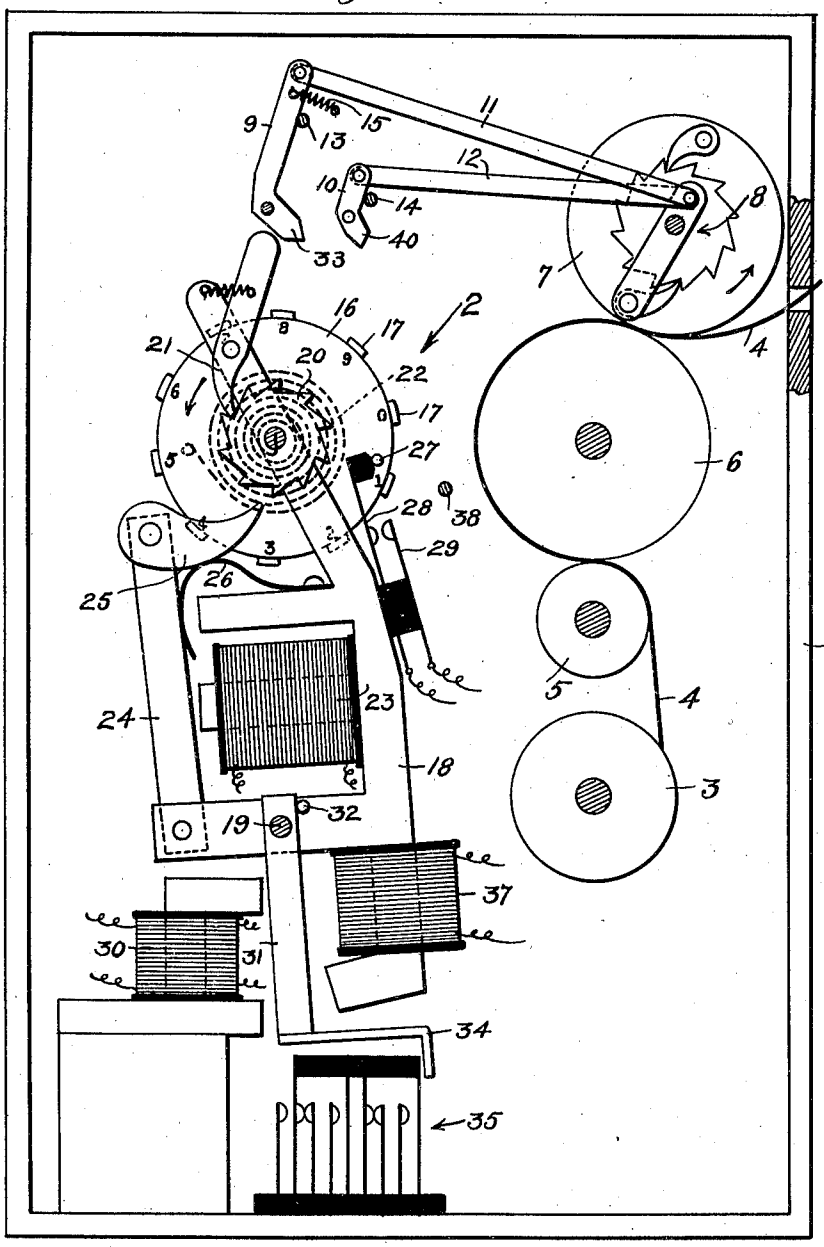
March 23 , 1926. 1,577,869

B. PODOLSKY

RECORDING INSTRUMENT

Filed Feb. 21, 1920 2 Sheets-Sheet 1

Fig. 1.



