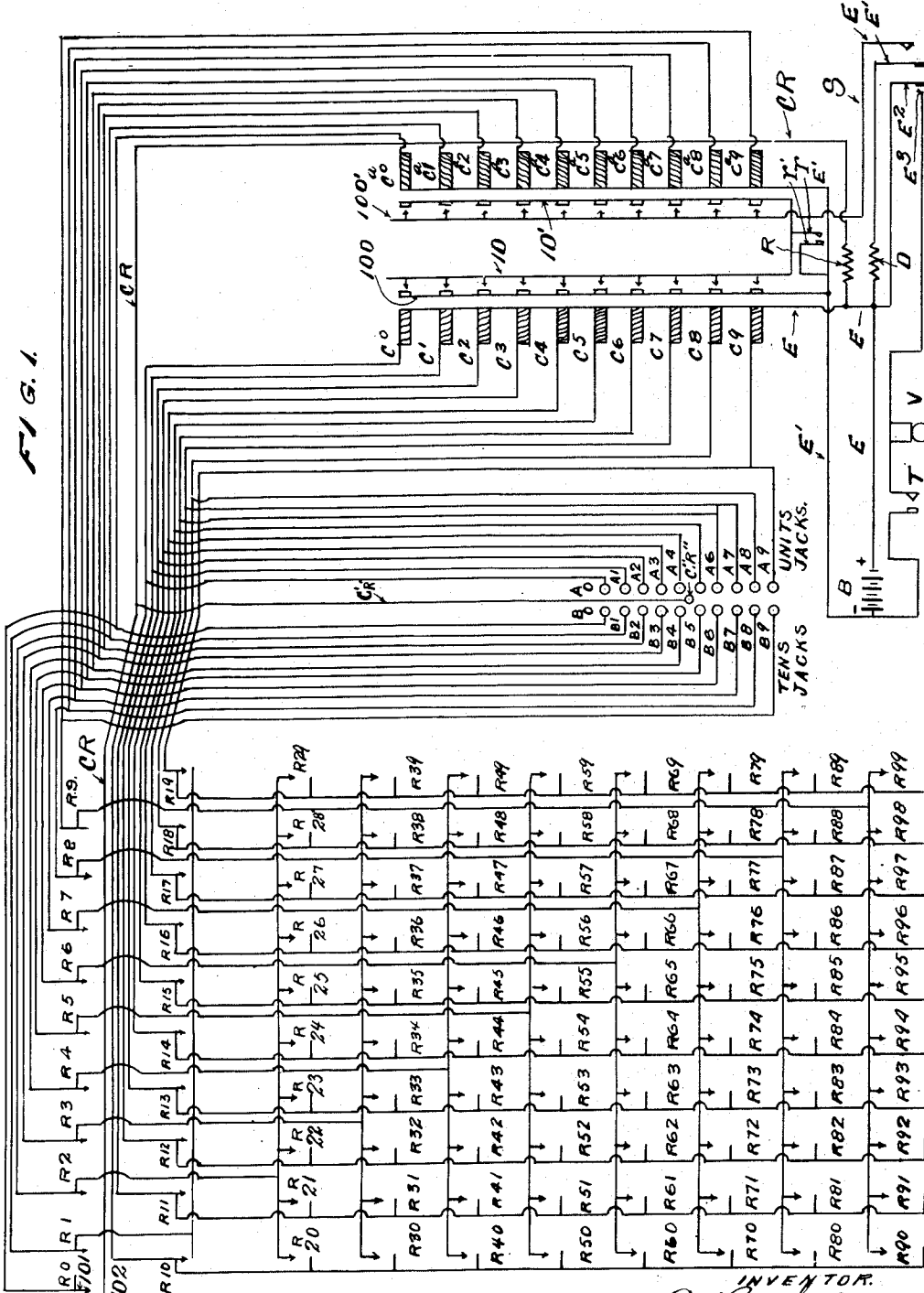


988,218.

Patented Mar. 28, 1911.

3 SHEETS-SHEET 1.



WITNESSES.

