

H. A. WATSON.
TIME RELAY FOR SELECTIVE SIGNALING.
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917,916.

Patented Apr. 13, 1909.
2 SHEETS—SHEET 1.

Fig. 1.

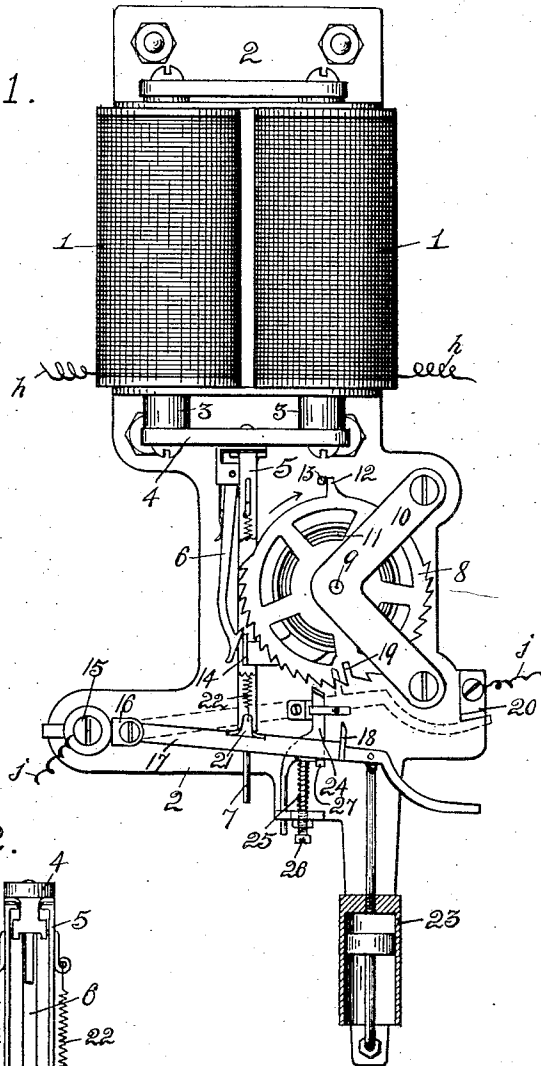
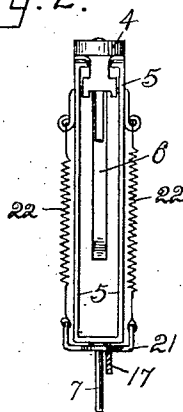


Fig. 2.



WITNESSES:

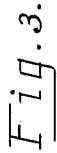
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE

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TIME-RELAY FOR SELECTIVE SIGNALING.

No. 917,916.

Specification of Letters Patent.

Patented April 13, 1909

Application filed March 26, 1906. Serial No. 423,327.

To all whom it may concern:

Be it known that I, HARRIS A. WATSON, a citizen of the United States, and a resident of Kendallville, in the county of Noble and State of Indiana, have invented a certain new and useful Time-Relay for Selective Signaling; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates particularly to selective ringing means for use in connection with party-telephones, but is not restricted to such use, as it may be employed in connection with railroad signaling or in other connections for which it may be adapted or appropriate.

A very objectionable feature incident to the use of party-line telephones is the ringing of the bells of all the phones on the line when calling a party to any one of such phones, thus not only making a constant source of annoyance to the parties on the line not intended to be called, but also notifying each of such parties when another is called and making it possible for them to come in on the line and overhear what is being said should they so desire.

An object of my invention is the provision of simple and efficient means which when used in connection with the common type of party-line phones eliminates the permanent bridging of the ringing circuit across the line and enables the party calling to ring only the bell of the party which he desires to call, thus obviating the annoyance incident to the ringing of the bells of all the phones on the line as above described.

The operation, construction and arrangement of the parts of the invention are fully described in the following specification and illustrated in the accompanying drawings, in which,—

Figure 1 is an elevation of the apparatus comprising my invention, with portions broken away and in section. Fig. 2 is a side elevation of the connection between the solenoid-bars and switch-lever thereof. Fig. 3 is a diagram of the circuits of a bridged phone with my apparatus associated therewith and the ratchet-wheel thereof adapted

to permit a closing of the ringing-circuit of such phone on one-impulse of the generator of any other phone on the line, and Figs. 4, 5 and 6 illustrate the ratchet-wheels of other phones on the line adapted to permit a closing of their ringing circuits on the second, third and fourth impulses, respectively.

