

C. L. GOODRUM & L. VON NAGY.

IMPULSE SENDER.

APPLICATION FILED MAY 1, 1916.

1,237,503.

Patented Aug. 21, 1917.

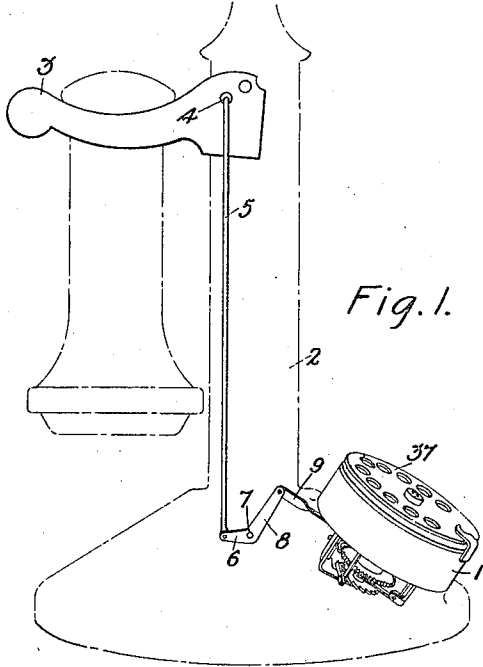


Fig. 1.

Fig. 5.

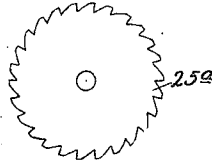


Fig. 6.

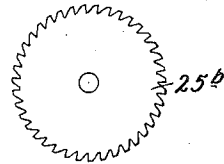


Fig. 7.

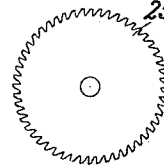


Fig. 4.

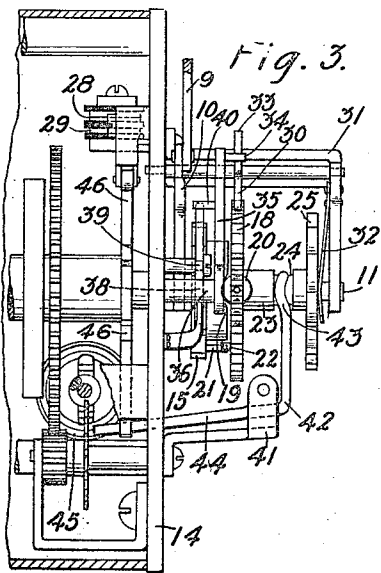
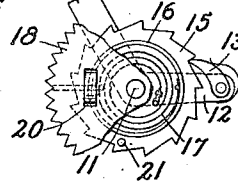


Fig. 3.

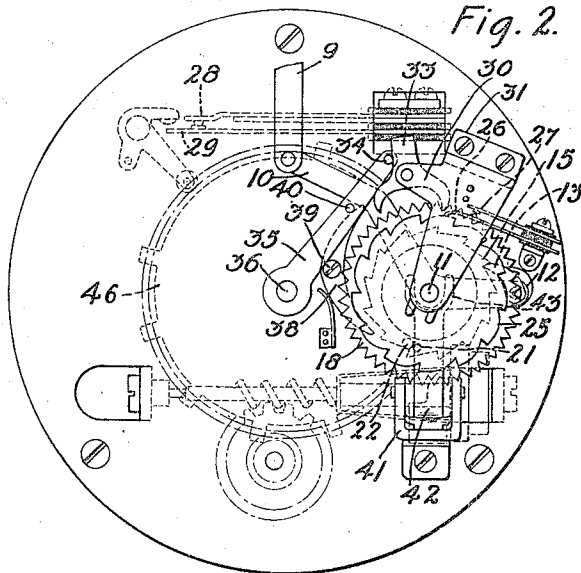


Fig. 2.

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UNITED STATES PATENT OFFICE.

CHARLES L. GOODRUM, OF NEW YORK, AND LADISLAUS VON NAGY, OF BROOKLYN, NEW YORK, ASSIGNORS TO WESTERN ELECTRIC COMPANY, INCORPORATED, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

IMPULSE-SENDER.