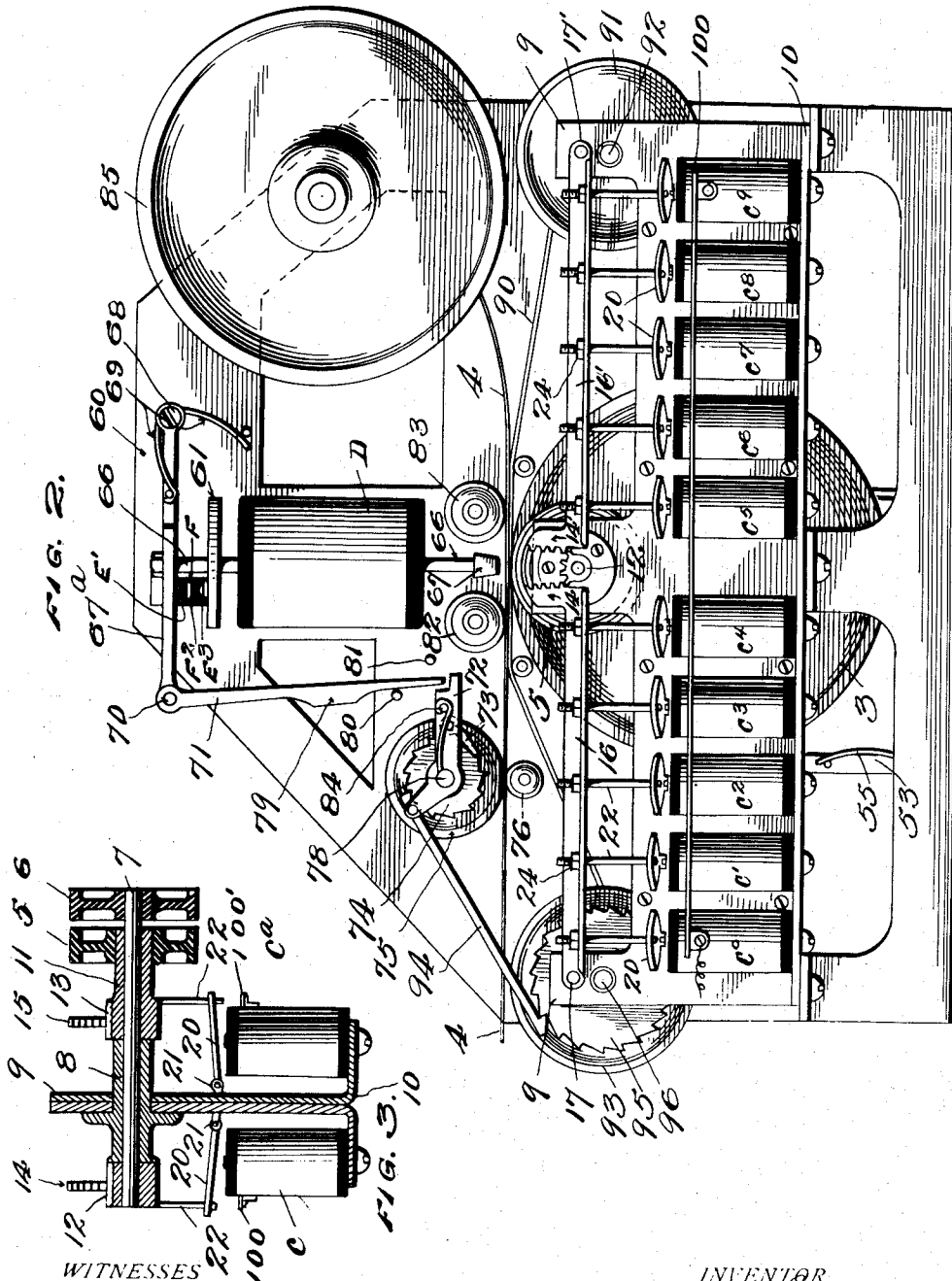
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988,218.

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3 SHEETS-SHEET 2.



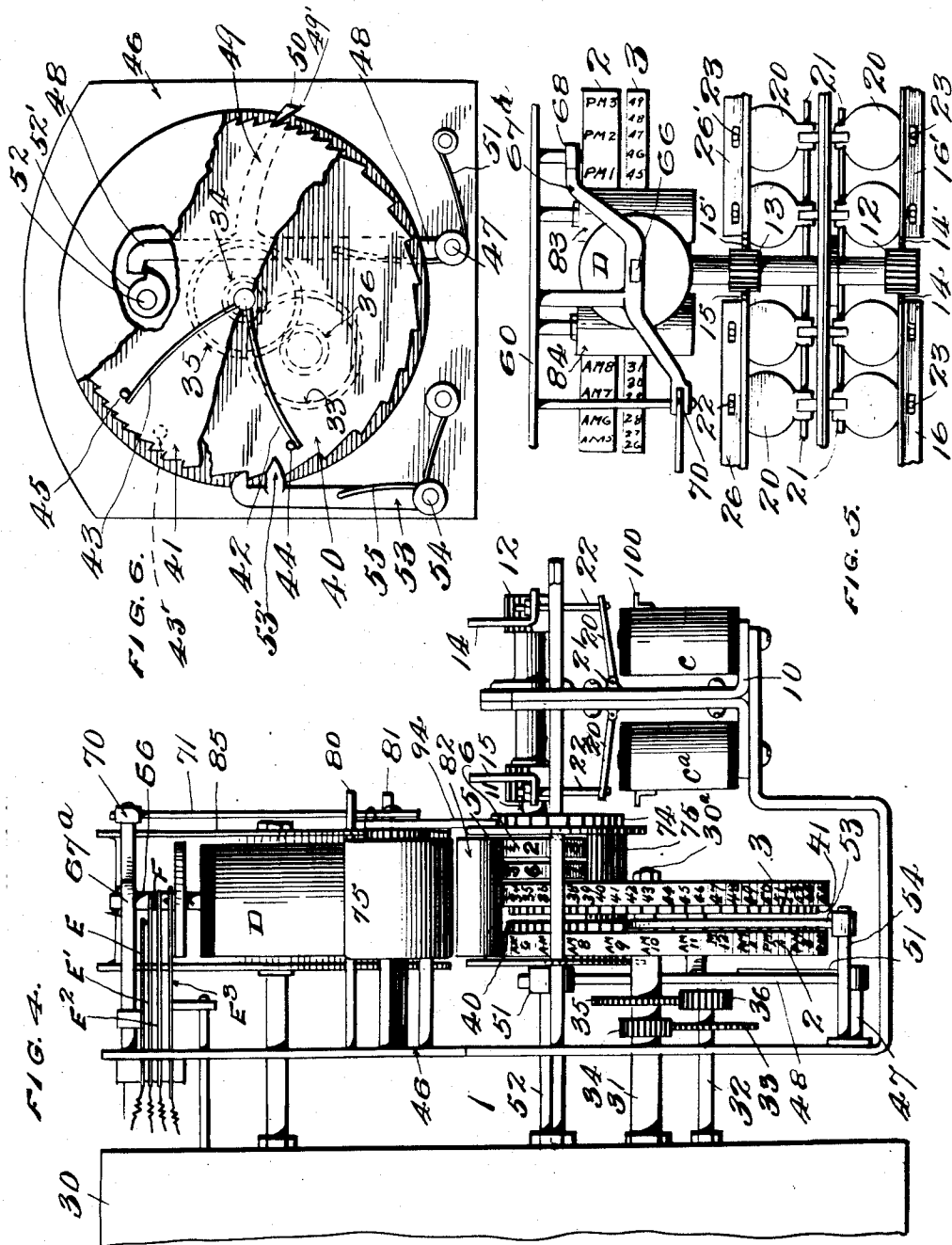
WITNESSES
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3 SHEETS-SHEET 3.



