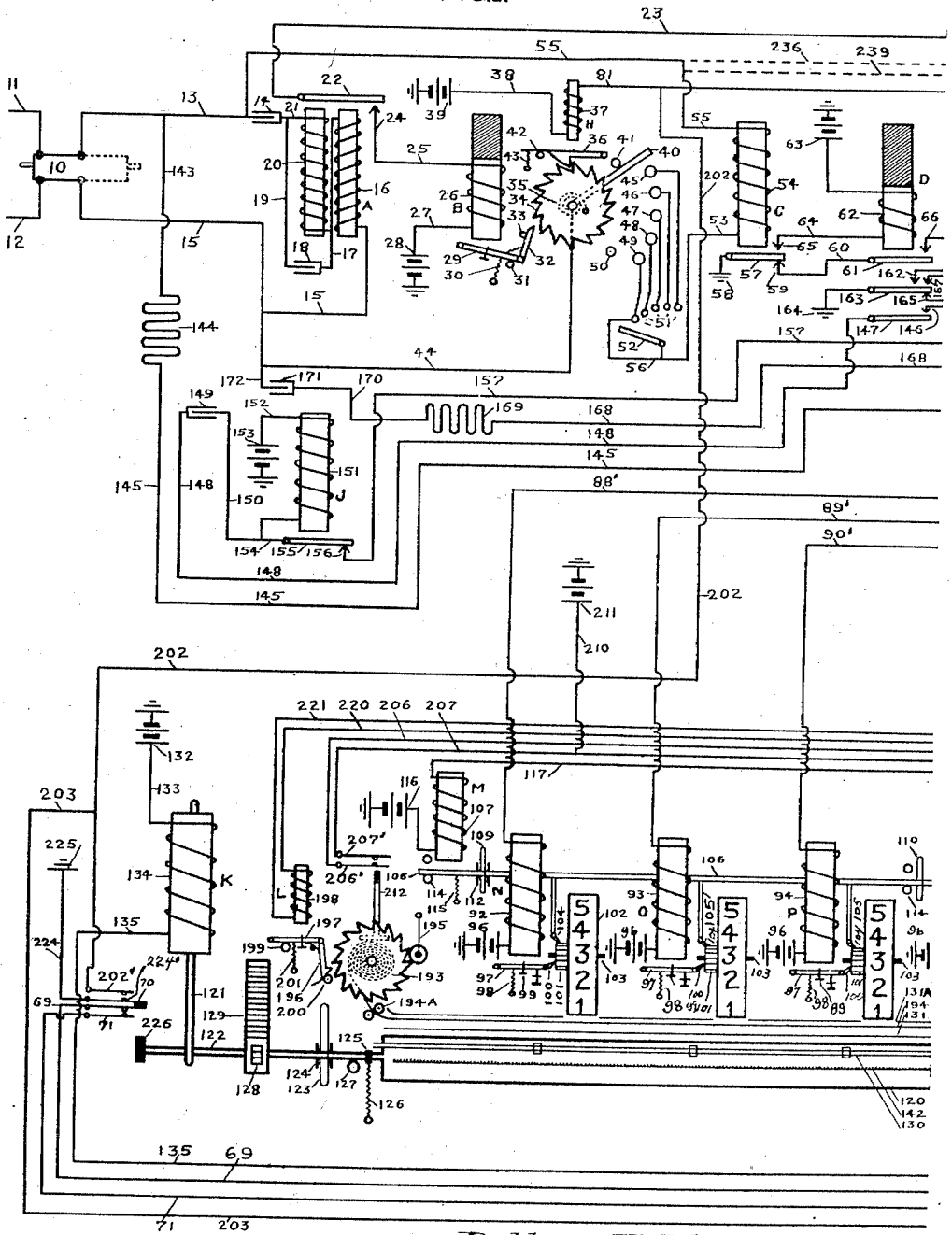
Feb. 24, 1931. R. TILDEN ET AL 1,793,761

TELEPHONE CALL RECORDER

Filed July 1, 1925 3 Sheets-Sheet 1

FIG. 1.



Robbins Tilden and Thomas A Tilden, INVENTORS

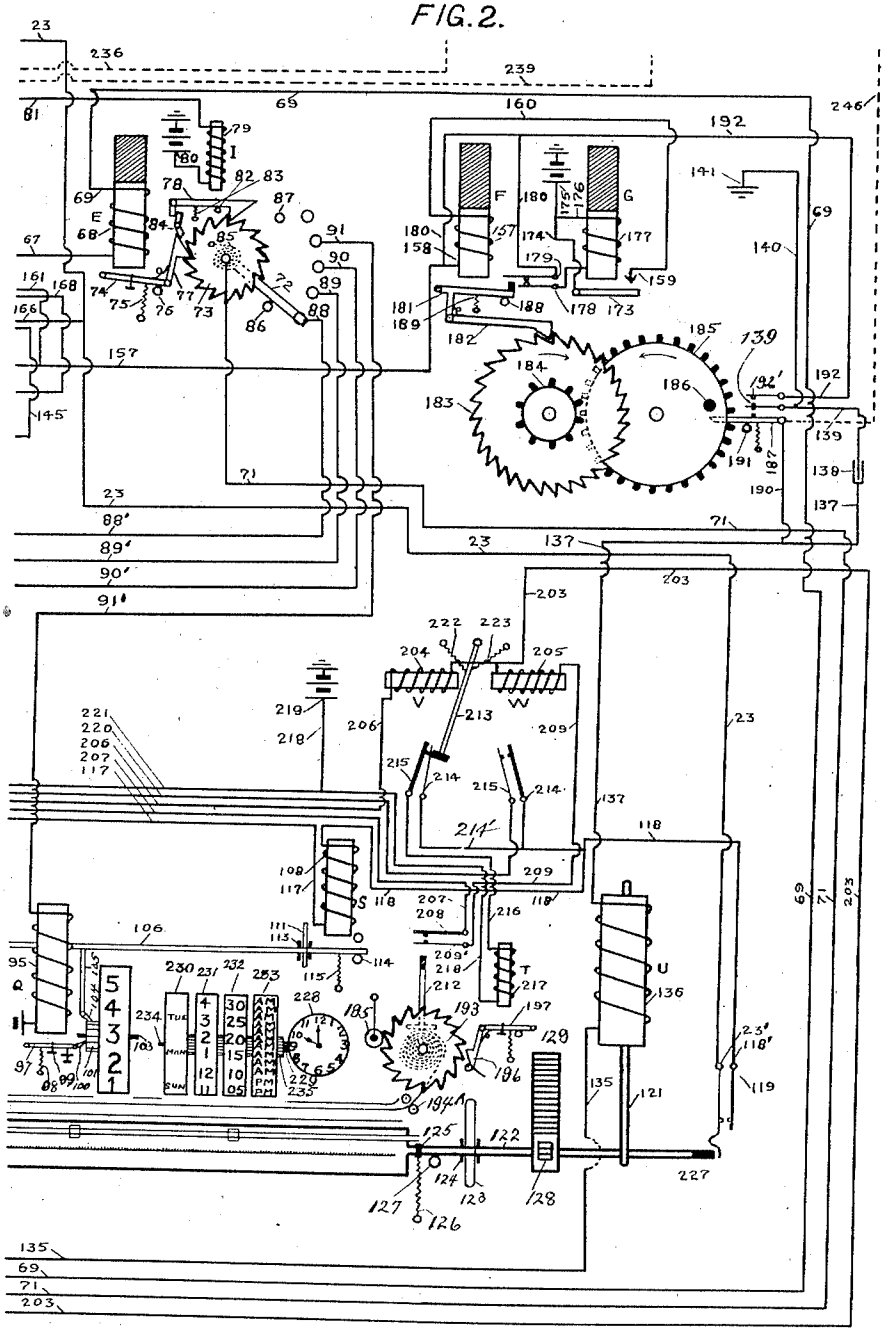
BY O. E. Overholt ATTORNEY

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TELEPHONE CALL RECORDER

Filed July 1, 1925 3 Sheets-Sheet 2

FIG. 2.



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Feb. 24, 1931. R. TILDEN ET AL 1,793,761

TELEPHONE CALL RECORDER

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FIG. 3.

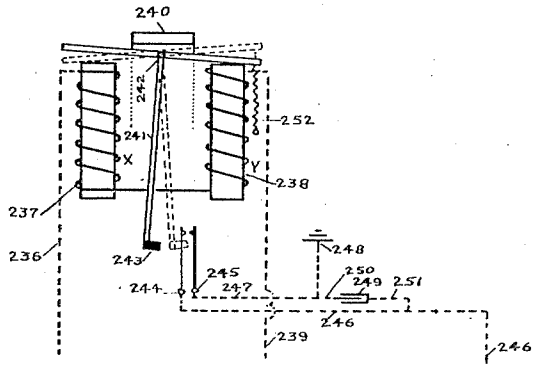
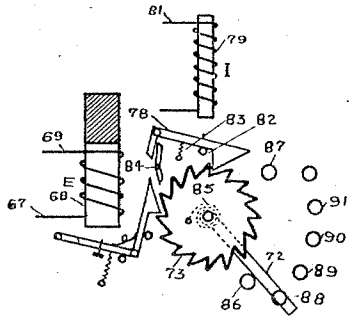


FIG. 4.