Referring to the drawings, 1, 1 designate companion solenoid coils, which are carried in a suitable manner by a plate 2, and have bars or magnet cores 3, 3 movable therein and projected from their lower ends, as shown. A yoke 4 connects the outer ends of said bars or magnet cores and has the frame or member 5 and spring-pressed pivoted dog 6 suspended from the central portion thereof in a suitable manner. The frame or member 5 is shown as being rectangular in shape with the dog 6 hanging substantially centrally thereof, and has its lower end provided with a longitudinally projecting pin or stud 7.

8 designates a ratchet-wheel, which is carried by a short shaft 9, the ends of which are journaled in the plate 2 and the bearing-bracket 10 which latter projects from the plate around the outer side of the wheel. This wheel is intended to have intermittent movement imparted thereto in the direction of the arrow due to its teeth being engaged by the dog 6 at each upward movement of the latter. The shaft 9 of the ratchet-wheel is encircled by a coiled spring 11, which acts on the ratchet-wheel to return it to its normal at-rest position when released as hereinafter described. The stopping of the ratchet-wheel at a predetermined point on its return movement is effected by a lug 12 on the wheel engaging a stop-pin 13, which projects from the plate 2. A fixed releasing finger 14 is disposed to coact with the lower end of the dog 6 to effect a disengagement thereof from the ratchet-teeth when the dog is near its limit of lowering movement.

Projecting from the lower portion of the plate 2 is a post 15 carrying a bracket 16 to which one end of a switch-lever 17 is pivoted for vertical oscillatory movements. This lever passes under the ratchet-wheel 8 and is provided with a spur 18, which is intended, when the lever is elevated, to work into a peripheral slot or recess 19 in the wheel when said slot or recess has been moved into register therewith as hereinafter more fully described. The lever 17 when at its limit of upward movement with its spur 18 in the slot or recess 19 is intended to make contact

at its free end with the contact-piece 20, thus closing connection between said contact-piece and the post 15. The lever 17 is provided on its top with a cross-piece 21, which is intended to receive the lower end thrust of the frame or member 5 and is provided with a suitable opening through which the pin 7 of said frame loosely projects. The frame 5 and lever 17 are yieldingly held in contact with each other by the coiled contraction springs 22, one of which is disposed on each side of the frame and attached at its upper end to a part projecting from the upper end portion of the frame and at its lower end to one end of the cross-piece 21 of the lever, as shown in Fig. 2.

Pivotaly suspended from near the outer end of the lever 17 is the cylinder of a dash-pot 23, the piston of which latter has its rod pivoted to the lower end of the plate 2. The purpose of this dash-pot is to retard both the raising and lowering movements of the lever 17, the former of which movements is influenced by the springs 22 when the frame 5 is raised under the energizing action of the coils 1, 1, while the latter is influenced by the weight of the frame 5 and attached parts when the current through the coils is cut out.

24 designates a catch which is mounted for reciprocatory movement at the side of the lever 17 and is influenced by a spring 25 to have its upper end normally engage with a registering tooth on the ratchet-wheel 8 to prevent a return of said wheel to its normal position when released by the dog 6 by which its forward movement is influenced. The catch 24 has its lowering movement limited by an adjusting screw 26, about which the spring 25 is coiled, and is provided with a lug or spur 27, which projects laterally therefrom beneath the lever 17. As the lever nears its limit of lowering movement it engages the lug or spur 27 and effects a release of the catch from engagement with the wheel-tooth.