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UNITED STATES PATENT OFFICE.

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ELECTRICAL SIGNAL-RECORDING SYSTEM.

988,218.

Specification of Letters Patent.

Patented Mar. 28, 1911.

Application filed May 20, 1908, Serial No. 433,941. Renewed February 23, 1910. Serial No. 545,498.

To all whom it may concern:

Be it known that I, ALFRED L. SOHM, a citizen of the United States, residing at Whittier, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Electrical Signal-Recording Systems, of which the following is a specification.

This invention relates to electric recording apparatus and has particular reference to an electric system adapted for recording the time of arrival and departure of employees, checking the movements of watchmen, and for transmitting and recording fire and burglar alarms or other signals where the time of the signal is to be recorded.

An important object of my invention is to provide a system of the character specified which will be more reliable and durable than apparatus at present in use for the same purpose.

Another object of the invention is to simplify the construction and very greatly lessen the cost of manufacture of apparatus of this character.

A further object of the invention is to produce an electric time recording system which will occupy much less space and require far less wire for its installation than any system of the character specified heretofore used.

Other objects and advantages of my invention will be apparent from the following specification in which reference is made to the accompanying drawing.

Figure 1 is a diagrammatic view of my system showing the arrangement and wiring of the various parts employed. Fig. 2 is a front elevation of my recording mechanism. Fig. 3 is a detail cross section through the shafts carrying the station number stamping rolls, Fig. 4 is a side elevation of my recording mechanism, Fig. 5 is a detail plan view of time and station stamping rolls with parts of the operating mechanism therefor and Fig. 6 is a detail side elevation, with parts broken away, of a portion of the actuating mechanism for the time stamping rolls.

For purposes of illustration I have shown my invention as embodied in a combined fire alarm and employees' time clock recording system.

My invention comprises numbered signal sending means which may be, for example, two wire push buttons, manually or automatically operated, fire or burglar alarm signal apparatus, watchman's stations or switches or jacks to be operated by employees, combined with signal receiving and recording means adapted to automatically register the time of signals and the number of the signal stations or signal sending means from which signals are sent.

The signal receiving and recording means hereinafter referred to as the recording apparatus consists of spring driven clock work mechanism 1 designed to rotate hour and minute stamping rolls 2 and 3 which are employed to print upon a mechanically propelled tape the hour and minute a. m. or p. m. at which a signal is sent. The recording apparatus also comprises a plurality of number-carrying stamping rolls operated by suitable coils C and C^a, to print upon the tape the number of each station from which a signal is sent. For purposes of illustration I have shown two such stamping rolls, 5 designating the tens and 6 the units rolls. The movement of each stamping roll is controlled by a separate series of actuating coils C and C^a as indicated in Fig. 3. It is obvious that three or more number stamping rolls may be employed by the addition of a corresponding number of additional series of coils C.