Robbins Tilden and Thomas A. Tilden, INVENTORS.

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Patented Feb. 24, 1931 1,793,761

UNITED STATES PATENT OFFICE

ROBBINS TILDEN AND THOMAS A. TILDEN, OF HIGH POINT, NORTH CAROLINA

TELEPHONE-CALL RECORDER

Application filed July 1, 1925. Serial No. 40,900.

This invention relates to electric signaling devices and has special reference to a call recorder whereby one telephone station may call a second station and record, at the called station an indication, by number or otherwise the station which has called and also show the time each call is received.

In other words, the invention embodies means for receiving and making a permanent record at a telephone station of the calls received from other stations and also indicating on such permanent record the station from which a call has been received, so that the user of the telephone station, in the event of his or her absence therefrom, may upon their return, at once perceive not only the number of calls that have come in, but also the telephone numbers of the stations from which said calls have been made and the order and time in which they have been made.

This device is preferable with automatic or machine switching equipment, that is, equipment that uses a calling device or other forms of impulse transmitters, senders or circuit breakers on telephone stations for setting up and operating apparatus in a proper manner for connecting one station with any other station in the exchange or system, automatically, without the aid of human operators.

The purpose of the invention is to enable a telephone subscriber or station to call any other telephone subscriber or station in that particular city or system and register at the called station, the number of the station calling. The device is preferably connected in parallel with the user's telephone as an extension, and using the same line as that connected to the regular or main station.

The principle involved is to indicate on a suitable surface such as a strip of paper an impression disclosing, upon the receipt of a telephone call, the number or other characteristic of the calling station and the time at which same was received. For instance, the telephone number of the calling station may be actually and automatically printed in the form of figures or letters. These characters may either form the number of a station; may form a word or figure; or may be in the form of Roman numerals or code indications. These code indications may, in some instances, be in the form of dots, or dots and dashes.

For instance, the arrangement may be such that a telephone numbered 3452 calling a station equipped with the device described herein will register on a strip or ribbon of paper the number just as written above and will also show the time said number was registered. Also the device may be arranged for coding these numbers as by three dots, a space, four dots, a space, five dots, a space and two dots. Obviously the latter method requires more time for interpreting the number and preferably the former printing method will be used.

The device is applicable to individual or party lines. To use on a party line employing harmonic bells, the relay A would be such as would respond only to a particular frequency ringing current. This relay could also be connected from either side of line to ground. Long distance operators in the central office, or any other particular operator, employee or official of the telephone company would register their number by the machine as in the same case of any regular calling telephone station. It could also be used in private systems, and could be used to replace complaint operators whose duties are to record telephones in trouble as subscribers report them.

The invention employs peculiar circuit arrangements which involve slight changes in the circuit of certain equipment (connectors) of the Strowger automatic equipment and also of similar changes in other types of automatic machine switching equipment. However, the changes made do not impair in the slightest degree the successful operation of such equipments nor does it take away any of its particular features or improvements; nor do these minor changes effect transmission over its circuit, or complicate it to any appreciable extent. Such minor changes to be made by the operating telephone company only in the group or groups having access to

the lines connecting with the machine described herein.

It is noted that the use of this device is entirely under the control of the subscriber at whose station it is installed. That is to say, it is not necessary to keep the device constantly connected in the line if the subscriber does not wish to do so. He may, by a suitable switch, connect the device for service when he leaves his office or house and during his presence at such office or house may disconnect the same.

There is also provided an arrangement whereby the subscriber at whose telephone this device is connected, may by means of a switch accessible to five contacts, allow his telephone bells to ring from one to five times before this device cuts off the ringing current and actually connects itself and is in readiness to record the calling telephone number. This arrangement gives the party that has a machine of this kind a chance to answer his telephone if he is in proximity, before this device actually connects itself with the line.

Business men in their offices, and any other class of men and women anywhere, may leave their offices or other places equipped with this machine described herein and all incoming calls will be registered and recorded in a permanent form in their proper order, automatically, during their absence, thus dispensing with, in many cases a clerk left merely to answer and record telephone calls.

The principal and most important objects of the invention are to provide an improved and novel construction of a device of this character to render the same, by improved means, capable of recording in a permanent manner the number of a calling station and the time that this number is recorded; to improve and simplify the wiring of such a device; to provide an improved means in a device of this character for effecting the printing of the numbers of the calling stations and the time that such calls are received; and in general to provide a comparatively simple and highly efficient device; indicating on a permanent record the numbers of the stations calling any particular subscriber at his station and the time of such calls.

With the above and other objects in view as will be hereinafter apparent, the invention consists in general of certain novel details of construction and combination of parts hereinafter fully described, illustrated in the accompanying drawings and specifically claimed;

In the accompanying drawings like characters of reference indicate like parts in the several views, and:

Figure 1 gives a diagrammatic view of one part of an apparatus constructed in accordance with this invention.

Figure 2 is a diagrammatic view of the remainder of such apparatus.

Figure 3 is a diagrammatic view of a polarized relay which may be used for releasing the device and Figure 4 is an enlarged detail of a special relay used in this apparatus.

In carrying out the objects of this invention there is provided an ordinary double pole switch or key 10 to which is connected the line wires 11 and 12 leading to the particular subscriber's station. The telephone instruments themselves are not here shown as they do not enter directly into the invention, although certain parts of such instruments do co-operate with the invention, but as these parts are of well known forms it has not been deemed necessary to show drawings thereof, the showing being restricted to a diagrammatic illustration but the platen and numbering wheels co-operating therewith are regularly illustrated. From this switch 10 leads a wire 13 which is connected to a condenser 14 and similarly there leads from the switch a second wire 15 which is connected to one terminal of the winding of a relay coil 16, the other terminal of said relay coil being connected by a wire 17 with a condenser 18, connected by a wire 19 with the condenser 14. Also there is provided a second relay coil 20 having one terminal of its winding connected by a wire 21 with the condenser 14 and the other terminal connected to the wire 17. The two coils 16 and 20 are arranged side by side and serve when energized to attract an armature 22. To this armature is connected a wire 23 which is connected to a contact 23′ on spring assembly 119. At 24 is a contact where the armature 22 makes connection upon energization of the magnets 16 and 20 or either of them. This contact 24 is connected by a wire 25 to one terminal of the winding of a relay coil 26, a wire 27 connecting the other terminal of said relay coil to battery 28. This coil 26 is provided with an armature 29 normally held away from the magnet by a spring 30 against stop 31 and this armature carries a spring drawn pawl 32 guided by guide 33 which operates on a ratchet wheel 34 so that each time the magnet 26 is energized the armature 29 is attracted and the wheel 34 caused to rotate one step. The ratchet wheel 34 is urged backward against such rotation by a spring 35 and a stop pawl 36 is provided to releasably restrain the wheel from such backward rotation. This stop pawl 36 constitutes the armature of a magnet 37 which has one terminal of its winding connected by a wire 38 with battery 39. Fixed to the wheel 34 is a wiper arm 40 which is arranged, when the holding pawl 36 is moved to release the wheel, to rest against a stop 41 thus limiting the backward movement of said wheel. The holding pawl 36 is held in normal position against stop 42 by the tension of spring 43. A wire 44 connects the wiper arm 40 with the

wire 15 and the arm 40 constitutes a contact wiper arm which traverses an arcuate series of spaced contact points 45, 46, 47, 48, 49; a suitable stop 50 being provided at the end of the series to limit the rotation of the wheel in a forward direction. The contacts 45, 46, 47, 48 and 49 are connected by wires to contacts 51, this last series being traversed by a switch arm 52 which is connected by a wire 53 to one terminal of the winding of a coil 54, the other terminal of the winding of said coil being connected by wire 55 with the wire 13. Also the last contact of the series 51 is connected by wire 56 with the wire 53.