INVENTOR

Boris Podolsky

BY

Edmund A. Thacher

ATTORNEY

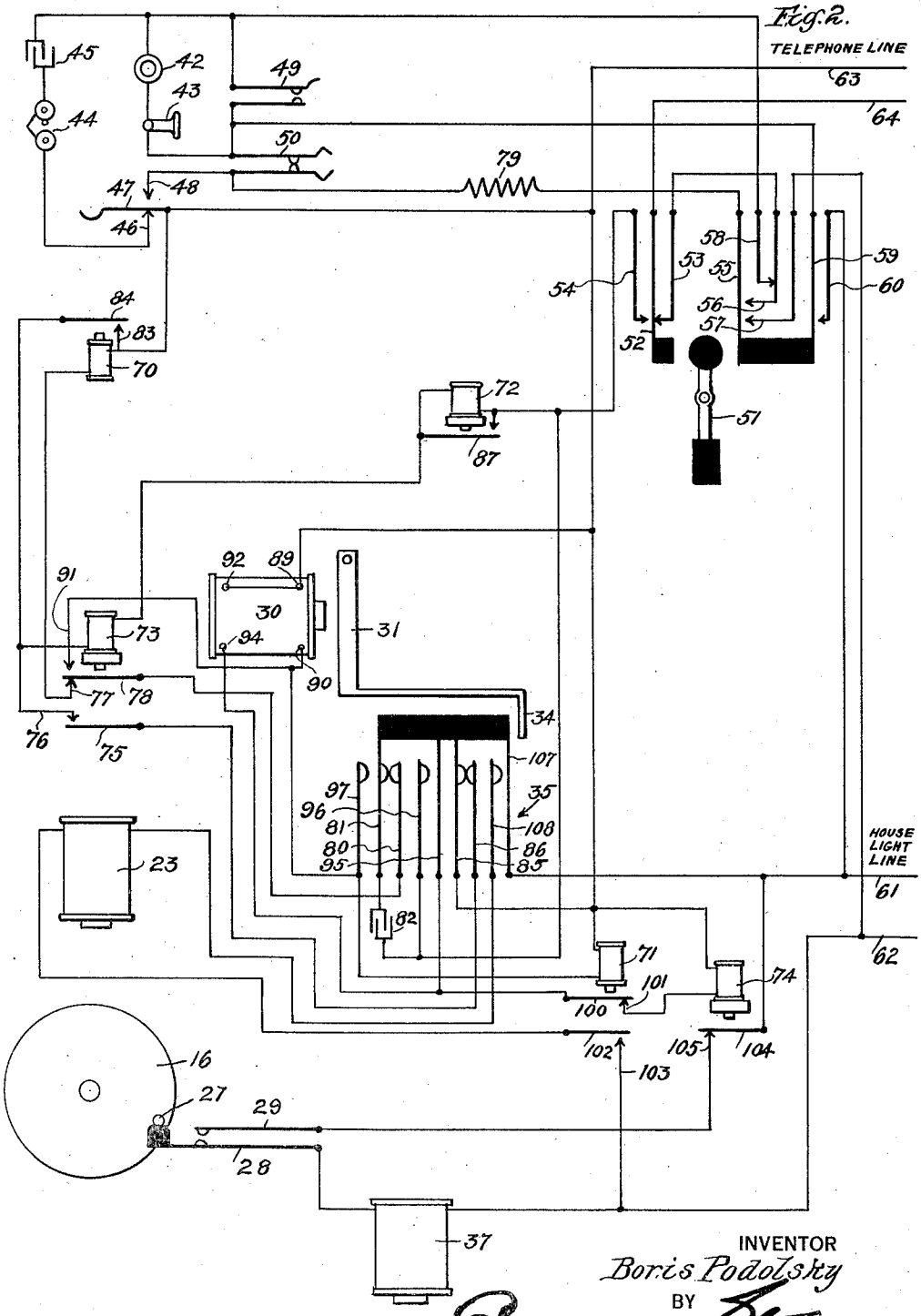
March 23, 1926. 1,577,869

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RECORDING INSTRUMENT

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Fig. 2.



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UNITED STATES PATENT OFFICE.

BORIS PODOLSKY, OF LOS ANGELES, CALIFORNIA.

RECORDING INSTRUMENT.

Application filed February 21, 1920. Serial No. 360,363.

To all whom it may concern:

Be it known that I, BORIS PODOLSKY, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Recording Instruments, of which the following is a specification.

My invention relates to electrically operated recording mechanism adapted for use in connection with automatic and auto-manual telephone systems.

The main object of my invention is to provide an electrically operated recording mechanism to be used in connection with telephone systems, whereby when a party calls another party and receives no answer, he may register his number at the office or home of the party called, in order that the party called may know who has been calling him during his absence.

A further object of my invention is to provide a recording instrument, capable of registering any number of individual calls, which will be properly separated, in order that the party called may have a full and complete record of all calls made during his absence.

Another object of my invention is to provide means for automatically notifying the party calling that the party called is not present, in order that no time need be wasted in waiting for an answer to his call.

I accomplish the above and other objects by means of the apparatus herein described and illustrated in the accompanying drawings, in which:

Fig. 1 represents in side view a recording instrument, suitably mounted in a box, some of the electrical units which may also be mounted in said box not being shown.

Fig. 2 is a diagram illustrating the application of my recording apparatus to an automatic or auto-manual telephone system.