The rolls 5 and 6 are formed of rubber and are mounted upon separate shafts. The units roll 6 is carried by a shaft 7 mounted within bearings 8 supported by an upstanding portion 9 of the frame 10 upon which the coils C and C^a are secured. The tens roll 5 is mounted upon a hollow shaft 11 which is rotatable upon the shaft 7. The shaft 8 carries a mutilated pinion 12 and the shaft 11 carries a mutilated pinion 13, said pinions being respectively in engagement with curved racks 14, 14' and 15, 15' as clearly illustrated in Figs. 2 and 5. The racks 14 and 14' are carried at the free end of rods or bars 16 and 16' (Fig. 2) pivoted at 17 and 17' adjacent the outer ends of the upstanding portion 9 of the frame 10, said ends being bent outward to bring rods or bars 16, 16' into alinement with mutilated gear 12 as indicated in Fig. 2. It will be obvious from an examination of Fig. 2 that depressing the free end of rod 16 will cause a partial revo-

lution of stamping roll 6 in one direction and that a similar depression of rod or bar 16' will cause a partial revolution of said stamping roll in the opposite direction.

5 I have shown in Fig. 2 ten coils, C⁰, C¹, C², C³, C⁴, C⁵, C⁶, C⁷, C⁸ and C⁹ which control the operation of the units printing wheel. Each of these coils is provided with an armature 20 pivoted to brackets 21 carried by the up-right portion 9 of the frame 10 and each armature is pivoted or otherwise flexibly secured at its free end to a vertical rod 22 extending loosely through an opening 23 in the horizontal portion of the rods or bars 16, 16'. Each rod 22 is screw-threaded at its upper end and provided with a nut 24. It will thus be seen that when any one of the coils C is energized its armature will be attracted and will pull down the 20 pivoted rod 16 or 16' with which it is connected a distance which will depend upon the position of the coil. Thus in Fig. 2 coil C⁰ would cause a depression of rod 16, and the subsequent rotation of stamping roll 6 25 to a much greater extent than coil C⁴. The parts are so arranged that upon energizing coils C⁰ it will cause a rotation of the units dial to such an extent as to bring the digit 0 into its uppermost position and similarly energizing any other coil illustrated in Fig. 30 2 will bring the number with which the said coil corresponds into the uppermost position.

The tens stamping dial is operated by a 35 similar movement of rods 26, 26' actuated by similarly numbered coils C¹ so that energizing units coils C¹ and tens coil C¹² will bring tens figure 2 and units figure 1 uppermost on rolls 5 and 6, in a position to imprint the number 21 upon the tape 4. Units coil C¹, it may be here explained, is connected with one side of all of the signal sending means, stations or jacks whose units figure is 1 and tens coil C¹² is similarly connected with the other 45 side of all of the signal sending means whose tens figure is 2. Similarly each units coil is connected with all of the stations having a corresponding units number and each tens coil with all stations having the same tens number. This connection of stations and 50 coils is clearly shown in Fig. 1 of the drawing and will be hereinafter more fully explained in connection with the operation of the recording apparatus.

55 In order that the time in hours and minutes may be recorded on the tape 4 adjacent the imprint of the number of the station from which a signal is sent I provide the hour and minute stamping rolls 2 and 3 adjacent rolls 5 and 6 and operate said time stamping rolls by means of a clock spring and separate hour and minute hand shafts 60 which may be connected in any approved manner to cause the minute shaft to revolve 65 twenty-four times to every revolution of the

hour hand shaft. This mechanism which forms no part of my present improvement is contained within a case 30.

The hour shaft 31 is rotatably mounted upon the minute hand shaft 30^a and is 70 caused to make a complete revolution every twenty-four hours by the rotation of a shaft 32 which transmits its motion to shaft 31 by means of gears and pinions 33, 34, 35 and 36 (Fig. 4). The hour shaft carries the stamp- 75 ing roll 2 at its free end upon the stamping roll 2 is formed two sets of numbers from 1 to 12 one set having the letters a. m. adjacent thereto and the other set having the letters p. m. adjacent thereto as shown. 80 The minute stamping roll 3 is carried at the free end of shaft 30 which is caused by the clock work mechanism to rotate once every hour.

In order that the hour and minute at 85 which a signal is sent may be stamped legibly and in the correct position upon the tape 4 I provide mechanism to hold the numbers on the time stamping rolls in an operative position until an hour, in the case of roll 90 No. 2, and a minute in the case of roll No. 3, has expired. By reference to Figs. 4 and 6 it will be seen that ratchet wheels 40 and 41 are associated with rolls 2 and 3 respectively. Ratchet wheel 40 is rigidly secured 95 to roll 2 and ratchet wheel 41 is rigidly secured to roll 3. By reference to Fig. 6 it will be seen that ratchet wheel 40 and roll 2 connected therewith are rotated by the action of a spring arm 42 rigidly secured to 100 shaft 31 and that ratchet wheel 41 and roll 3 connected therewith receive their motion from spring arm 43 rigidly secured to shaft 30. Spring arm 42 bears against a pin 44 and spring arm 43 bears against a similar 105 pin 45, pins 44 and 45 being carried by ratchet wheels 40 and 41 respectively.

