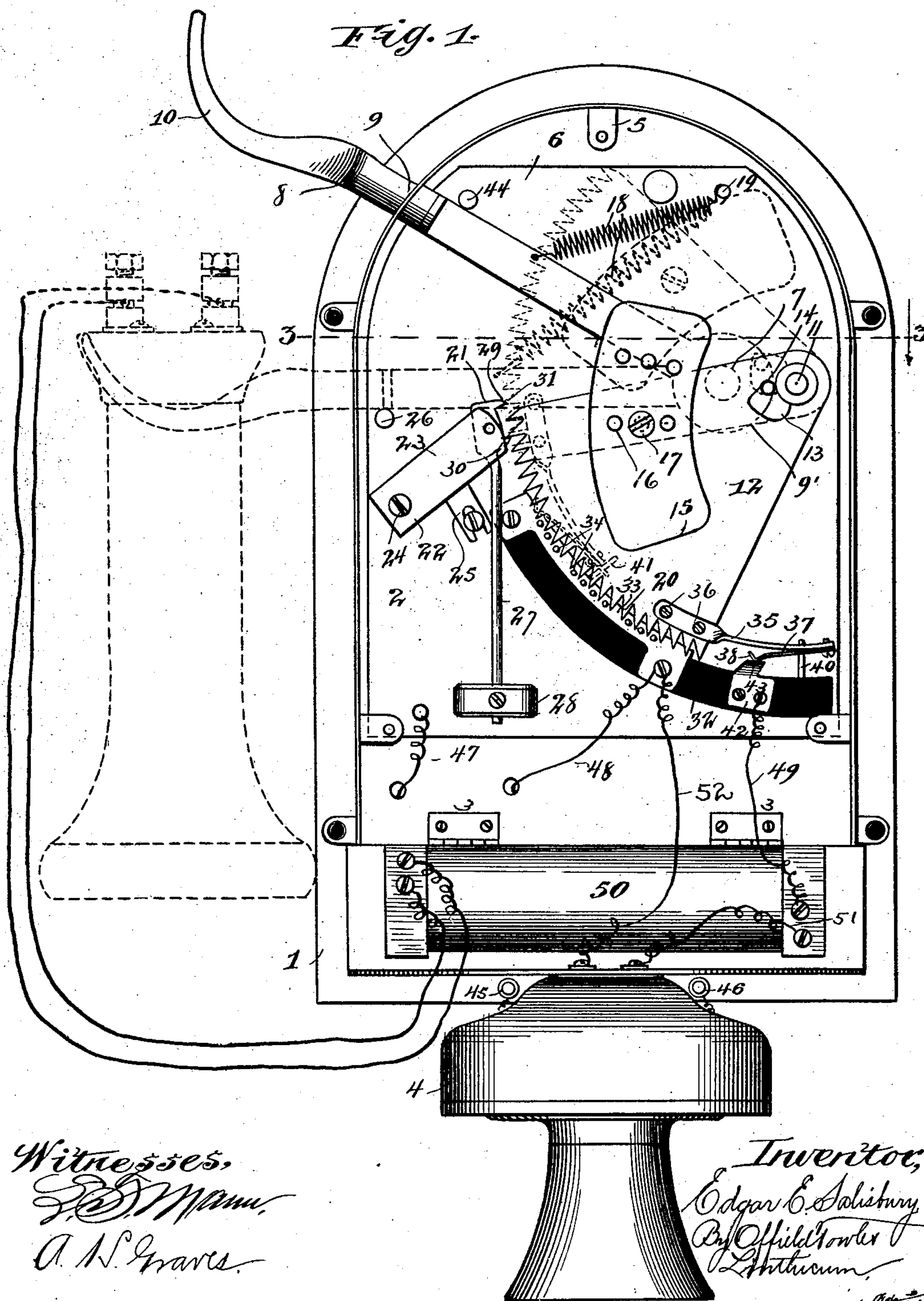


E. E. SALISBURY.
AUTOMATIC GRAVITY SIGNALPHONE.

(Application filed Sept. 20, 1901.)