In Fig. 3; which illustrates the use of my invention in connection with the signaling or ringing circuit of a party-line telephone, *a* and *b* designate the main line wires of a party-line telephone to which are connected the sets of leads A, B, C and D from the different party phones or sub-stations on the line. As the diagram is that of the ordinary bridged telephone, except that my apparatus is placed in series with the ringing circuit, it will only be necessary to refer to such circuit. The leads *c*, *d* of each phone have the magneto-generator *e* in series therewith and are bridged across the line in the ordinary manner when the receiver-hook is down. Also in permanently closed circuit with the leads *c*, *d* is the electro-magnet *f*, with which is associated the hinged armature *g*. This armature, when raised by an energizing of the magnet *f*, is intended to close connection

with the wire *h*, which has in series the batteries *i* and relay coils 1, 1 of the apparatus comprising my invention, and connects at its other end with the coil of the magnet *f*. It will now be apparent that by sending a current over the line the magnet *f* of each phone on the line will become energized, thus effecting an elevation of its armature *g* to close the associated circuit in which the batteries *i* and relays 1 are disposed. The energizing of the relays 1, due to the battery current flowing therethrough, effects a sudden raising of the frame 5 and dog 6 of each phone and a consequent rotation of the ratchet-wheel 8 the length of one tooth. Should there be four or any other number of substations on the line the slot or recess 19 in the ratchet-wheel of each phone will stand the number of teeth from the neutral or at-rest position of the wheel as corresponds to the number of call rings for such phone. For instance, should the calls of the phones A, B, C and D be one, two, three and four rings, respectively, the slots 19 of the wheels of such phones would be one, two, three and four teeth from the neutral point, respectively. As each impulse over the line moves the ratchet-wheels of the several phones the length of one tooth, it will be seen that in calling a party it is necessary to give the same number of impulses as there are teeth disposed between the neutral point and slot 19 of the ratchet-wheel of the part called, which is the same to the party calling as giving one or more rings to the party called. If party "A" is desired, a prolonged impulse is given, which moves the ratchet-wheels 8 of all the phones the length of one tooth so that the slot 19 in the wheel of phone "A" is in register with the spur 18 of the switch-lever 17, and maintains the relay circuit closed a sufficient length of time to enable such lever, which has a slow upward movement due to the retarding action of the dash-pot 23, to raise sufficiently for its spur 18 to work into the slot 19 and its free end to make contact with the contact-piece 20. Upon an opening of the relay circuit the frame 5 and attached parts drop by gravity forcing the lever 17 down therewith against the retarding action of the dash-pot, and lowering the catch 24 to release the wheel to permit it to return to its normal position due to the lever engaging the spur 27 on the catch just prior to its limit of lowering movement. In calling up a party requiring more than one impulse over the line, all of the impulses, except the last, are made comparatively short and in rapid succession so that the ratchet-wheels of all the stations will be turned the desired distance and the switch-levers, due to the retarding action of the dash-pot 23 thereon, permitted to oscillate freely between said wheels and the catches 24 without engaging either, as it is necessary that the catches 24 should not be

released from engagement with the ratchet teeth until after the last impulse. When contact has been made between a switch-lever and contact-piece 20 the ringing-circuit *j* having the bells *k* therein is closed across the line so as to allow a current from the line to flow therethrough and ring the bells. It is desired to make it clear that each impulse over the line will work every relay in unison, but as the slots 19 in the wheels 8 at the different stations are differently positioned relative to the starting-point only one bell can be switched on to the line at one time. As, for instance, three impulses will bring the slot at sub-station C in register with the spur on the switch-lever so that when the spur works up into said slot to effect a closing of the circuit, only the bell at such station will ring.

While the apparatus comprising my invention is, for the purpose of illustration, shown in connection with the signaling or ringing circuits of a party-line telephone, it is apparent that it can be used for other purposes, as, for instance, railway signaling, in which case the relays would be connected directly to the despatcher's wire. It is also apparent that it is not necessary in all cases to employ the electro-magnet *f* and its circuit, for with a direct current in the line of sufficient volume to energize the relay it may be connected directly thereto, and thus do away with the batteries *i*.

I wish it understood that I do not restrict myself to the exact construction and arrangement of the parts of the invention shown and described, as obvious modifications will occur to persons skilled in the art.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is,—

1. In a signaling circuit, a normally open switch, means for retarding the movements thereof, a movable part adapted to normally prevent a closing of said switch except when moved to a predetermined position, a relay, reciprocatory mechanism having yielding connection with the switch and movable by the relay when energized to impart movements to said switch, and means carried by and movable with said mechanism for imparting movements to said movable part.