Secured upon the supporting plate 46 by a standard 47 is a rod 48 having an arm 49 110 carrying at the free end of an extension 49', disposed at a right angle to arm 49 a pawl 50 which is pressed by spring 51 into engagement with the teeth of ratchet wheel 41 secured to the roll 3. The pawl 50 prevents 115 the rotation of roll 3 until said pawl is thrown out of engagement with said ratchet wheel by the rotation of the cam 52' carried by a second hand shaft 52 which makes a complete revolution every sixty seconds. It 120 will thus be seen that the shaft 32^a in its continuous rotation produces tension in the spring 43 and that as the pawl 50 is thrown out of engagement with the teeth of ratchet wheel 41 every sixty seconds said ratchet 125 wheel and the stamping roll 3 will be advanced one-sixtieth of a complete revolution every sixty seconds. Similarly ratchet wheel 40 is held against rotation by a pawl 53 which is carried by a standard 54 and is 130 pressed by spring 55 against the teeth of

ratchet wheel 40. Pawl 53 carries an offset arm 53' having an inclined surface at the end thereof adapted to be engaged by a pin 43' carried by wheel 43. Pawl 53 is designed to hold ratchet wheel 40 in each of its twenty-four positions for a period of one hour until released by the engagement of pin 43' carried by ratchet wheel 43 against the offset arm 53' said pin engaging said offset arm once during every revolution of ratchet wheel 41 and throwing it out of engagement with the teeth of ratchet wheel 40 permitting said last named wheel to make one-twentyfourth of a revolution. It will thus be seen that the time-stamping rolls are so operated by clock work mechanism that they are at all times in a position to imprint upon the tape 4 the hour and minute at which a signal is received.

The means by which the time and numbering rolls are caused to produce an impression on the tape 4 comprises a coil D suitably carried by the supporting frame 60 secured to the plate 46 as shown in Figs. 2 and 4. The coil D is hollow and is provided adjacent its upper end with an armature 61 secured to a plunger 66 intermediate the ends of the latter. The lower end of the plunger 66 is provided with a head 67 designed to press the tape 4 against the time and numbering rolls 2, 3, 5 and 6 (see Fig. 2). Secured to the upper end of the plunger 66 is an arm 67^a pivoted at 68 and normally pressed upward by spring 69. The spring 69 is put under increased tension when the coil D is energized and the plunger lowered.

The free end of the rod 67^a is pivoted at 70 to a cam bar 71 the lower end of which is adapted to abut against and depress the pivoted arm 72 carrying a pawl 73 in engagement with the teeth of the ratchet wheel 74 to which wheel is secured tape advancing roll 75 between which and friction roll 76 the tape 4 is held.

It will be noted by reference to Fig. 2 that during the first portion of the downward movement of plunger 66 the cam rod 71 is moved downward and produces a partial rotation of the arm 72 about the shaft 78 thereby advancing the tape 4 a predetermined distance. As the cam rod 71 continues its downward movement the cam surface 79 thereon engages a pin 80 which by its action causes the lower end of the cam rod 71 to move in toward coil *d* until said lower end is no longer in engagement with the arm 72 and is free to move downward without depressing said arm 72. As a result of this movement when the head 67 of plunger 66 is about to contact with tape 4 the tape advancing roll 75 is at rest so that a clear impression is produced. Guide pin 81 prevents the lower end of cam rod 71 from being thrown into engagement with

tape guiding roll 82 which coöperates with a similar roll 83 to maintain the tape in the correct position to receive impressions from the stamping roll.

When the coil D is deenergized cam rod 71 is raised by the action of spring 69 into a position to repeat the operation hereinbefore described. As soon as the lower end of cam rod 71 is thrown out of engagement with the arm 72, said arm is raised to its original position by the action of spring 84 secured to shaft 78.

The tape 4 is carried by a reel 85 and after being unwound therefrom and printed as hereinbefore described, it is delivered to a suitable basket or other receptacle or if preferred, it may be re-wound upon a reel.

The impression is produced upon the tape 4 by reason of interposing between the tape and the stamping rolls an inking ribbon 90 wound upon a reel 91 which is mounted upon a shaft 92 and withdrawn therefrom upon a reel 93 by the action of a pawl 94 acting upon the teeth of a ratchet wheel 95 as illustrated in Fig. 2. The pawl is secured to an off-set extension of the arm 72 which is caused to rock upon the shaft 78 in the manner hereinbefore set forth. The receiving reel 93 is loosely mounted upon a shaft 96 supported in the frame work as illustrated.

The electrical connection of the various parts of the apparatus will now be described. By reference to Fig. 4, it will be seen that each of the coils C and C^a are carried by, but insulated from the metal frame 10, and that a rod or bar 100 is secured to each of the said coils adjacent the upper portion thereof. When the armatures 20 are attracted by the coils, the rods 22 secured thereto, and which are electrically connected with the frame 10, will contact with said rod 100 for a purpose to be hereinafter described. By reference to Figs. 2 and 4 it will be noted that four spring contact arms E, E¹, E² and E³ are carried by the plate 46 and disposed in proximity to pivoted arm 67^a. These contact arms are suitably insulated from the plate 46 and from each other. The springs E¹, E² and E³ have their free ends disposed beneath the arm 67^a so that when said arm 67^a is pulled down by reason of its connection with armature 61, it will contact with spring arm E¹, pressing the same out of its normal engagement with spring arm E and pressing arm E² into contact with arm E³ for a purpose to be hereinafter described. Spring arms E and E¹ are normally in electrical contact with each other. The arm E¹ is provided on its lower surface adjacent its outer end with a button F of insulating material which prevents electrical contact between arms E¹ and E². When, however, the pivoted arm 67 is lowered, spring arms E² and E³ are in electrical contact.