1,237,503.

Specification of Letters Patent. Patented Aug. 21, 1917.

Application filed May 1, 1916. Serial No. 94,846.

To all whom it may concern:

Be it known that we, CHARLES L. GOODRUM, a citizen of the United States, residing at New York, in the county of New York and State of New York, and LADISLAUS VON NAGY, who arrived in New York from Hungary in October, 1906, when sixteen years of age, declared his intention of becoming a citizen of the United States August 10, 1908, enlisted in the United States Army August 12, 1908, and was honorably discharged August 11, 1911, has been a constant resident of the United States since his arrival, and took out his final naturalization papers May 4, 1916, now residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Impulse-Senders, of which the following is a full, clear, concise, and exact description.

This invention relates to a sending device for use in automatic or semi-automatic systems where it is desired to identify the subscriber making the call.

One object of the invention is to provide a sending device having means beyond the control of the calling subscriber to transmit a definite identifying series of impulses.

A further object is to provide means to prevent the operation of such a sending device until the receiver has been removed from the hook.

A still further object is to insure that the parts will, under all circumstances, return to normal position.

In the drawings, Figure 1 is a perspective view showing the invention applied to a desk set telephone; Fig. 2 is a rear view of the device; Fig. 3 is a side view, the surrounding casing being shown in section; Fig. 4 is a detailed view of the actuating lever and pawl, together with the spring connection between the ratchet and escapement wheels; and Figs. 5, 6 and 7 illustrate different wheels regulating the preliminary impulses sent, said wheels differing according to the respective party number of the telephone on which they are to be used.

In the drawings in which the same reference characters represent the same parts, 1 represents a sender which is secured to the base of a telephone stand 2 in any convenient manner. Pivottally secured to the stand 2 is a switchhook 3 having an open-

ing 4 therethrough in which is mounted one end of a rod 5. The rod 5 is secured at its other end to one arm 6 of a bell crank lever, which is pivoted at 7 to the telephone and has its other arm 8 pivottally secured to an arm 9. This arm is in turn pivottally secured to one arm 10 of a second bell crank lever pivoted on the bearing stud 11. This lever has a second arm 12 carrying a spring-pressed pawl 13.

The stud 11 is mounted in suitable supports on a back plate 14 of the casing proper of the sending device 1. The stud 11, in addition to the second bell crank lever, carries a ratchet wheel 15 with which the pawl 13 engages. Securely mounted on the wheel 15 is an annular casing 16 to which one end of a spiral spring 17 is secured, the other end being secured to an escapement wheel 18 which is mounted on the stud 11 so as to have both pivotal and longitudinal movement. The wall of the casing 16, adjacent to the wheel 18, has a curved notch 19 acting as a cam surface on which a roller 20, pivoted in an opening of the wheel 18, rests and which serves to keep the wheels 15 and 18 normally in the relative positions shown in Fig. 3.

The spring 17 serves to revolve the wheel 18 in a counter-clockwise direction. The wheels 15 and 18 are provided with stop pins 21 and 22, respectively, which engage and prevent further relative rotation of the wheels when the notch 19 and roller 20 have been brought into registration.

Fixed to the wheel 18 and surrounding the stud 11 is a barrel 23 having an annular groove 24 therein for a purpose to be hereinafter described. Fixed to the barrel 23 is also an impulse wheel 25 having a series of cam teeth. The number and arrangement of teeth on each impulse wheel will be in accordance with the designation of the substation at which it is to be used. Mounted adjacent to and held normally closed by the cam teeth of the impulse wheel 25 are two contact members 26 and 27. The lower member 26 is of spring material which acts to maintain the free end thereof in contact with the edge of the wheel 25. When the spring 26 drops into a notch of the impulse wheel 25, the contact members 26 and 27 are separated but are again closed by the spring contact 26 riding up on the next tooth.