In carrying out my invention, 1 represents a suitable box adapted to be mounted adjacent a telephone set, in which is housed a recording instrument 2. The recording instrument 2 comprises suitably electrically operated mechanisms for impressing a selected number on a strip of paper and for feeding said paper progressively, as the numerals are impressed thereon. More specifically 3 is a spool journaled on a suitable shaft which is supported in the sides of box 1, upon which is wound a strip of narrow waxed paper 4 which passes over an idler roller 5 also journaled on a suitable shaft secured to sides of box 1. The paper 4 passes between roller 5 and a platen roller 6 journaled on a shaft supported in box 1, takes a half turn around platen roller 6 and then passes between said roller and a feed roller 7 mounted to revolve on a suitable shaft supported in the walls of box 1, and passes out through a slot in the wall of box 1. By this construction it will be seen that when feed roller 7 is revolved in the direction indicated by the arrow, the paper 4 will be fed out through the slot in box 1.

The roller 7 is adapted to be intermittently revolved by means of a well known pawl and ratchet construction 8, which is connected to suitable bell crank levers 9 and 10 pivoted to the side walls of box 1, by means of the links 11 and 12 respectively. The bell crank levers 9 and 10 are held normally against stop pins 13 and 14 by means of the spring 15, as clearly shown. A disc 16 provided with a plurality of raised numerals 17 numbered from 0 to 9, is mounted to revolve intermittently in the direction indicated by the arrow on an upwardly extending arm of a frame 18, which is loosely pivoted to a pin 19 supported on the side walls of box 1, and is provided with a ratchet wheel 20, and is retained in a normal position by means of a pawl 21 pivoted on the upwardly extending arms of frame 18 against the action of a coil spring 22.

The disc 16 is adapted to be intermittently rotated to present the desired numeral in proper relation with the paper 4 on platen 6, by means of the magnet 23 mounted on frame 18 provided with the armature 24, which carries a pawl 25 adapted to engage with the teeth of ratchet wheel 20 at the proper time. The pawl 25 is normally held out of engagement with the teeth of ratchet wheel 20 by means of the spring 26 secured to the frame 18 which engages with armature 24 and pawl 25 for this purpose.

A pin 27 secured to disc 16 is adapted to normally hold the contact spring members 28 and 29 which are mounted on frame 18 out of contacting relation, but upon revolution of said disc in the direction indicated by the arrow, the pin 27 moves away from contact member 28 which is then released, and makes contact with member 29.

A starting magnet 30 is secured in box 1, and is adapted to energize an armature 31 which is loosely mounted on pin 19 to move frame 18 to a vertical position, the upwardly extending end of said armature being adapted to engage with a pin 32 for this purpose. When frame 18 is moved to a vertical position the upwardly extending end of pawl 21 engages with the end 33 of bell crank lever 9 and thereby rocks said lever and operates the feeding mechanism to shift the paper 4 a sufficient distance to form a space between groups of numerals.

When the frame 18 is shifted to a vertical position the hook 34 mounted on armature 31 operates to shift a group of spring contact members 35 which are secured in box 1. The frame 18 is adapted to move from the vertical position towards the right in order that a numeral 17 on disc 16 may form an impression on paper 4 and to this end the magnet 37 is mounted on the lower end of frame 18 which when energized acts to draw frame 18 towards armature 31. During this operation the spring contact member 28 engages with a pin 38 secured to box 1 and thereby breaks contact between members 28 and 29. Also during this operation and just previous to making an impression on the paper 4, the upper end of pawl 21 engages with the end 40 of bell crank 10 and actuates said bell crank to shift the paper a short distance in order that the following numerals of a given number may be impressed on the paper.

The contact between members 28 and 29 is not broken until just after the impression is made and when broken, de-energizes magnet 37, thereby allowing frame 18 to once more assume its central position by force of gravity, it being understood that frame 18 is so weighted as to move in a counter-clockwise direction from the extreme position to which it is moved clockwise by the electromagnets 30 and 37. During this movement the end of pawl 21 engages with arm 40 of bell crank lever 10 and thereby releases ratchet 20 and permits the spring 22 to return the disc 16 to a normal position, ready to be ratcheted to the next desired numeral. At the same time the pin 27 operates to open the spring contact members 28 and 29.

Referring to Fig. 2 of the drawings, 42 is a transmitter and 43 a receiver of the subscriber's telephone; 44 is the usual ringer, 45 a condenser, and 46 a spring contact member inserted in the line. The receiver hook 47 operates between the spring contact members 46 and 48. If automatic telephone be used there will be found a pair of shunt springs 49 and the impulse springs 50 in the circuit. In the auto-manual system the subscriber upon deciding that the called party is not at home may ask the central station operator to dial his number for him. In the manual system a separate dial with the springs 49 and 50 may be provided.