By reference to Fig. 1 it will be noted that 100 signal stations, numbered from R^0 to R^{99} are shown at the left-hand side of the figure, and that all the stations, numbered 5 above 10, having the same units digit are connected, and similarly that all of the stations numbered above 10, having the same tens digit, are connected, and that ten units digit wires and ten tens digit wires connect all of the signal stations with the recording apparatus indicated at the right of the figure, the tens digit wires being illustrated above the units digit wires.

The stations numbered below 10 are each connected with the stations having a corresponding tens digit and also with a common return wire CR.

As has been heretofore explained, a signal from any station in the series numbered 20 above 10, will cause a current to energize a units roll coil corresponding to the units digit of the number of the station, and the tens roll coil corresponding to the tens digit of the number of the station, so that a signal sent from station 34, for example, will energize units coil C^4 and tens coil C^{34} and bring the digit 4 on stamp roll 6, and digit 3 on stamp roll 5, into a position to imprint the number 34, upon the tape 4.

As the stations numbered below 10 are connected with the correspondingly numbered coils for operating the tens dial, it will be obvious that signals sent from said last named stations, will be recorded by the tens stamping roll 5, the circuit being completed through the line connecting each station with the similarly numbered coil C^4 , and back through the common return wire CR. The circuit in the recording apparatus will be hereinafter particularly described.

The arrow 101, and the line 102 at each station, designate the contact elements of a burglar or similar alarm of any ordinary construction, the alarm being given by closing the contact between said elements.

It is obvious that 101 and 102 may designate the contact elements of any signal sending apparatus, and also that several signal sending means, as for example, a watchman's station, or a thermostatic fire alarm, may be located at each station in addition to the burglar alarm, the alarm from said station being given when the contact elements of any such apparatus are closed.

Located between the signal station hereinbefore referred to, and the recording apparatus, I have illustrated a series of jacks for the use of employees for recording the time of their arrival and departure.

The jacks numbered from A^0 to A^9 are connected as shown with the wires which connect stations having a corresponding units digit with the correspondingly numbered coil C and similar jacks numbered

from B^0 to B^9 are connected with the wires which connect stations having similar tens digits with correspondingly numbered coil C^4 . One of the jacks $C'' R''$ is connected with common return wire CR by a branch $C' R'$ as shown.

It will be evident from the description of the operation of the signal sending means at stations from R^0 to R^{99} , that when one of the units jacks A, is connected by suitably connected jack plugs with a tens jack B, that a current will be established through the correspondingly numbered units and tens operating coils C and C^4 , and that the stamping rolls 5 and 6 will imprint a number on the tape corresponding to the number of the units and tens jacks connected. For example, if one of the connected plugs is inserted in units jack A^4 , and the other end inserted in tens jack B^3 , the units roll operating coil C^4 and the tens coil C^{34} will be energized and the digit 4 on the units stamping roll and the digit 3 on the tens stamping roll will be pressed against the tape 4 to imprint the number 36 thereon.

When an employee whose number is below 10 wishes to record his number and the time of his arrival and departure, he inserts one plug in jack $C'' R''$ and the other into either a tens jack or units jack corresponding to his number. If for example, his number is 4, he inserts one jack plug in jack $C'' R''$, and the other into jack B^4 , and his number will be recorded by the tens dial stamping roll on the tape 4.

It will be obvious that with the apparatus shown, one hundred employees numbered from 0 to 99 inclusive, can record their numbers and time of arrival and departure on the tape 4, as hereinbefore described. The apparatus is however, adapted for keeping a record of the time of arrival and departure of ten additional employees, who record their time by inserting one plug into $C'' R''$, and the other into a units jack corresponding to their number, as for example, employee No. A7 will insert one plug into jack $C'' R''$ and the other into units jack A^7 . This will cause the number 7 to be imprinted on the tape 4, by the units stamping roll instead of the tens stamping roll. The difference in position on the tape relative to the imprint of the hour and minute will enable the time keeper to distinguish between the record of employees numbered from 0 to 9 and those numbered A, A1, A2, etc. The apparatus with two number stamping dials and twenty-one connecting wires is thus seen to be perfectly adapted for recording the time of arrival and departure of 110 employees.

I will now explain the operation of the recording apparatus, and certain details of construction and arrangement not heretofore set forth.