These contact members may be connected in series with the circuit controlled by the hook-switch and also in series with the contact springs 28 and 29 of a well-known type of calling device, such as shown in United State Patent No. 1,164,626. These contact members operate to send a preliminary series of impulses which may be used to effect the operation of means to identify the calling subscriber, or on a party line to associate the calling subscriber's message register with its operating means, as disclosed in an application to C. L. Goodrum, Serial No. 106,603, filed June 29, 1916. The succeeding series of impulses operate to select the number called in the usual manner.

Actuation of the finger hole plate 37, when the receiver is on the hook 3, will have no effect as the line will be open at the hook-switch, and furthermore, no movement of the wheels 15, 18 and 25 will be possible until the hook-switch is moved.

In Fig. 2 the impulse wheel 25 and ratchet wheel 15 have an equal number of teeth, so that for each tooth moved by the ratchet wheel 15, the impulse wheel 25 will also move one tooth if the escapement wheel 18 be freed, as hereinafter described, thus actuating the contacts 26 and 27 to give a single impulse. If the invention is applied to a party line as described in the above noted application, the impulse wheel 25 shown in Fig. 1 might be used for party I, while impulse wheels 25^a, 25^b, 25^c of Figs. 5, 6 and 7, having two, three and four teeth, respectively, to each one of the ratchet teeth of the wheel 15 so as to transmit two, three and four impulses respectively at each actuation, might be used for parties II, III and IV respectively. Obviously, this arrangement is not limited to four parties but is capable of further extension.

Between the right end of the barrel 23 and the bracket 31, surrounding the stud 11 and pressing against the wheel 25 to hold it normally to the left, is a spring 32.

To prevent too rapid a movement of the impulse wheel 25, an escapement pawl 30 is carried by an arbor mounted pivotally between back plate 14 and the bracket 31, which bracket also carries the stud 11. A pin 34 carried by an arm 35 fixedly secured to a rotatable shaft 36, normally presses against an extension 33 of the pawl 30. This shaft 36 is an extension of the central shaft of the usual finger hole plate 37 of a sender of the type illustrated in Patent No. 1,164,626 which shaft turns with the movement of the finger hole plate, and in the present construction carries the arm 35 therewith.

The arm 35 is so placed that when the finger hole plate 37 is in its normal position, the pin 34 engages the extension 33 of the pawl 30, as shown in Fig. 2, and prevents rocking of the pawl and consequent move-

ment of the escapement wheel 18. Therefore, no actuation of the wheels 18 and 25 can take place until the finger hole plate 37 has been first rotated in setting up a call, thus drawing the pin 34 with arm 35 from engagement with extension 33 and permitting rotation of said wheels through a mechanism now to be described.

A detent 38 is pivoted on a stud 39 secured to the plate 14 and is arranged to engage the ratchet wheel 15 to prevent return movement thereof. Arm 35 has a second pin 40 secured thereto, normally engaging the rear end of the pawl 38 to hold it out of engagement with the ratchet wheel 15. Thus, unless the finger hole plate be moved to send in a call, the ratchet wheel 15 will move with the pawl 13 back and forth, since in the normal position of the dial the detent 38 cannot operate. The first set of impulses, stored up by the movement of the finger hole dial 37, cannot be sent until the sending of the automatic preliminary impulses has been completed.

In order to prevent the series of impulses set up by the subscriber in making his call from being operated before the first series of impulses has been completed, an L-shaped lever 42 is pivoted to a bracket 41 mounted on the plate 14. One arm of this lever has a yoke 43 seated in the annular groove of the barrel 23 and actuated by longitudinal movement of said barrel on the stud 11 to raise or lower the other arm 44 which passes through a suitable opening in the plate 14 into position to engage or release the governor 45 of the main impulse sender. The preliminary impulses must first be completed and the wheels 15 and 18 be in their normal position, in which the arm 44 of the L-shaped lever is lowered to release the governor 45, before the impulses stored up by the turning of the finger hole dial 37 can be transmitted to set up the connection to the called line. The governor 45 is of the rotatable type, and the arm 44 of the L-shaped lever is arranged to engage one of the governor arms to prevent movement of the governor until the preliminary series of impulses has been sent and the wheels 15 and 18 are back in their normal position.