A switch handle 51 is preferably mounted in box 1 and may be moved either to the right or to the left from its normal vertical position. If moved to the right the spring contact member 52 is disconnected from the spring contact member 53 and brought in contact with the spring contact member 54. If moved to the left the spring 55 is brought in contact with springs 56 and 57 after which the springs 56 and 58 are disconnected, and at the same time the spring 59 is connected to the spring 60. The springs 57 and 60 are connected to the ordinary house-light alternating current circuit 61 and 62, while the spring 52 is connected to one of the wires of the telephone line 63 and 64.

Relays 70 and 71 are ordinary alternating current relays. Relay 72 is a high resistance retarded relay. Relays 73 and 74 are also retarded relays, the relay 73 being adjusted to operate in series with relay 72. The spring contact members 75 and 76 are adapted to make contact before contact between spring members 77 and 78 is broken. All relays are of the type ordinarily used in automatic systems.

The operation of the device is as follows: When a subscriber desires to call up a party, the receiver is removed from the hook in the usual manner, which closes a circuit from the line wire 64, through the spring contact members 52, 53, 56 and 58, the transmitter 42, receiver 43 (or through the shunt springs 49) through the impulse spring contact member 50, spring contact member 48, and receiver hook 47, to the line wire 63. Thus the desired number may be called in the usual manner.

All the subscribers who are provided with the recording instrument, when present should leave the switch handle 51 at a normal position as shown in Fig. 2, and when absent should leave said handle to the right to close the circuit between spring contact members 52 and 54.

Upon receiving a signal in a manner which will hereinafter be described, that the party called is not at home, the party calling moves the switch handle 51 of his instrument to the left which closes a circuit from the alternating current house light line 61, through the spring contact members 60 and 59, impulse spring contact members 50 and 48, receiver hook 47, line 63, back through line 64, spring contact members 52, 53, 56 and 57 to line 62. At the same time a high resistance shunt 79 is placed across the line which serves a double purpose; first it maintains the necessary current through the line relay at the central

station, and secondly it prevents the discharge from the line condensers from welding the impulse springs 50 together.

The party calling now dials his own number in the usual manner which transmits alternating current impulses to the recording apparatus of the party being called, and registers said number on the waxed paper 4.

When a party whose number for example it 623 calls a subscriber who is not in, the circuit is closed through the ringing generator at the station, through line 63, relay 70, spring contact members 77, 78, 80, 81, condenser 82, spring contact members 54, 52, and line wire 64. Relay 70 will then actuate spring contact members 83 and 84, to close a direct current circuit through the back-bridge relay at the station, (not shown) through line wire 63, spring contact members 83 and 84, relay 73, relay 72, spring contact members 54 and 52, to line wire 64. The relay 73 at this time will actuate the contact member 75 to form its own locking circuit, which can be traced from line wire 63, spring contact members 85, 86, 75, 76, relays 73, and 72, spring contact members 54 and 52, to line wire 64. A moment later relay 73 will actuate contact member 78 to open the circuit through the relay 70, and to close a circuit through contact member 79. Relay 72 will now alternately lift and drop its armature 87 which will cause a succession of clicks to be heard in the receiver of the calling party, which may be recognized as the signal that the called party is not in. If the party calling wishes to leave a record of his call, he will now move the switch handle 51 of his instrument to the left and dial his own number, i. e., 623. As soon as his switch handle is shifted the alternating current will pass through the line 63, the terminal 89 of the alternating current winding of the starting magnet 30, the terminal 90, spring contact members 91, 78, 80 and 81, condenser 82, spring contact members 54 and 52, to line 64. The starting magnet 30 will then actuate the mechanism above described to shift the paper 4 a suitable distance, and at the same time shift the group of springs 35, thus breaking the circuit through the relays 72 and 73, and closing a direct current locking circuit through magnet 30, through wire 63, terminals 89, 92, direct current winding of the magnet 30, terminal 94, spring contact members 95, 96, 54 and 52 to line 64. The magnet 30 will therefore remain energized as long as the connection between the two telephones is retained. During this time the alternating current from the line 63 will pass through the relay 71, spring contact members 97 and 81, condenser 82, spring contact members 54 and 52, and the line 64, thereby energizing relay 71, which will operate to break the circuits through armature 100 and contact 101, and armature 102 and contact 103 until the party calling begins to dial his own number.