The coil 54 is provided with an armature 57 which has ground 58. Normally this armature rests against contact 59 which is connected by wire 60 to an armature 61 arranged to be attracted by a coil 62 which receives battery 63. The other end of the relay coil 62 winding is connected by a wire 64 with a contact 65 which is engaged by the armature 57 upon energization of the relay coil 54. The armature 61 normally lies free from a contact 66 but makes contact upon energization of the coil 62. The contact 66 is connected by a wire 67 with the winding of relay coil 68, the other end of this winding being connected by a wire 69 with a contact on spring assembly 70 which is in turn connected by make contact and wire 71 to wiper arm 72 of ratchet wheel 73. The coil 68 is provided with an armature 74 which is pulled away from the core of coil by spring 75 against stop 76. This armature carries a spring pressed pawl 77 which is so formed as to actuate a ratchet wheel 73 upon the coil 68 being de-energized. For this ratchet wheel there is provided a retaining pawl 78 which forms the armature of a coil 79 having one end of its winding connected to battery 80. The other end of the winding of the coil 79 is connected by a wire 81 to the winding of the coil 37. This retaining pawl 78 is held engaged with ratchet wheel 73 and against stop 82 by spring 83. There is provided a releasing arm 84 for holding back pawl 77 while armature 78 is held against core of coil 79. Ratchet wheel 73 has a spring 85 for returning its wiper arm 72 to normal position against stop 86. There is also provided a suitable stop 87 for limiting the selecting movement of wiper arm 72.

The ratchet wheel 73 carries an arm 72 which forms a contact wiper arm and traverses a series of arcuate spaced contacts 88 to 91 inclusive. The contacts 88, 89, 90 and 91 are connected by wires 88′, 89′, 90′ and 91′ with one end of the windings of printing wheel actuating magnets 92, 93, 94 and 95, the other ends of the windings of said magnets being connected to batteries 96. Each printing wheel actuating magnet is provided with an armature 97 normally held away from the magnet by a spring 98 against the adjustable stop 99. The armature carries a pawl 100 which engages a ratchet wheel 101 mounted on the side of a printing wheel 102 provided with a series of raised numbers on its periphery. Each of the ratchets 101 has a bearing 103 and is provided with a retaining pawl 104 and the wheels are spring actuated to zero positions. These retaining pawls are all connected by links 105 to a long armature 106 at each end of which is a releasing magnet 107 and 108. This long armature has guides at 109, 110, 111, and thrust bearings at 112, and 113, and is normally held against stops 114 by the tension of springs 115. The releasing magnet 107 has one terminal of winding connected to battery 116 and the other terminal to wire 117, through winding of magnet 108, wire 118 to spring contact 118′ of spring assembly 119.

Adjacent the wheels 102 is a paper carrying platen roller 120 which is supported in suitable bearings formed in the ends of solenoid cores 121. At each end of this roller is a shaft 122 forming the journal for mounting the roller and each of these shafts is provided with a vertical and thrust bearing 123 and 124; on this roller platen shaft at collar 125 is a spring 126 for holding same against rubber stop 127. This shaft also has a ratchet and cog wheel arrangement 128 designed to move over a vertical cog track 129. Thus, when the solenoids 134 and 136 are energized, the roller is pulled up towards the wheels 102 but is not rotated as cog wheel 128 slips on the shaft as it travels upward over cog track 129, but on the roller's downward movement the cog wheel catches in shaft and rotates roller platen. A suitable gripper mechanism 130 is provided so that when the roller platen is pulled down that part of the paper strip 131 which has already been printed upon is released and a fresh grip taken to feed more of the paper from a roll (not shown). 131A is a metal guide to protect and keep in proper position the ink ribbon 194. At 132 is a battery which may be positive terminal grounded and its negative terminal connected by wire 133 with the winding of solenoid 134 controlling a respective core 121. The other end of the winding of this solenoid is connected by wire 135 with one end of the winding of a second solenoid 136 controlling the other core 121. The remaining end of the winding of this second solenoid 136 is connected by a wire 137 with a condenser 138 having its other lug connected to wire and contact 139. The wire 139 is also connected by a wire 140 with ground 141. In connection with the roller platen 120 is a strip of metal 142 having saw teeth for tearing off the paper ribbon after the numbers have been printed. Leading from the wire 13 is a wire 143 which is connected to a resistance 144 from which extends a wire 145 which leads to a contact 146

engageable by an armature 147 controlled by the relay coil 62. This armature 147 is connected by a wire 148 with a condenser 149, the other side of which is connected by a wire 150 with one end of the winding of buzzer coil 151. The other end of the winding of this coil is connected by a wire 152 with battery 153. To the wire 150 is also connected a wire 154 which is connected to the armature 155 of buzzer J. Normally, this armature rests on a contact 156 which is connected by a wire 157 with one end of the winding of a magnet 158, the other end of said winding leading to a contact 159 over a wire 160. To the wire 157 is also connected a wire 161 which leads to a contact 162 which is normally free from an armature 163 controlled by the relay coil 62 said armature being connected by wire to ground 164. This armature 163 normally rests on a contact 165, which is connected by a wire 166 with the wire 23. Also there is, for this armature 163 a second normally free contact 167 which is connected by a wire 168 with a resistance 169 having its other end connected by a wire 170 with condenser 171. The other side of this condenser 171 is connected by wire 172 with the wire 15. The contact 159 normally lies free from connection with armature 173 but is in position to be engaged by this armature 173 and is connected by a wire 174 to battery 175. Also this terminal of the battery is connected by wire 176 to one end of the winding of said relay coil 177, the other end of the winding being connected to a contact 178 on which normally rests a contact 179 connected by wire 180 with the wire 157. At 181 is an armature which is controlled by the relay coil 158 and which is so arranged as to open the circuit between the contacts 178 and 179 upon energization of the relay coil 158. This armature operates a spring thrusted feeder pawl 182 to cause step by step movement of a ratchet wheel 183 carrying a pinion 184 which meshes with a gear of wheel 185, whereon is a pin 186 adapted to move contact arm 187 and close it against the contact 139, previously described. The armature 181 of relay F is held in inoperative position against stop 188 by the tension of spring 189. This contact arm 187 is connected by wire 190 with the wire 137 and is held normally against stop 191 by a spring. A wire 192 and contact 192′ is connected to the wire 180. Contact 192′ is closed, simultaneously with the closing of the contacts 139 and 187, by the action of the pin 186.

At each end of the platen roller 120 is a ribbon bobbin 193, a ribbon 194 of the ordinary typewriter character having its ends wound on these bobbins; it is guided and fed in proper position by two rollers 194A at each end of roller platen 120. Each bobbin or roll 193 has ratchet teeth on its periphery and is held in its operated position by spring and roller 195. The bobbins are actuated by a thrust pawl 196 mounted on and operated by an armature 197 controlled by a magnet 198. This pawl 196 and armature 197 are kept in the proper inoperative position against stop 199 and stop 200 by the tension of spring 201. From wire 81 leads a branch 202 which is connected to contact 202′ of spring assembly 70 and branching off from this wire 202 is a wire 203 to which is connected one end of each of the windings of a pair of magnets 204 and 205; the other end of 204 winding is connected by wire 206 with the spring contact 206′ of a pair of contac s, the upper contact being indicated at 207′. This upper contact 207′ is connected to wire 207 and contact 208, which is the upper contact of a pair of contacts, the lower contact being 209′ which is connected to wire 209, thence to one winding of magnet 205; branching off from wire 207 is another wire 210 which is connected to battery 211.

The contacts 206′ and 207′, 208 and 209′ are losed by plungers 212 which rest on the rolls of inking ribbon so that whenever, in the course of operation, one of these bobbins becomes filled the circuit closer controlled by the particular plunger 212 is energized and thereby energizes a respective magnet 204 or 205 which thus shifts an armature 213 from one side to the other of the pair of magnets 204 or 205. To a wire 118 is connected in multiple a pair of contacts 214 which are adapted to be engaged respectively by contacts 215 lying in the path of the armature 213 so that, as this armature is swung from one side to the other it closes one or the other of these pairs of contacts, each closing pair being made up of one contact 214 and another contact 215. Left hand contact 215 is connected by a wire 216 to the winding of a magnet 217 which controls the right hand armature 197, the other end of the winding of this magnet being connected by wire 218 with battery 219. Similarly one end of the winding of the other magnet 198 is connected to the right hand contact 215 over wire 220, and the other end of this winding is connected to battery 219 over wire 221. The armature 213 is held in the operated position by springs 222 and 223. Connected to contact 224′ of spring assembly 70 is a wire 224 which leads to ground 225. Contact 224′ makes with contact 202′ by the upward movement of bushing 226 which is mounted on shaft 122 of roller platen. At the other end of this shaft is a bushing 227 for making contacts 23′ and 118′.