The operation of the device is as follows:

The subscriber desiring to make a call first raises his receiver from the hook, which operates through the rod 5, arms 6 and 8 of the bell crank lever, arm 9, and arms 10 and 12 of the second bell crank lever to move the pawl 13 forward, carrying with it the ratchet wheel 15. The escapement wheel 18 is locked against rotation by the escapement pawl 30 held in place by pin 34 on arm 35. The wheel 15 alone rotates, and the cam surface 19 on the annular casing 16 acts to force the roller 20 with its escapement wheel 18 and barrel 23 to the right on the stud 11.

This movement is transmitted to the arm 44 of the L-shaped lever 42 by the yoke 43 seated in the annular groove 24 of the barrel 23, and acts to raise the arm 44 into position to prevent rotation of the governor 45 of the main sending device.

This much will take place each time the receiver is moved from the hook, whether for answering the call or for any other purpose. If a call is to be made, the finger hole plate 37 must be rotated to set up the number called, and the first movement rotates the arm 35 with its pins 34 and 40 from engagement with the extension 33 of the escapement pawl 30 and from the detent 38 respectively.

The detent 38 then engages a tooth of the ratchet wheel 15 and prevents its following the pawl 13. In the turning of the wheel 15, while the escapement 18 was held against movement, the tension of the spring 17 was increased, and on the release of the pawl 30, the spring 17 acts to rotate the wheels 15 and 18 into their registering position. The stop pins 21 and 22 keep the spring 17 from carrying the parts beyond this position. The movement of the escapement wheel 18 produces a movement of the impulse wheel 25 with the consequent breaking and making of the circuit passing through the contact members 26 and 27, thus creating impulses which may be employed to actuate suitable mechanism to connect the proper party line meter in the registering circuit, or to record the fact that a certain subscriber has made a call. The use and purpose of the present invention in toll and measured service is obvious.

The movement of the finger hole plate 37 to set up the first number of the line being called has been started before the impulse wheel 25 is free to travel, but there is no danger of the series of impulses, representing the first digit of the number of the line being called, interfering with the series of impulses automatically sent to identify the calling line, since governor 45 is held against movement by the lever arm 44 until the preliminary series of impulses are over and the roller 20 is seated in the notch 19. This allows the barrel 23 to be moved to the left in Fig. 3 by the spring 32, carrying the yoke 43 to the left and allowing the series of impulses, stored up by the first movement of the finger hole plate 37, to be sent out. From this point the rest of the series of impulses will be transmitted in the usual manner.

When the conversation is over the receiver will be hung up and the ratchet wheel 15 will follow the pawl 13 to normal position ready for subsequent use.

Should the receiver be hung up after the operation of the finger hole plate 37 but before the sending of the preliminary impulses

has been completed and the arm 44 has returned to normal position, the pawl 38 will engage the ratchet wheel 15 and hold it against movement, and the pawl 13 will ride over and engage the next tooth ready for subsequent action, when the receiver is again removed from the hook and the finger hole plate 37 is operated. The escapement 18 being free to move until the arm 35 returns to normal position, the device will have sent the proper preliminary impulses through the impulse wheel 25, the notch 19 and roller 20 will be in engagement, and the lever arm 44 withdrawn. The governor 45 can then rotate and run down the main actuating wheel 46 of the main impulse sender. Thus, no matter in what position the parts may be when the receiver is hung up, the parts will all be automatically actuated to bring them back to normal position ready for subsequent use.

What is claimed is:

1. The combination with a main impulse sending device, of an auxiliary sending device, and means controlled by the actuation of said main device to permit the automatic operation of said auxiliary device on setting movement of said main sending device.

2. The combination with an impulse sending device, of means for automatically sending an auxiliary impulse, said means comprising an auxiliary interrupter, means to set the interrupter, and means to release the interrupter actuated by the first setting movement of said sending device.

3. The combination with a sending device, of means for automatically sending a preliminary impulse when said sending device is operated to send the first series of impulses, said means comprising an auxiliary interrupter, means to set the interrupter, and means to release the interrupter upon setting movement of said sending device.

4. The combination with a sending device, of means for automatically sending a preliminary impulse, said means comprising an interrupter, a switchhook, means controlled by said hook to set said interrupter, and means for releasing the interrupter on initial movement of said sending device.