The first numeral to be dialed by the party calling is 6, which he proceeds to dial in the usual way. With each impulse the circuit of the alternating current through the relay 71 will be interrupted and its armature will drop. At such a time a circuit can be traced from the line 63, through the relay 74, springs 101, 100, 95, 96, 54, 52, and the line 64, thus breaking the circuit at 104 and 105. The relay 74, being a slow acting relay will therefore remain energized until the impulses cease. At the same time a circuit is completed through the alternating current line 61, spring contact members 107 and 108, magnet 23, spring contact members 102 and 103, to line 62. The magnet 23 thereby makes six impulses and actuates numeral disc 16 to present the numeral 6 into proper registering relation with the paper 4.

After the last impulse, when numeral 6 on the disc 16 will be opposite the platen 6, the relay 74 will de-energize allowing spring contact members 104 and 105 to close the circuit through alternating current line 61, spring contact 29 and 28, magnet 37 to line 62, it being understood that at this time pin 27 on numeral disc 16 has moved out of the path of member 28 to allow said member and member 29 to contact with each other. The magnet 37 will at this time cause the disc 16 to move into contact with platen 6 and thereby cause the selected number to be stamped on the waxed paper 4. During the stamping operation the spring member 28 comes into contact with pin 38 which opens the circuit between members 28 and 29, thereby allowing the disc 16 to assume a position for the dialing of the subsequent number, which is then impressed upon the paper 4 in a similar manner.

After all the figures of the desired number have been recorded, the party calling places the receiver on the hook, thus breaking the connection between the two telephones. The starting magnet 30 will then become de-energized and the entire mechanism will assume normal position, ready to receive the next call.

What I claim is:

1. In an automatic telephone system in which an impulse wheel is used to secure necessary connections, a substation equipment comprising a number recording device and suitable electric units and circuits cooperating with said impulse wheel and number recording device whereby said number recording device may be operated by the said impulse producing wheel.

2. In a telephone system provided with an impulse producing mechanism, substation equipment comprising a number recording instrument actuated by a series of alternating current impulses and suitable electric circuits and units cooperating with said impulse producing mechanism, whereby said impulse producing mechanism may be operated to record a number.

3. In a telephone system provided with an impulse producing mechanism, substation equipment comprising a number recording instrument actuated by a series of alternating current impulses, an alternating current lighting circuit and suitable electric circuits and units connecting said source of alternating current with said impulse producing mechanism, whereby said impulse producing mechanism may be operated to record a number.

4. In a telephone system, substation equipment comprising a normally closed impulse switch, a source of alternating current, a normally open switch connecting said source of alternating current in series with said impulse switch across the telephone line, a relay responsive to alternating current only, recording mechanism controlled by said relay and a second normally open switch connecting said relay across said line.

5. In an automatic telephone system, substation equipment, comprising an impulse switch, a source of alternating current, a normally open switch connecting said source of alternating current in series with said impulse switch across the telephone line, a relay responsive to alternating current only, recording mechanism and an answer back signal controlled by said relay, and a second normally open switch connecting said relay across said line.

6. In a telephone system, substation equipment comprising a normally closed impulse switch, a source of current of different character from that of the telephone operating current, a normally open switch connecting said source of current in series with said impulse switch across the telephone line, a relay responsive only to the current of said source, a second normally open switch connecting said relay across said line, an answer back signal, a recorder starting magnet, and means controlled by said relay for connecting said answer back signal and recorder starting magnet across said line through said normally open switch.

7. In a telephone system, substation equipment comprising an impulse switch, a source of alternating current, a normally open switch connecting said source in series with said impulse switch across the telephone line, a relay, a second normally open switch, a circuit across said line including in series said relay and said second normally open switch, a second circuit controlled by said relay, and recording instrument controlled by said second circuit.

8. In a telephone system provided with an impulse producing mechanism, substation equipment comprising a number recording instrument, connected to a telephone set of a subscriber called by another subscriber, and suitable electric units and circuits whereby the calling subscriber may actuate said number recording instrument by operating said impulse producing mechanism.

9. In a telephone system, substation equipment comprising a normally open manually operable switch, a device for producing a series of electric impulses, a relay responsive to ringing current, connected to the telephone line through said switch, and suitable electric circuits and units, cooperating with said relay and said telephone system to stop the ringing current and to connect said impulse producing device to said telephone line.

10. In a telephone system, substation equipment comprising a normally open manually operable switch, a relay responsive to alternating current connected across the telephone line through said normally open switch, means controlled by said relay for giving an answer back signal and for disconnecting said relay and connecting across the line a recorder actuating magnet.

11. In a telephone system, substation equipment comprising a number recording instrument and suitable electric units and circuits whereby said recording instrument may be operated to record a plurality of numbers and to automatically separate said numbers.

In witness that I claim the foregoing I have hereunto subscribed my name this 6th day of February, 1920.

BORIS PODOLSKY.