228 is an eight day clock having suitable gearing connected by rotatable shafts 229 to the wheels 230, 231, 232 and 233. These wheels are caused to turn on an axle 234 by the gear 235 which meshes in the pinion secured to the rotatable shafts 229. The clock 228 causes wheel 230 to make a com-

plete revolution every seven days, each day being moved one notch or division so as to bring one of the series of abbreviated words Sun., Mon., Tue., Wed., Thu., Fri. or Sat embossed on the periphery of wheel, to a printing position immediately over the platen printing roller 120. Wheel 231 has twelve figures 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 12 embossed on the periphery of same and also after each figure as above is the mark similar to a colon. The clock 228 moves this wheel 231 one notch or division each hour, or two complete revolutions each 24 hour day, and these embossed figures 1 to 12 inclusive are successively moved to the printing position immediately over roller printing platen 120.

Wheel 232 has twelve sets of two figures, 00, 05, 10, 15, 20, 25, 30, 35, 40, 45, 50 and 55 embossed on the periphery of same. The clock 228 moves this wheel one notch or division every five minutes or one complete revolution in one hour, and these embossed figures 00 to 55 inclusive are successively moved to the printing position immediately over roller printing platen 120.

Wheel 233 has embossed on its periphery the letters A. M. and P. M. there being 12 of each on the entire periphery, or in other words half of the periphery of wheel 233 carries 12 sets of the letters A. M. and the other half of the periphery of this wheel carries 12 sets of the letters P. M. This wheel 233 is moved one notch or division each hour, or one complete revolution in 24 hours.

Each of these printing wheels 230 to 233 inclusive is provided with a slip gear arrangement, in order that as each wheel is moved on its shaft 234 by the gearing associated with clock 228, same is moved one division of its periphery surface. For example, wheel 230 is moved a complete revolution once per week, or one division per day. To move the wheel from the position where same would print Sun. to the Mon. position would require 24 hours. Instead of wheel moving gradually during this entire period it would move one-seventh of its periphery surface at one instant, each such movement being 24 hours separated from the last such movement. The wheel 232 making a complete revolution every 12 hours moves, for example, from 05 to 10 in five minutes, but such wheel turns from 05 to 10 in an instant, such instant of time being five minutes after the last movement of such wheel—from 00 to 05. Wheels 231 and 233 are provided with similar mechanism—each of the four wheels thus moving one division at its own proper instant. It should also be understood that each wheel is geared to the clock in such manner, that each movement bears its correct relation to its neighbor and to the day, hour, 5 minute period, and whether A. M. or P. M.

The face of clock 228 is exposed to outside view, and would serve as a regular timepiece if desired.

There are two methods of restoring the parts of the device to initial position after each recording operation. Either method may be used, depending upon the type and make of central office equipment that the local operating telephone company uses. Polarized relay arrangement will operate upon a reversal of battery when the calling party hangs up his receiver, after his own number has been dialled.

The timing release plan as shown on the attached drawings employs a timing arrangement, relay F and G, whereby the calling party will be instructed to not hang up his telephone receiver until after the audible buzzing tone stops.

This timing arrangement, which may be adjusted by different size wheels 184 and 185 and different number of cogs, will give ample time for the calling party to dial his own number, and then probably wait a few seconds afterwards for the tone to cease. The tone ceases when the timing arrangement has completed its operation and the telephone number of calling party has been printed.

A second plan of releasing the device, by means of a polarized relay is shown on drawing Fig. 3 and may be preferable in certain exchanges or under certain conditions.

In this case wire 55 is cut, line end being connected by wire 236 to one end of relay coil winding 237. The other terminal of this winding being connected to one terminal of relay coil winding 238. The other end of this winding is connected by wire 239 and to the C relay end of the cut wire 55. 240 is one pole of a permanent magnet. The armature 241 pivoted at 242 carries an insulated bushing 243, and in the position shown in Figure 3 by the dotted lines—will close contact springs 244 and 245, such contacts being normally open, when armature 241 is in the position shown by the full closed lines. Contact 244 is connected by wire 246 to wire 190—when the polarized relay release plan is used. Contact 245 is connected by wire 247 to ground 248. Condenser 249 is connected by wire 250 to wire 247, and by wire 251 to wire 246. The armature 241 is normally held away from contacts 244 and 245 by a spring 252.

This device is operated by local battery, a small storage battery, dry battery, a battery lead from central office, 110 volt, A. C. commercial current, or any other source of current, either A. C. or D. C. may be used by adapting coils of the proper resistance and type. This source of current can be grounded or insulated as desired. The drawings show one terminal of battery grounded, which is merely the conventional form.

In case this device is used in cities whose telephone numbers are composed partly of

letters as H A P 164, this device in its present form as described herein will record these letters as figures, which upon being re-dialled by the user of this device will ring the correct and same telephone number as called into it.

The action in a general way from the calling party's telephone, having automatic service, is as follows: A person dials the number of the telephone desired; if the party does not answer in a very short interval of time a distinctive audible tone will be heard in the receiver of the calling telephone subscriber's station, notifying him that the device described herein has connected itself, and is ready to receive his telephone number and record the same. Without hanging up he immediately dials his own number and then waits a few seconds until the tone ceases. He then hangs up the receiver. In certain exchanges where release is accomplished by means of a polarized relay as described herein the calling party would hang up the receiver immediately after dialling the last digit of his own number without waiting for the tone to cease. The calling party would be furnished with explicit detailed instructions appropriate for his particular exchange or system. The telephone station that has been called, equipped with the machine described herein, has no hold on his line, and he can immediately call any other telephone station, just as if he had called a regular subscriber's station not so equipped.

When the number that this device is connected to is called, the action is as follows: The ringing current sent out from the central or branch office, operates relay A at each period of the ringing current, which in turn operates relay B with its ratchet, arm, and contact points, relay B may be set to cut off the ringing current, by switching in impulse repeating relay C, at any desired number of rings by the means of the switch 52. When relay C is connected to the calling line (after the desired numbers of rings have occurred) the subscriber will receive a distinctive audible buzzing tone in his receiver, and battery from central office will be flowing through this impulse repeating relay C, so that by means of a circuit-breaker or calling device the calling party may transmit a series of electrical impulses over this line (the number of impulses sent out will of course be determined by the number of the calling telephone subscriber's station) and this device by means of a combination of relays, ratchets, registers, magnets, rollers and other stationary and moving parts substantially as described herein, will record in a visible and permanent form on a strip of paper or other suitable material the number of impulses sent out by the calling or sending telephone which would be the telephone number of the calling subscriber. As shown in the accompanying drawings these impulses are printed in the form of figures on a strip of paper by means of an ink ribbon, which is automatically reversible. This printing is done by a series of wheels that have figures 1 to 0 embossed on their periphery, but any other means of printing, stamping, writing, perforating, or marking paper or other suitable material can be employed by rearranging the device slightly. The timing arrangement will cause to be printed the day and hour at which the call was received.

The operation of the device is as follows:

Provided the switch or key 10 is in the operative position connecting the machine to the telephone line, as would be the case when the user or users were away, ringing current from the central office intended to operate the bells and signal the party desired would come in over wires 13 and 15 through condensers 14 and 18, operating relay A during the period of the ring. Armature 22 of relay A closes the circuit to relay B over wire 23, wire 166 contact 165, armature 163 and wire to ground 164. Relay B is supplied battery from 28 over wire 27, and the other end of the coil winding of B is connected to contact 24 by wire 25. On account of the design of relay A and proper adjustment of its armature, the contact spring will not vibrate with the ringing current but will remain steadily pulled up. However, should a very low frequency or weak or peculiar ringing current have a tendency to cause relay A armature to chatter, and thus vibrate contacts 22 and 24; this would not cause relay B armature to chatter, relay B being made slightly slow acting by means of a copper slug on the heel end of coil or by enclosing the coil with a copper sheath. When B energizes, armature 29 will be pulled away from its stop 31, and against the tension of spring 30, the ratchet pawl 32 being guided by stop 33 and held inwardly by a spring, will engage a tooth in the wheel 34 moving the said wheel and contact arm 40 from its normal position against stop 41 to first contact 45. The holding catch 36, held against stop 42 by the tension of spring 43 engaging the teeth of wheel 34 will catch and hold in the next tooth as contact wiper arm 40 connects with first contact 45. Upon the cessation of current supplied relay B by armature 22 restoring, after the first ringing impulse, armature 29 will restore to normal position against its stop. Upon the next ringing impulse received from central office the above process will be repeated and contact wiper arm 40 will be moved to second contact 46, and so on until last contact 49 is reached on the fifth ringing period, the arm coming to a stop against stop 50. Attached to wheel 34 is a coiled spring 35 under tension to force the wheel 34 and contact wiper arm 40 against stop 41—the nonoperative position.

The user or users of the machine may set

switch 52 in contact with any one of the five wires connecting with the five contacts 45 to 49 inclusive, which will determine how many ringing periods will be allowed before the apparatus is ready to receive the calling party's telephone number and at the same time cut off the ringing current. If the user does not care for a chance to answer his telephone then the switch 52 may be set on the first contact.