Units coils C are connected with a common wire E, which leads to the positive side of battery B, while tens coils C^a are each connected by a common wire E¹, with the negative side of battery B. The common return wire C R connects with the wire E through a relay coil R as illustrated. Adjacent one end of the relay coil R, is an armature τ , which when the said coil is energized, is attracted into contact with contact arm τ' . The armature τ , is carried by and in electrical communication with the frame 10 of the machine.

To illustrate the operation of the system, consider a signal sent from station R⁴³ or a signal sent by employee No. 43 by connecting tens jack B⁴ with units jack A³, as hereinbefore described, the circuit will be completed through tens coil C⁴⁴, common wire E¹, battery B, common wire E, units coil C³, and back to the signal station. When however, coils C⁴⁴ and C³ are energized, the adjacent armatures 20 (Fig. 2), will be attracted and the lower end of the vertical rods 22 brought into contact with the conductor 100, in the case of units coil, and 100' in the case of the tens coil. When these contacts are made, the current will flow along conductor 100 to E¹, through battery B to printing coil D (see Fig. 2) through spring contact points E¹ and E by a connecting wire S, to the conductor 100', and back to conductor 100, through the frame 10 of the machine.

The passage of the current through coil D energizes it and forces the plunger 66 downward as herein described. The downward movement of the plunger forces the pivoted arm 67 against contact spring E¹ and opens the circuit at contact springs E and E¹, thereby returning the system to its normal position ready to receive and record another signal.

Where a signal is sent from a station numbered below 10, or by an employee whose number is below 10, the circuit is as follows, considering for example, that number 5 is to be recorded on the tape: from R⁵ or B⁵ to C⁴⁵, through common wire E¹, through battery B, common wire E, through relay coil R, and back to the signal station by common return C R. When coil C⁴⁵ is energized however, the armature 20 associated therewith, is attracted and conductor 100' is brought into electrical contact through rod 22 (Fig. 2) with frame 10 as described. Similarly the relay coil R being energized attracts armature τ bringing it into contact with contact arm τ' . The current from battery B will then flow along common wire E through printing coil D, spring contacts E¹ and E connecting wire S, conductor 100' to frame 10, armature τ , contact arm τ' , to common wire E¹, back to the battery.

When an alarm is used in connection with

the recording apparatus, a switch T of any desired construction and a bell V, are connected between the negative side of battery B and contact spring E³, as indicated.

When switch T is closed, and the pivoted arm 67 (Fig. 2) is depressed, bringing spring contact arm E², into contact with spring contact arm E³, the current from battery B will flow through the bell sounding an alarm as long as the coil D is energized. When however, the coil D is deenergized, the pivoted arm 67 will be raised by spring 69, and the contact between the contact spring E² and E³ will be broken, and the recording apparatus will be ready to receive and record other signals.

It is of course to be understood that a single set of signal sending means may be employed in connection with the recording apparatus, and that the applicant's system is well adapted for use in an outdoor fire alarm or a police call system, or for any other use where signals are to be sent to and recorded at a central station, an identifying number at the location of the station from which a signal is sent being recorded either alone or preferably in connection with a record of the time of the signal.

Having described my invention, I claim:

1. A device of the character described, comprising a plurality of numbered signal sending means, means to record any selected digit from 0 to 9 in the units place on a suitable receiving medium, means to record any selected one of a series of digits in the tens place on said receiving medium, a series of coils corresponding in number to the units digits and adapted upon being energized to select the digit to be recorded in the units place by the first named recording means, a series of coils corresponding in number to the tens digits and adapted upon being energized, to select the digit to be recorded in the tens place by the second named recording means, each of said units digit-selecting coils being in electrical communication with all signal sending means whose unit digit corresponds to the units digit, the selection of which is controlled thereby, and each of said tens digit-selecting coils being in electrical communication with all signal sending means whose tens digit corresponds to the tens digit, the selection of which is controlled thereby, electrically actuated means to produce forcible contact between said recording means and said receiving medium, said contact means being adapted to be energized by a local battery circuit and means to automatically close said local battery circuit through said contacting means when said recording means is in operative position, substantially as described.

2. A device of the character described, comprising a plurality of numbered signal sending means, a units digit-carrying stamp-

ing roll adapted to imprint the digits carried thereby upon a suitable receiving medium, a tens digit-carrying stamping roll adapted to imprint the digits carried thereby on a suitable receiving medium to the left of the impressions of the first named roll, a series of coils corresponding in number to the digits on the first named coil and adapted upon being energized, to select the digit to be imprinted thereby, a series of coils corresponding in number to the digits on the second named stamping roll, and adapted to select the digit to be imprinted thereby, each of the digits-selecting coils of the first named series being in electrical communication with all signal sending means the units digit of whose number corresponds to the digit, the selection of which is controlled thereby and each of the digit-selecting coils in the second named series being in electrical communication with all signal sending means, the tens digit of whose number corresponds to the digit, the selection of which is controlled thereby, electrically actuated means to effect forcible contact between said stamping rolls and said receiving medium, said contacting means being adapted to be energized by a local battery circuit and means actuated by the digit-selecting coils to close said local circuit through said contacting means, substantially as described.