5. The combination with a sending device, of means for automatically sending identifying impulses, said means comprising an interrupter, means to set the interrupter, means to release the interrupter upon initial movement of said sending device, and means to prevent impulses from said sending device being transmitted during the sending of the impulses controlled by said interrupter.

6. The combination with a sending device, of means for automatically sending a special series of impulses, said means comprising an interrupter, means to set the

interrupter, means to release the interrupter upon setting movement of said sending device, and means to prevent impulses from said sending device being transmitted until the impulses controlled by the interrupter have been sent.

7. The combination with a sending device, of means for automatically sending an impulse, said means comprising an interrupter, means to set the interrupter, means to release the interrupter upon setting movement of said sending device, and means to prevent impulses from said sending device being transmitted coincident with the sending of the impulses controlled by the interrupter.

8. The combination with a sending device, of means for automatically sending an impulse, said means comprising an interrupter, means to set the interrupter, means to release the interrupter upon setting movement of said sending device, means to prevent the impulses set up by operation of said sending device being transmitted prior to the sending of the impulses controlled by the interrupter, means for storing up impulses set up by the operation of said sending device, and means for releasing said storing means when the impulses controlled by said interrupter have been sent.

9. In a sending device, an operating lever, a pawl thereon, a ratchet wheel engaged by said pawl, a second ratchet wheel, contacts, means on said second wheel to operate said contacts, means to normally keep said wheels in registering position, and means to normally hold the second wheel against movement when the first wheel is moved, said means comprising a pawl to engage said second wheel and a movable arm normally holding said pawl in engagement with said second wheel, said arm being movable to release said pawl and allow said wheels to move into registration.

10. In a sending device, a main impulse device, a governor therefor, an operating lever, a pawl thereon, a wheel engaged by said pawl, a second wheel, means to normally keep said wheels in registering position, means to normally hold the second wheel against movement when the first is moved, a movable member normally holding said second wheel against movement, contacts controlled by said wheel when moved, and means controlled through movement of one of said wheels to lock said governor against movement until said second wheel has been released and returned to its registering position with the first wheel.

11. A sending device, a governor therefor,

a pivoted lever having two arms, one arm adapted to engage said governor to lock it against movement, the second arm movable to carry said first arm into and out of engagement with said governor, a slidable member having a groove in which one end of the second arm rests, a cam cooperating with said slidable member to slide the same, thereby moving the first arm into engagement with said governor and on retraction permitting the sliding member to free the first named arm of the lever from said governor, and means to operate said cam.

12. In combination, a sending device, a speed governor for said device, an arm normally out of engagement with said governor, a movable hook, and means operated through the movement of said hook for moving said arm to lock and release said governor.

13. In a sending device, an operating member, a pawl thereon, a wheel engaged by said pawl, a second wheel, said wheels being rotatable with respect to each other, means to normally hold said wheels in registering relation, means to normally prevent the movement of the second wheel on movement of the first, impulse means carried by said second wheel, contacts automatically actuated by said impulse means, and means to release said second wheel whereby said impulse means may automatically actuate the contacts.

14. In a sending device, an impulse mechanism, a governor therefor, an operating member, a pawl thereon, a stud, a ratchet wheel on said stud engaged by said pawl, a cam carried by said wheel, a second ratchet wheel on said stud rotatable and slidable with respect to said first wheel, means on said second wheel cooperating with said cam to move said second wheel longitudinally of said stud, means normally holding said wheels in registering position, a second pawl to engage the teeth on said second wheel, an arm movable with said impulse mechanism, means on said arm normally engaging said second pawl to prevent movement, a detent pawl to engage said first wheel, means on said arm to normally hold said detent pawl out of engagement with said first wheel, a lever partaking of said longitudinal movement of the second wheel to lock and release said governor, an impulse wheel movable with said second wheel and contacts controlled by movement thereof.

In witness whereof, we hereunto subscribe our names this 29th day of April, A. D., 1916.

CHARLES L. GOODRUM.
LADISLAUS VON NAGY.