A circuit will now be formed over wires 15 and 44 to contact wiper arm 40 and to whichever one of the wires 45 to 49 the switch 52 is connected with, wire 53 relay coil 54, wire 55, and to wire 13. This will cut off the ringing current and relay coil 54 will energize from central exchange battery. Relay C will close a circuit to relay D, from ground 58, armature 57 contact 65, wire 64 to relay coil 62 to battery 63.

As relay D energizes it will close a circuit from ground 164, armature 163, contact 162 and wire 161 wire 157 contact 156 armature 155 and wire 154 to buzzer coil 151 wire 152 to battery 153, buzzer coil 151 will be energized by this circuit but its armature 155 will break its own circuit at contact 156 as soon as the coil energizes. The armature 155 will then restore to make contact with 156 again and it will then buzz — so long as relay D remains energized. This buzzing will put a clear, easily audible tone on the line back to the calling party over wire 150 condenser 149, wire 148, armature 147, contact 146 and wire 145 to non-inductive resistance 144, wire 143 and wire 13 and back over the other side of the circuit from contact 156 and wire 157, wire 161 contact 162 and contact 167, wire 168 to non-inductive resistance 169, wire 170 condenser 171, and wire 172 to line wire 15.

This buzzing tone will be heard in the immediate vicinity of the machine audible to any one in the room and can be heard in the receiver of the calling party, notifying him that the person called is away and the machine is ready to receive his number. Without hanging up he proceeds to dial his own number. Relay D, being slow acting will not release its armature as armature 57 on relay C moves back and forth between contacts 65 and 59 in accordance with the dial impulses, sent out from the calling party's calling device sender or circuit breaker. Since relay D will hold its armature throughout the dialling impulses until the release of the apparatus, a circuit will be formed, from positive battery 58, armature 57 contact 59 and wire 60, armature 61, contact 66, wire 67, relay coil 68, wire 69, contact 69′ of spring assembly 70, contact 71′ of spring assembly 70 wire 71, wiper arm 72, first contact and wire 88, winding of magnet 92, to battery 96. Relay coil 68 is of low resistance and slow acting; it will attract and hold its armature in the energized position as the first series of impulses from the calling subscriber's dial operates the armature 57 of relay C, but coil 92 will attract its armature 97 in accordance with the impulses of the calling device. If the first figure dialled is 4, then these four impulses (four breaks in the line circuit) will cause the first wheel 102 with numbers 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, embossed on its periphery to move four notches or to move to a point where the figure 4 is immediately over roller platen 120. Armature 97 is normally held against the adjustable screw stop 99 by the action of the spring 98. It is adjustable in its relation to core of coil 92 by the adjustable residual screw. The armature 97 is pivoted at one end and has attached a pawl 100 at the other end, capable of rotating the wheel 102 on an axis 103 by means of engaging the teeth on hub 101 of wheel 102. A holding or releasing pawl 104 engages the same set of teeth on hub 101 to hold wheel in position operated by the armature and pawl, and also causes wheel 102 to release or return to normal position when pawl 104 is held disengaged on release of the apparatus.

As the calling party pulls the dial around to select the next digit in his number, and also during any interval of time elapsing between the selection of digits relay C will hold its armature 57 against its make contact 65. The circuit to relay E will thus be opened at contact 59 and relay E during this interval, will release its armature 74. The spring 75 will pull armature 74 back against stop 76 and the ratchet pawl 77 held to engage the teeth on wheel 73 by a thrust spring, will catch in a tooth in wheel 73 and as armature is drawn back will turn wheel 73 to cause contact wiper arm 72 to connect with contact 89; ratchet wheel 73 is held in operated position by holding catch 78, caused to engage teeth in wheel 73 by the tension of spring 83. The next impulses coming over the line will rotate the number wheel associated with printing register 0 and cause it to register the number of impulses received, representing the digit dialled.

As the calling party selects his next digit and as dial is rotated around to select such digit by the calling party, relay E releases its armature 74 again, its ratchet pawl 77 again moving the wheel 73 and its associated contact wiper arm 72 to contact 90. These next impulses coming over the line will rotate the number wheel associated with printing register P and cause same to register the number of impulses received according to the digit dialled.

This process of moving wheel 73 by relay coil 68 and of registering the digit dialled by the calling party by the number wheels continues until the last digit of the calling subscriber's number is dialled. Thus the number of printing wheels required would vary according to the greatest number of digits

required to be recorded in the particular system having access to this device.

When relay D was energized at the time the ringing current was cut off through relay coil 54 a circuit will be formed to relay G from ground 164, armature 163, contact 162, wire 161, wire 157, wire 180, contact 179, contact and wire 178, coil of relay G, wire 176 to battery 175. Relay G will energize over this circuit and will close a circuit to relay F from battery 175, wire 174, armature 173, contact 159, wire 160, coil of relay F, wire 157, wire 161, contact 162, armature 163, to ground 164. Relay F will attract armature 181 and will break the contacts 178 and 179 opening the circuit to relay G, which relay being slow acting, will still hold its armature for an instant before releasing the circuit to relay F. Relay G on releasing its armature will open the circuit to relay F, which will not however immediately release due to its being slow acting. When relay F does release its armature, it will close the circuit to relay G at contacts 178 and 179. Thus these two relays F and G will alternately attract their armatures as long as relay D remains energized. By adjustment of residual screws, spring tension and length of armature movement, these relays may be made to operate at the rate of about 2 movements per second—more or less as desired.

Now as armature 181 is alternately attracted to coil 158 and restored against stop 188 by spring 189, the ratchet pawl 182 engages a tooth in wheel 183. Ratchet pawl 182 is pivoted and is held against the teeth in wheel 183 by a coiled thrust spring. Ratchet pawl 182 is moved backward and forward as relay coil 158 energizes and releases its armature and will cause wheel 183 to be moved, with each movement of armature 181, from left to right. Wheel 183 has a hub with teeth which engage the teeth on the periphery of wheel 185 causing same to turn from right to left. Near the outside edge of wheel 185 is a pin 186 with insulated bushing. When wheel 185 has made a complete revolution (which requires from 15 seconds to a minute as desired according to relay F and G adjustment, and the ratio of teeth on wheel 183 inside hub to wheel 185 periphery, this time interval being adjustable in order that the calling subscriber may have time to dial from 2 to 10 digits more or less as required in his call number according to the size of the exchange) pin 186 will lift or move contact arm 187, which is normally held against stop 191 by a spring, and close contacts on spring 139′ and 192′ and contact on arm 187. A circuit will then be formed from ground 141, wire 140, contact 139′ and 187, wire 190 and wire 137 to solenoid coil 136, wire 135, solenoid coil 134, wire 133 to battery 132. Condenser 138 connected by wires 139 and 137 prevent excessive sparking at these contacts. Solenoid coils 136 and 134 will draw their plunger shafts 121 upward, drawing printing platen roller 120 and its associated apparatus up against the number exposed on the number wheels associated with registers N, O, P, and Q. This will print on a ribbon of paper 131 the number of the telephone calling this device. 131A is a metal guide open at points immediately under number wheels and timing device. 194 is an ink ribbon, 131 is the paper carried on a roll (not shown). 120 is the platen roller, 130 is a rod running the length of the platen roller and moving with same when drawn upward or downward, and has rubber rollers to hold paper against platen roller, and 142 is a strip of metal having sharp teeth in order that the paper ribbon may be readily torn off as desired by the user. The platen roller 120 on shaft 122 is prevented from having side play by collars 124 against guide 123 which permits the roller to move freely upward and downward. The platen roller 120 is normally held downward against rubber stops 127 by the spring 126 with one end arranged to turn on shaft 122 and the other end held by an adjustable post.

Now as the platen roller 120 is pulled up against the number wheels and time recording wheels by solenoids U and K, the insulated bushing 226 on end of platen roller axle 122 breaks a circuit at spring assembly 70 opening the circuit to relay E and the number wheel magnet coil which wiper contact arm 72 is connected with. This prevents any movement of the number wheels on the release of the apparatus as wiper contact arm 72 passes over its associated contacts and insures the printing of the correct number of the calling party's telephone. At the same time this circuit is broken at the spring assembly the contact springs 202′ and 224′ are closed, closing a circuit; from ground 225, wire and contact 224′, contact and wire 202, wire 81, magnet 37, wire 38 to battery 39; also through wire 81, magnet 79, battery 80. Magnets 37 and 39 will energize over this circuit. Magnet 37 will attract armature 36 disengaging the holding catch on teeth of wheel 34 and allow same permitting wiper contact arm 40 to move back against stop 41. Magnet 79 will attract armature 78, normally held against stop 82 by a spring 83 releasing wheel 73 and permitting wiper contact arm 72 to take its normal position. An L shaped extension of armature 78 will trip pawl 77 by means of releasing arm 84. The wiper contact arm 40 now opens the circuit to relay C, relay C armature 57 opens the circuit to relay D.