3. A device of the character described, comprising a series of ten coils each adapted to control the recording of a different digit, a second series of coils each also adapted to control the recording of a different digit, a series of ten jacks numbers from 0 to 9, each jack being electrically connected with the coil of the first named series adapted to control the recording of a correspondingly numbered digit, and a second series of jacks numbered to correspond with the digits, the recording of which is controlled by the coils of the second named series, and each jack being electrically connected with the coil in said last named series adapted to control the recording of a correspondingly numbered digit, each of said coils being in electrical communication with each other, and a jack in communication with the opposite side of each of said coils from that with which the remaining jacks are connected, substantially as described.

4. A device of the character described, comprising a units digit stamping means, a series of ten selective coils adapted to select the digit to be stamped thereby, a tens digit stamping means, and a series of selective coils adapted to select the digit to be stamped thereby, a series of ten jacks connected with coils of the first named series and a series of jacks corresponding in number to the last named coils and connected therewith, and a single jack elec-

trically connected with each of the selective coils, substantially as described.

5. In a device of the character described, recording means comprising a plurality of number-carrying stamping rolls, pinions connected therewith, racks engaging said pinions, said racks being carried at the free ends of pivoted bars, an alined series of coils located in proximity to said bars and armatures connected with said bars and located within the range of influence of said coils, said parts being so disposed that upon energizing any coil, the adjacent rod will be rocked upon its pivot through an arc dependent upon the relative distance of the coil from the said pivot, substantially as described.

6. In a device of the character described, recording means comprising a number-carrying units stamping roll, a mutilated pinion connected therewith, racks carried by pivoted rods disposed at opposite sides of said pinion, each rack being adapted upon being actuated to engage said pinion and effect its partial rotation, means to advance a tape in proximity to said stamping roll, a series of alined coils corresponding in number to the numbers on the roll, said coils being disposed in proximity to said rack-carrying bars, and each of said coils being adapted upon being energized, to rock one of said rods on its pivot through an arc approximately inversely proportional to the distance of the coil from the said pivot, and electrically actuated means thrown into operation by energizing said coils to advance the said tape and to thereafter press the said tape and the adjacent number into contact to cause an impression of said number to be imprinted upon said tape, substantially as described.

7. In an electrically operated signal recording apparatus, hour and minute stamping rolls, shafts carrying the same, an auxiliary shaft, ratchet wheels associated with said hour and minute stamping rolls, spring actuated means to rotate the hour stamping roll-carrying shaft once in twenty-four hours, the minute stamping roll-carrying shaft once in one hour, and the auxiliary shaft once in one minute, springs rigidly secured to said first named hour and minute shafts, and adapted to be put under tension by the rotation of the said shafts, pawls engaging said ratchets, adapted to normally hold the same against rotation and means actuated by the auxiliary shaft to throw one of the said pawls out of engagement with the ratchet wheel associated with the minute stamping roll once every minute, and means actuated by the last named ratchet wheel to throw the other of said pawls out of engagement with the ratchet associated with the hour stamping roll once every hour.

8. In apparatus of the character described, a printing roll, means to partially rotate the same in either direction, comprising pivotally mounted levers, a plurality of electro-magnets arranged near each of said levers and at different distances from its pivotal connection, a plurality of armatures connected with each of said levers to cooperate with the electro-magnets and means to close a circuit, including a selected one of said electro-magnets.

9. In apparatus of the character described, a plurality of rotatable printing rolls, means to independently rotate said rolls in either direction, comprising pivotally mounted levers, a plurality of electro-magnets arranged near each of said levers and at different distances from its pivot point, a plurality of armatures connected with the lever to cooperate with said electro-magnets, means to feed a tape in proximity to said rolls and electrically operated means to press said tape in engagement with said rolls.

10. In apparatus of the character described, a plurality of rotatable printing rolls provided with numerals, swinging levers to partially rotate said rolls, and a plurality of electro-magnets to move said levers, means to energize a certain of said electro-magnets to cause the rotation of one of the rolls to bring a corresponding selected numeral into an operative position, apparatus to conduct a tape in operative relation to the

rolls, electrically actuated means to press the tape into engagement with said rolls, and means to close a circuit to effect the operation of the electrically actuated means, after the rolls have been moved by the energized electro-magnets.

11. In apparatus of the character described, recording means, comprising rotatable rolls provided with a plurality of numerals, means to rotate said rolls, time stamping means, apparatus to conduct a tape in proximity to said time stamping means and recording means, an electrically actuated device to press said tape into engagement with said time stamping and recording means, and means to advance said tape.

12. In apparatus of the character described, a rotatable roll provided with symbols, a shaft with which said roll is connected, a plurality of swinging levers to rotate said shaft in opposite directions, a plurality of electro-magnets arranged at different distances from the pivot points of said levers, a plurality of armatures connected with said levers to be moved by said electro-magnets, and means to energize certain of said electro-magnets.

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

ALFRED L. SOHM.

Witnesses:

H. E. JONES,
W. L. CRAIG.