2. In a signaling circuit, a normally open switch, means for retarding the movements thereof, a movable part adapted to normally prevent a closing of the switch except when moved to a predetermined position, a relay, a member having yielding connection with the switch and movable by the relay when energized to effect a closing movement of the switch, an element movable with said part and adapted to impart a predetermined movement to said movable part at each impulse of the relay, and means adapted to engage with said part to prevent its return to

normal position when the switch is out of normal position.

3. In a signaling circuit, a normally open switch, means for retarding both the opening and closing movements of the switch, a movable part adapted to normally prevent a closing of the switch except when moved to a predetermined position, means acting on said part to normally retain it in one position, a relay, a member having yielding connection with the switch and movable by the relay when energized to effect a closing movement of the switch and adapted to act on the switch to open it when released by the relay, a dog movable with said member and adapted to move said part a predetermined distance at each switch-closing movement of said member, and a catch influenced to normally engage said part to hold it in a position to which it has been moved, said catch being released by an engagement therewith of the switch at its limit of opening movement.

4. In a signal-line, a signal circuit connected thereto, a normally open switch in said circuit comprising a fixed and a movable part, a relay connected to the line, means adapted to normally prevent a closing of the switch and movable to permit such closing, mechanism movable by the relay when energized, said mechanism having a part for co-acting with said means to move it a predetermined distance at each impulse over the line and a part having yielding connection with the movable switch part to influence a closing movement thereof at each impulse to permit the parts of said mechanism and the movable switch part to have differential movements, and means for retarding the closing movement of the switch.

5. In a signal line, a signal circuit connected across the same, a normally open switch in said circuit adapted to open by gravity, a movable member normally serving to prevent a closing of the switch and adapted when moved to a predetermined position to permit such closing, means for retarding the movements of the switch, mechanism electrically operated to impart intermittent movements to said member and having connection with the switch to impart a yielding closing movement thereto when energized, and an element influenced to normally engage said movable member to hold it in moved position except when the switch is in full open position.

6. In a signal-line, a signal circuit connected across the same, a normally open switch in said circuit and having a projection thereon, a rotary member having teeth and provided with an incut, said member being adapted to normally stand with its incut in one position relative to the switch, means for retarding the movements of the switch, mechanism electrically operated to impart yielding closing movements to the switch

and intermittent movements to the rotary member to move the incut therein in register with the switch projection, said switch being adapted to close its circuit when its projection works into said incut, and means normally acting on the rotary member to prevent its return to normal position, said means being adapted to be released by the switch when completely open.

10 7. In a signal-line having a plurality of signal stations connected thereto, a normally open switch disposed in the circuit of each station, a movable member associated with each switch and normally serving to prevent
15 a closing thereof but adapted when moved to a predetermined position to permit such closing, means for retarding the movements of each switch, and mechanism at each station which is electrically operated by im-
20 pulses over the line to effect intermittent movements to said movable member and yielding closing movements to the switch, and a part serving to prevent a return of its movable member to normal position and be-
25 ing automatically released therefrom when its switch is in full open position.

8. In a signal-line, the combination with a plurality of signal circuits connected thereto, of a normally open switch in each circuit,
30 said switch comprising a fixed and a movable part and having the movements of its movable part retarded, and, in association with each switch, mechanism which is electrically operated by impulses over the line to effect
35 a movement of the movable switch part to close the switch when a predetermined num-

ber of impulses are sent over the line, the number of impulses necessary to the closing of the several switches being different for each switch.

9. In a signal-line, the combination with a plurality of signal circuits connected across the same, of a normally open switch in each circuit which has its movements re-
40 tardated, and, in association with each switch, a movable member normally serving to prevent a complete closing movement of the switch but adapted when moved a pre-
45 determined distance to permit such closing, the switch-closing position of the member of each circuit being different from that of the
50 other members, a relay having connection with the line, mechanism movable by the relay at each impulse over the line and having a part which when moved coacts with
55 said member to impart intermittent movements thereto and a part in yielding connection with the switch adapted to impart closing movements thereto at each impulse, and
60 means for engaging said member to prevent a return thereof to normal position when the switch is not in full open position, said means
being automatically released from said member when the switch is in full open position.

In testimony whereof I have hereunto
65 signed my name to this specification in the presence of two subscribing witnesses.

HARRIS A. WATSON.

Witnesses:

WILSON CROOKS,
JAMES CROOKS.