Relay D releasing its armature, clears the line of tone connections, opens the circuit to buzzer, the tone on the line ceasing, and opens the circuit to the relays F and G. Contact arm 187 still gets current, if pin 186 is not entirely clear of its connection with contact

187. This will furnish current for an instant after B releases, in order that wheel 185 could not stop in such position as to keep closed contacts 187 and 139.

Pin 186 in wheel 185, reaching the position as shown will now permit contact arm 187 to be returned against stop 191 by the tension of spring. The solenoids U and K will now release and the platen roller 120 and its assembly will return to the normal position by the action of springs 126—against rubber stops 127. In releasing, the shaft 122 at the insulated end 227 will close contacts 23 and 118 for an instant and then open same again. As contacts 23 and 118 were momentarily closed on the downward movement of the roller assembly, a circuit was closed as follows: from ground 164, armature 163, (relay D armature now being released) contact 165, wire 166, wire 23, contacts 23 and 118, wire 118, coil S, wire 117, coil M, wire 116 to battery. Coils S and M will energize for an instant over this circuit and will draw the armature 106 from its normal position against stops 114 against spring tension 115. This will for an instant lift the arms 105 with holding pawl at end engaging teeth on hub of number wheels. The number wheels actuated by coiled springs, will return to normal. Armature 106 movement is limited by stops 114 is prevented from side play by collars 112 and 113 against the guides 109 and 111.

129 is a cog track geared to receive the cogs on cog wheel 128 on axle 122. A ratchet inside cog wheel 128 allows cog wheel 128 to turn in cog track 129 without moving axle 122 as the axle is drawn upward by solenoids U and K, but on the return to normal drawn by springs 126 fastened to axle by tubular bearing 125, the ratchet in cog wheel 128 catches and axle 122 platen roller 120 is rotated and causes paper ribbon 131 to be thrust out beyond edge of rollers 130, permitting user to read the numbers printed thereon, and tear same off against toothed guide 142, as desired.

A circuit is also closed momentarily by 118 and 23 as follows: from ground 164, armature 163, contact 165, wire 166, wire 23, contact 23′, contact 118′ and wire 118, wire 214′ and contact 214, contact 215, wire 216, coil 217, wire 218, battery 219. Coil 217 will momentarily energize over this circuit and attract armature 197, normally held against stop 199 by spring 201. Armature 197 has a ratchet pawl 196 attached which is thrust against the teeth in wheel 193 by spring, as the armature is drawn toward coil. Pawl 196 catches a tooth in wheel 193 and moves same space of one step, roller and spring 195 catching and holding wheel in operated position. Pawl 196 of armature 197, is guided out of engagement with teeth in wheel 193 by an adjustable guide post 200, when same restores by tension of spring 201. The rollers 194A guide the ribbon 194 into spools attached to wheels 193.

The ribbon is reversed as follows: As the ribbon is wound off one spool or bobbin onto the other, the spool or bobbin receiving the ribbon will get full and will press against post 212 pushing same against spring 206′ or 209′ depending upon which bobbin is being wound up or unwound. Suppose it is contacts 209′ and 208 that are closed, a circuit will be closed from battery 211 wire 210, wire 207, contacts 208 and 209′, wire 209, coil 205, wire 203, wire 202 and contact 202′, contact and wire 224 to ground 225. Coil W will energize upon next upward movement of roller platen axle bushing 226 over this circuit, and will attract armature 213. Armature 213 carries an insulated bushing at one end and is pivoted at other end and is held by springs 222 and 223 in the position attracted by the last magnet pull (either V or W), the right hand contacts 214 and 215 will now be closed, opening the left hand pair of contacts 214 and 215. Coil L will now operate over wires 220 and 221 etc., which would now be used to rotate ribbon the other way. If the post on the bobbin closes contacts 206 and 207 then coil V will attract armature 213 and close the left hand contacts 214 and 215 and open right hand pair contacts. Thus the ribbon will automatically reverse itself at intervals—when the bobbin on one end becomes full it will switch the circuit to operate the ratchet on the bobbin at the other end and in turn fill it.

The clock 228 automatically sets the four wheels 230, 231, 232 and 233 according to the day of week, the hour of the day, the five minute period, and whether A. M. or P. M. in the manner previously explained. Thus, at the same instant the telephone number of the calling telephone station was printed, the day of the week and the time would be also printed. Thus if 2742 called on Wednesday at a quarter past three in the afternoon the machine would print the following memorandum—2742 Wed. 3:15 P. M.

In certain exchanges or at certain times it may be desirable to release the apparatus, without reference to time, and allow the calling party to hang up immediately after dialling the last digit of his telephone number without waiting for the tone to cease. In this case the release of the apparatus will be accomplished by means of a polarized relay X, Y, and when the calling party hangs up a reversal of battery from central office operates the armature 241. This relay shown connected by dotted lines on drawing Fig. 4 is connected to the circuit thus: Wire 55 is cut, tapping wire 236 to the line side and wire 239 to the C relay side. X and Y are wound as shown on drawing and armature 241 is piv-

oted at 242 under permanent magnet 240 and is normally held by spring 252 in position shown on drawing. When the reversal of battery occurs, the armature moves to position shown with dotted lines and closes contacts 244 and 245. A circuit will now be formed from ground 248, wire 247, contacts 245 and 244, wire 246, wire 190, wire 137, solenoid U, wire 135, solenoid K, wire 133 to battery 132.

This will energize solenoids U and K, drawing the platen roller 120 against the number wheels and printing the number and time on paper 131, of the calling telephone. A condenser 249, connected by wires 250 and 251 to wires 247 and 246 respectively, as shown on drawing prevents excessive sparking at contacts 244 and 245 on release of armature. The remainder of the apparatus shown works as stated above except that relays F and G and their particular associated equipment is omitted, and therefore the description referring to their operation.

The printing wheels operated by coils O, P, and Q, are precisely like the one described operated by coil N. The coils are also similar and have the same relation to their respective printing wheels.

(These coils, wheels and associated ratchets, stops etc. will vary in number from two to ten more or less, depending upon the size of the system with which the machine will be used. The machine will have a number wheel for every digit in the greatest digit number having access to same. Where letters appear in a telephone number these are handled as are figures—a letter merely represents and is substituted for a figure in a number, on account of the greater ease in remembering. The number of wheels, coils, ratchets, etc. needed in the particular machine for an exchange will also determine the number of contacts to be engaged by contact wiper arm 72 operated by relay E.)

It is obvious that minor changes may be made in the form and construction of the invention without departing from the material spirit thereof. It is not, therefore, desired to confine the invention to the exact form herein shown and described, but it is desired to include all such as properly come within the scope claimed.

The expression "number of the calling telephone station", in the claims, is used as a brief expression to indicate the individual designation of the calling station whatever that may be, whether numbers, words, letters, or a combination of any or all of these, or any other individual designation that may be chosen.

Having thus described the invention, what is claimed as new, is:

1. The combination with an automatic telephone system, of means operated by battery current for intelligently recording the number of the calling telephone station at the called telephone station, and means for informing the calling station that the called station has a recording device and that connection is obtained therewith.

2. The combination with an automatic electro-mechanical switching telephone system, of a device to record the number of the calling telephone station at the called telephone station, means operated by regular exchange battery current for controlling the recording device, and means to release such recording device after a predetermined interval of time.

3. The combination with an automatic electro-mechanical switching telephone system, of a device to record the number of the calling telephone station, means controlled by the regular exchange battery current at the called station for operating the recording device, and means of audibly informing the calling telephone station that the recording device has connected itself and is ready to record the number of the calling station.

4. The combination with an automatic electro-mechanical switching telephone system, of a device to record the characteristic of the calling telephone station, and means controlled by the ringing current for setting into operation the recording device, and means for releasing such recording device after a predetermined interval of time.

5. The combination with an automatic electro-mechanical switching telephone system, of a device to record the number characteristic of the calling telephone station, and means controlled by the ringing current for setting into operation the recording device, means for releasing such recording device at a predetermined interval of time and means between the central office apparatus and the number recording device to connect and disconnect the recording device from the line connected with the telephone exchange.

6. The combination with an automatic electro-mechanical switching telephone system, of a device to print the number characteristic of the calling telephone station, means controlled by the ringing current for setting into operation the printing device, and automatic means for selecting the desired number wheel of a series and means for selecting the proper character thereon to register the number of the calling telephone station.

7. The combination with an automatic electro-mechanical switching telephone system, of a device to print the number characteristic of the calling telephone station at the called telephone station comprising a series of printing wheels, means for selecting each of the series of such wheels, and means for controlling the selecting means

together with means for informing the calling station that the called station has a recording device and that connection is obtained therewith.

8. The combination with an automatic electro-mechanical switching telephone system, of means for printing the number characteristic of the calling telephone station by repeating the electrical impulses of the battery current from the calling station, and means operated and controlled by the battery current for setting into operation the printing means.

9. In a device of the character described comprising a calling station and a called station, recording means at the called station for recording the number of the calling station, means at the called station for repeating regular direct calling impulses from the calling station for setting into operation the recording means.

10. In a device of the character described comprising a calling station and a called station, recording means at the called station for recording the character code of the calling station, means at the called station for repeating regular direct calling impulses from the calling station for setting into operation the recording means, and a time and date stamp adapted to cooperate with the recording means.

11. In a device of the character described, a recording device, and means located at the called station for repeating the regular direct calling current impulses for setting into operation the recording means.

12. In a device of the character described, a recording device, and means located at the called station for repeating the regular direct calling current impulses for setting into operation the recording means, a signal means for notifying the calling station that the called station has the recording device connected thereto.

13. The combination with an automatic electro-mechanical switching telephone system, of means for recording the characteristic of the calling station at the called station, means operated by the ringing current for setting into operation the recording device, and means for cutting off the ringing current after a predetermined number of rings.

14. The combination with an automatic electro-mechanical switching telephone system, of a recording device, means for operating the recording device, electro-mechanical means controlled by the ringing current for setting into operation the recording device, and a timing arrangement for allowing the proper time for recording the number before the number recording device is automatically released.

15. The combination with an automatic electro-mechanical switching telephone system, means for recording the characteristic of the calling station at the called station, means operated by the ringing current for setting into operation the recording device, and a timing arrangement for allowing the proper time for recording the number before it is automatically released.

16. In a device of the character described, a series of printing wheels, independent step by step actuating means for said wheels, each actuating means including an electromagnet connected to a source of electric energy, a series of individual contacts, a connection from each electromagnet to an individual contact, a step by step mechanism for closing the circuits successively through the individual contacts, and means for controlling the mechanism operating the printing wheels, said printing wheels and actuating mechanism therefor being located at the called station and set into operation by the ringing current.

17. In a device of the character described comprising a recording means operated by the regular exchange battery current for recording impulses of the calling station, and means operated by the ringing current for setting into operation the recording means.

18. In a device of the character described comprising a recording mechanism operated by an electrical current, means controlled by the impulses of the regular exchange battery current for setting into operation the recording mechanism, and means for recording the impulses transmitted by the calling station.

19. In a device of the character described, a calling station and a called station, telephone number recording mechanism at the called station and means operable after a predetermined number of ringing periods coming in from the exchange for operating the recording mechanism.

20. The combination with an automatic electro-mechanical switching telephone system of means for recording the number of the calling telephone station at a called party line station said party line station being of the selective harmonic ringer type, and means for releasing the said number recording device to normal position.

21. In an automatic electro-mechanical switching telephone system, a calling and a called station, a telephone number recorder at the called station, means for setting into operation said number recorder after a predetermined number of ringing periods of central office ringing current, and means for signaling back to the calling station that operative connection is set up between same and the number recording mechanism at the called station.

22. The combination with the Strowger automatic telephone system, of means operable by the regular exchange battery current for recording the number of the calling station at the called telephone station, and a time and date means adapted to cooperate

with the recording means and means for informing the calling station that the called station has a recording device and that connection is obtained therewith.

23. In a device of the kind described, a series of printing wheels mounted for independent rotation, a platen disposed in operative relation to said printing wheels, step by step actuating devices for each of said printing wheels, said actuating devices being electrically controlled by the regular exchange battery current, an electric selector mechanism adapted for bringing said printing wheels successively into operation, and means for restoring said printing wheels to normal position.

24. In a device of the kind described, a series of printing wheels mounted for independent rotation, a platen disposed in operative relation to said printing wheels and electrically operated step by step actuating devices for said printing wheels controlled by the regular exchange battery current and means for holding the wheels set at each step of their rotation by said actuating devices, an electric selector mechanism adapted for bringing said printing wheels successively into operation, means located at the called station for restoring said printing wheels to normal position, an ink ribbon interposed between said printing wheels and platen, and electrically operating means for intermittently feeding the ink ribbon over said platen at predetermined periods.

25. In a device of the kind described, a series of printing wheels mounted for independent rotation, a platen disposed in operative relation to said printing wheels and electrically operated step by step actuating devices for said printing wheels, an electric selector mechanism adapted for bringing said printing wheels successively into operation, means for restoring said printing wheels to normal position, an ink ribbon interposed beween said printing wheels and platen, and electrically operated means for intermittently feeding the ink ribbon over said platen and electrically operated means for shifting the direction of feed of said ink ribbon at predetermined stages in the operation, all of said electrically operated mechanism being located at the called station and controlled by the regular exchange battery current.

26. In a device of the kind described, a series of printing wheels mounted for independent rotation, a platen disposed in operative relation to said printing wheels, and electrically operated step by step actuating devices for said printing wheels, an electric selector mechanism adapted for bringing said printing wheels successively into operation, means for restoring said printing wheels to normal position, said platen being a roller platen and means for rotating said platen in one direction during its movement from said printing wheels.

27. In a device of the kind described, a series of printing wheels mounted for independent rotation, a platen disposed in operative relation to said printing wheels and electrically operated step by step actuating devices for said printing wheels, an electric selector mechanism adapted for bringing said printing wheels successively into operation, means for restoring said printing wheels to normal position, an ink ribbon interposed between said printing wheels and platen, electrically operated means for intermittently feeding the ink ribbon over said platen, said platen being a roller platen, and means for rotating said platen in one direction during its movement from said printing wheels.

28. In a device of the kind described, a series of printing wheels mounted for independent rotation, a platen disposed in operative relation to said printing wheels and electrically operated step by step actuating devices for said printing wheels, an electric selector mechanism adapted for bringing said printing wheels successively into operation, means for restoring said printing wheels to normal position, an ink ribbon interposed between said printing wheels and platen, electrically operated means for intermittently feeding the ink ribbon over said platen and electrically operated means for shifting the direction of feed of said ink ribbon at predetermined stages in the operation, said platen being a roller platen, and means for rotating said platen in one direction during its movement from said printing wheels.

29. In a device of the kind described, a series of printing wheels, independent step by step actuating means for said wheels, each actuating means including an electromagnet connected to a source of electric energy, a series of individual contacts, a connection from each electromagnet to an individual contact, a step by step mechanism for closing circuits successively through said individual contacts, a platen roller arranged in operative relation to said printing wheels and mounted for movement toward and from the printing wheels and rotation in one direction upon movement away from said wheels, and electro-magentic means for moving a platen roll toward the wheels and means for opening the circuit to said step by step mechanism upon movement of the platen roller toward the printing wheels.

30. In a device of the kind described, a series of printing wheels, independent step by step actuating means for said wheels, each actuating means including an electromagnet connected to a source of electric energy, a series of individual contacts, a connection from each electro magnet to an individual contact, a step by step mechanism for closing circuits successively through said individual

contacts, a platen roll arranged in operative relation to said printing wheels and mounted for movement toward and from the printing wheels and rotation in one direction upon movement away from said wheels, electromechanical means for moving the platen roll toward and from the wheels and means for opening the circuit to said step by step mechanism upon movement of the platen roller toward the printing wheels, an ink ribbon interposed between said printing wheels and platen, and electrically operated means for intermittently feeding the ink ribbon over said platen.

31. In a device of the kind described, a series of printing wheels, independent step by step actuating means for said wheels, each actuating means including an electromagnet connected to a source of electric energy, a series of individual contacts, a connection from each electromagnet to an individual contact, a step by step mechanism for closing circuits successively through said individual contacts, a platen roll arranged in operative relation to said printing wheels and mounted for movement toward and from the printing wheels and rotation in one direction upon movement away from said wheels, electromechanical means for moving the platen roll toward and from the wheels and means for opening the circuit to said step by step mechanism upon movement of the platen roller toward the printing wheels, an ink ribbon and electrically operated means for shifting the direction of feed of said ink ribbon at predetermined stages in the operation.

32. In a device of the kind described, a series of printing wheels mounted for independent movement, a roller platen movable toward and from said printing wheels, a paper feed carried by said roller platen, an ink ribbon arranged between said roller platen and printing wheels, means to rotate the platen in one direction upon movement away from said printing wheels, independent electrically operating step by step mechanism for rotating said printing wheels, means to receive electrical signal impulses including a series of branch circuit connections and a step by step mechanism for connecting said branch circuit connections to a main circuit, a switch for selecting a predetermined branch circuit, a step by step mechanism operable by connection to the branch circuit selected, relay means for connecting the last mentioned step by step mechanism to the selected branch circuit, and a selective circuit closer actuated by the last mentioned step by step mechanism and adapted to successively connect the wheel actuating step by step mechanism circuit.

33. In a device of the kind described, a series of printing wheels mounted for independent movement, a roller platen movable toward and from said printing wheels, a paper feed carried by said roller platen, an ink ribbon arranged between said roller platen and printing wheels, means to rotate the platen in one direction upon movement away from said printing wheels, independent electrically operating step by step mechanism for rotating said printing wheels, means to receive electrical signal impulses including a series of branch circuit connections and a step by step mechanism for connecting said branch circuit connections to a main circuit, a switch for selecting a predetermined branch circuit, a step by step mechanism operable by connection to the branch circuit selected, relay means for connecting the last mentioned step by step mechanism to the selected branch circuit, a selective circuit closer actuated by the last mentioned step by step mechanism and adapted to successively connect the wheel actuating step by step mechanism in circuit, and electrically controlled means for moving the platen roll toward the wheels.

34. In a device of the kind described, a series of printing wheels mounted for independent movement, a roller platen movable toward and from said printing wheels, a paper feed carried by said roller platen, an ink ribbon arranged between said roller platen and printing wheels, means to rotate the platen in one direction upon movement away from said printing wheels, independent electrically operating step by step mechanism for rotating said printing wheels, means to receive electrical signal impulses including a series of branch circuit connections and a step by step mechanism for connecting said branch circuit connections to a main circuit, a switch for selecting a predetermined branch circuit, a step by step mechanism operable by connection to the branch circuit selected, relay means for connecting the last mentioned step by step mechanism to the selected branch circuit, a selective circuit closer actuated by the last mentioned step by step mechanism and adapted to successively connect the wheel actuating step by step mechanism in circuit, electrically controlled means for moving the platen roll toward the wheels, and a relay arranged to break the circuit through the last mentioned electrically controlled means upon completion of printing.

35. In a device of the kind described, a series of printing wheels mounted for independent movement, a roller platen movable toward and from said printing wheels, a paper feed carried by said roller platen, an ink ribbon arranged between said roller platen and printing wheels, means to rotate the platen in one direction upon movement away from said printing wheels, independent electrically operating step by step mechanism for rotating said printing wheels, means to receive electrical signal impulses including a series of branch circuit connections and a step by step mechanism for connecting said branch circuit connections to a main circuit, a

switch for selecting a predetermined branch circuit, a step by step mechanism operable by connection to the branch circuit selected, relay means for connecting the last mentioned step by step mechanism to the selected branch circuit, a selective circuit closer actuated by the last mentioned step by step mechanism and adapted to successively connect the wheel actuating step by step mechanism in circuit electrically controlled means for moving the platen roll toward the wheels, a relay arranged to break the circuit through the last mentioned electrically controlled means upon completion of printing, and electrically controlled means for feeding said ribbon across said platen in one direction and the other selectively.

36. In a device of the kind described, a series of printing wheels mounted for independent movement, a roller platen movable toward and from said printing wheels, a paper feed carried by said roller platen, an ink ribbon arranged between said roller platen and printing wheels, means to rotate the platen in one direction upon movement away from said printing wheels, independent electrically operating step by step mechanism for rotating said printing wheels, means to receive electrical signal impulses including a series of branch circuit connections and a step by step mechanism for connecting said branch circuit connections to a main circuit, a switch for selecting a predetermined branch circuit, a step by step mechanism operable by connection to the branch circuit selected, relay means for connecting the last mentioned step by step mechanism to the selected branch circuit, a selective circuit closer actuated by the last mentioned step by step mechanism and adapted to successively connect the wheel actuating step by step mechanism in circuit, electrically controlled means for moving the platen roll toward the wheels, a relay arranged to break the circuit through the last mentioned electrically controlled means upon completion of printing, electrically controlled means for feeding said ribbon across said platen in one direction and the other selectively, and means controlled by the amount of ribbon so fed for reversing the action of the electrical feed mechanism.

37. In a device of the kind described, a series of printing wheels mounted for independent movement, a roller platen movable toward and from said printing wheels, a paper feed carried by said roller platen, an ink ribbon arranged between said roller platen and printing wheels, means to rotate the platen in one direction upon movement away from said printing wheels, independent electrically operating step by step mechanism for rotating said printing wheels, means to receive electrical signal impulses including a series of branch circuit connections and a step by step mechanism for connecting said branch circuit connections to a main circuit, a switch for selecting a predetermined branch circuit, a step by step mechanism operable by connection to the branch circuit selected, relay means for connecting the last mentioned step by step mechanism to the selected branch circuit, a selective circuit closer actuated by the last mentioned step by step mechanism and adapted to successively connect the wheel actuating step by step mechanism in circuit, electrically controlled means for moving the platen roll toward the wheels, a relay arranged to break the circuit through the last mentioned electrically controlled means upon completion of printing, electrically controlled means for feeding said ribbon across said platen in one direction and the other selectively, and means controlled by the amount of ribbon so fed for reversing the action of the electrical feed mechanism and means to clear the step by step mechanisms including a circuit adapted to be closed by the movement of the platen toward the wheels.

38. The combination with an automatic telephone system, of means for recording the number of the calling telephone station at the called telephone station, said means being controlled by the regular exchange battery current, and means for informing the calling station that the called station has a recording device and that connection is obtained therewith.

39. The combination with an electro-mechanical switching telephone system of means for recording the number of the calling telephone station at a called party line station, said party line station being of the ground connected ringer type and means for releasing the said number recording device to normal position.

40. In an electro-mechanical switching telephone system, a calling station and a called station, means for recording with a series of character wheels at the called station a plurality of sets of indicia representing the call designation of the calling stations; and means for spacing such sets of indicia in such manner as to distinguish complete call numbers from each other and from single indicia representing a portion of the complete call number.

41. The combination with an electro-mechanical switching telephone system, of means for recording the characteristic of the calling telephone station at the called telephone station, relay means at the called station for repeating the electrical impulses of the regular exchange battery operating current originating at the impulse sender of the calling telephone station, and means for operating the recording mechanism by a separate source of electric current.

42. The combination with an electro-mechanical switching telephone system, of

means for recording the characteristic of the calling telephone station at the called telephone station, relay means at the called station for repeating the electrical impulses of the regular exchange operating battery current originating at the impulse sender of the calling telephone station and means for audibly signalling the calling station that the called station does not answer, and a recording device in readiness to register the number of the calling station.

43. In an electro-mechanical switching telephone system, means for recording at the called station any desired number of indicia representing the call designation of the calling station; and means for spacing such sets of indicia in such manner as to distinguish complete call members from each other and from single indicia representing a portion of the complete call numbers, such calling station being of the regular standard automatic type with dial and employing no special sending apparatus in order to record its call designation.

44. The combination with an automatic electro-mechanical switching telephone system of a device to record any number of characters as may be required to represent the number of the calling telephone station at the called telephone station and means operated by regular exchange battery for controlling the recording device.

45. In a device of the character described, comprising a recording means controlled by the regular exchange battery for recording the number characteristic of the calling telephone station at the called telephone station, and a slow-releasing relay means with associated armature for holding the recording device in operative position during a series of open circuit impulses.

46. The combination with an automatic telephone system including the usual ringing apparatus and a talking circuit including means producing a series of current impulses at the called station upon operation of the dial of the calling station after the talking circuit is established, of a plurality of printing wheels and means for feeding a paper strip thereby, electro-magnetic means for advancing the printing wheels, and a sequence switch acting after a predetermined number of operations of the ringing apparatus to first establish the talking circuit and then consecutively connect the operating means of the printing wheels thereto.

47. The combination with an automatic telephone system including the usual ringing apparatus and a talking circuit including means producing a series of current impulses at the called station upon operation of the dial of the calling station after the talking circuit is established, of a plurality of printing wheels and means for feeding a paper strip thereby, electromagnetic means for advancing the printing wheels and a sequence switch acting after a predetermined number of operations of the ringing apparatus to consecutively establish the talking circuit connect the operating means of the printing wheels to said talking circuit for operation thereby and then force the paper strip into engagement with the printing wheels and release said printing wheels and sequence switch to permit return thereof to normal position.

48. In a telephone call recorder a series of printing wheels for recording a telephone number, an operating magnet for each of said printing wheels, a relay responsive to controlling impulses, a step-by-step switch controlled by said relay, circuit connections for the operating magnets of said printing wheels consecutively completed by the operation of said step-by-step switch whereby said magnets are operated by said control relay, a printing magnet for said printing wheels, a circuit for said printing magnet closed after the printing wheels have been operated, a release magnet for said step-by-step switch, and a circuit for said release magnet controlled by the printing magnet to release said switch.

In testimony whereof we affix our signatures.

ROBBINS TILDEN.
THOMAS A. TILDEN.