(No Model.)

2 Sheets—Sheet 1.



No. 696,198.

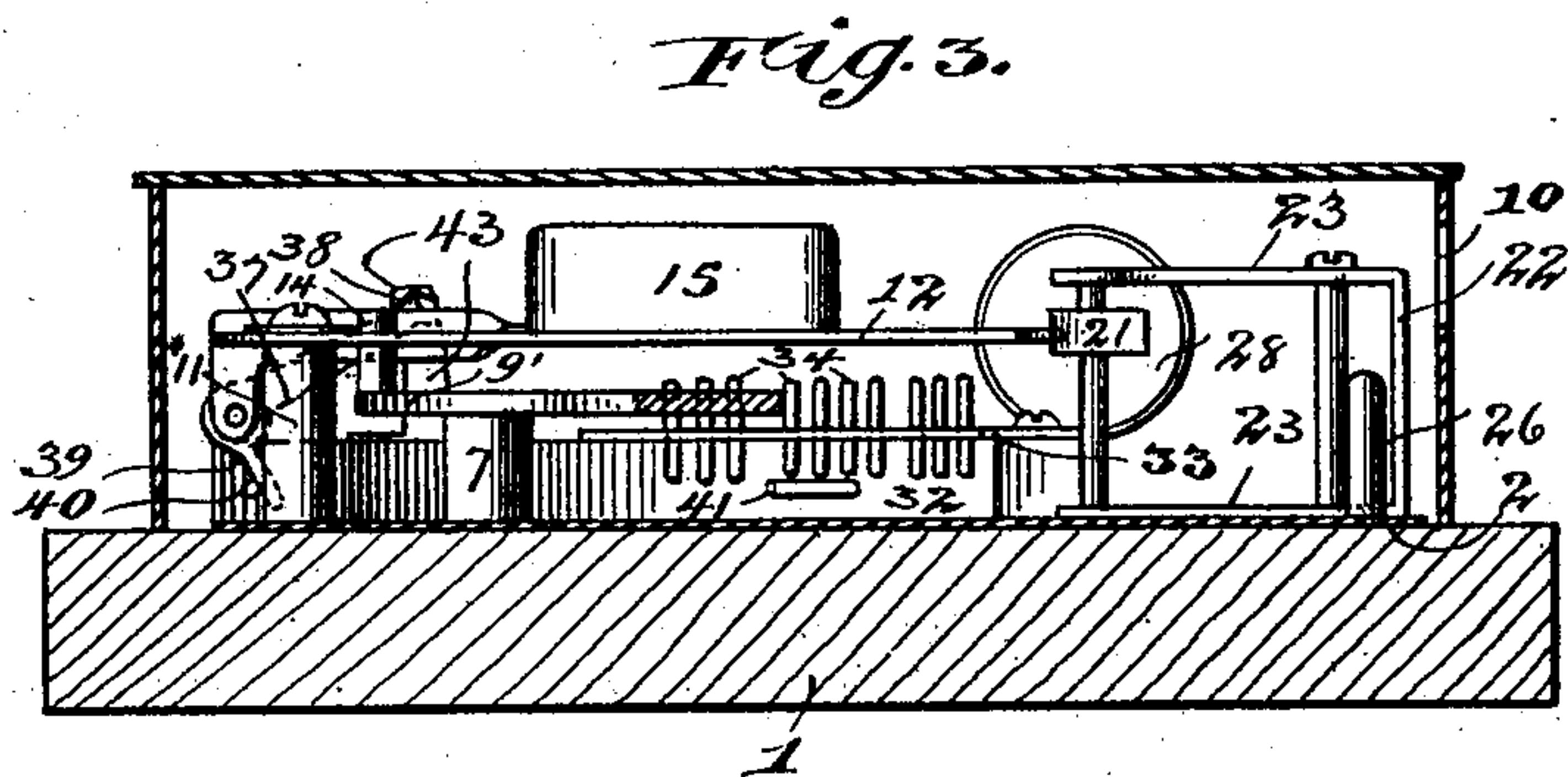
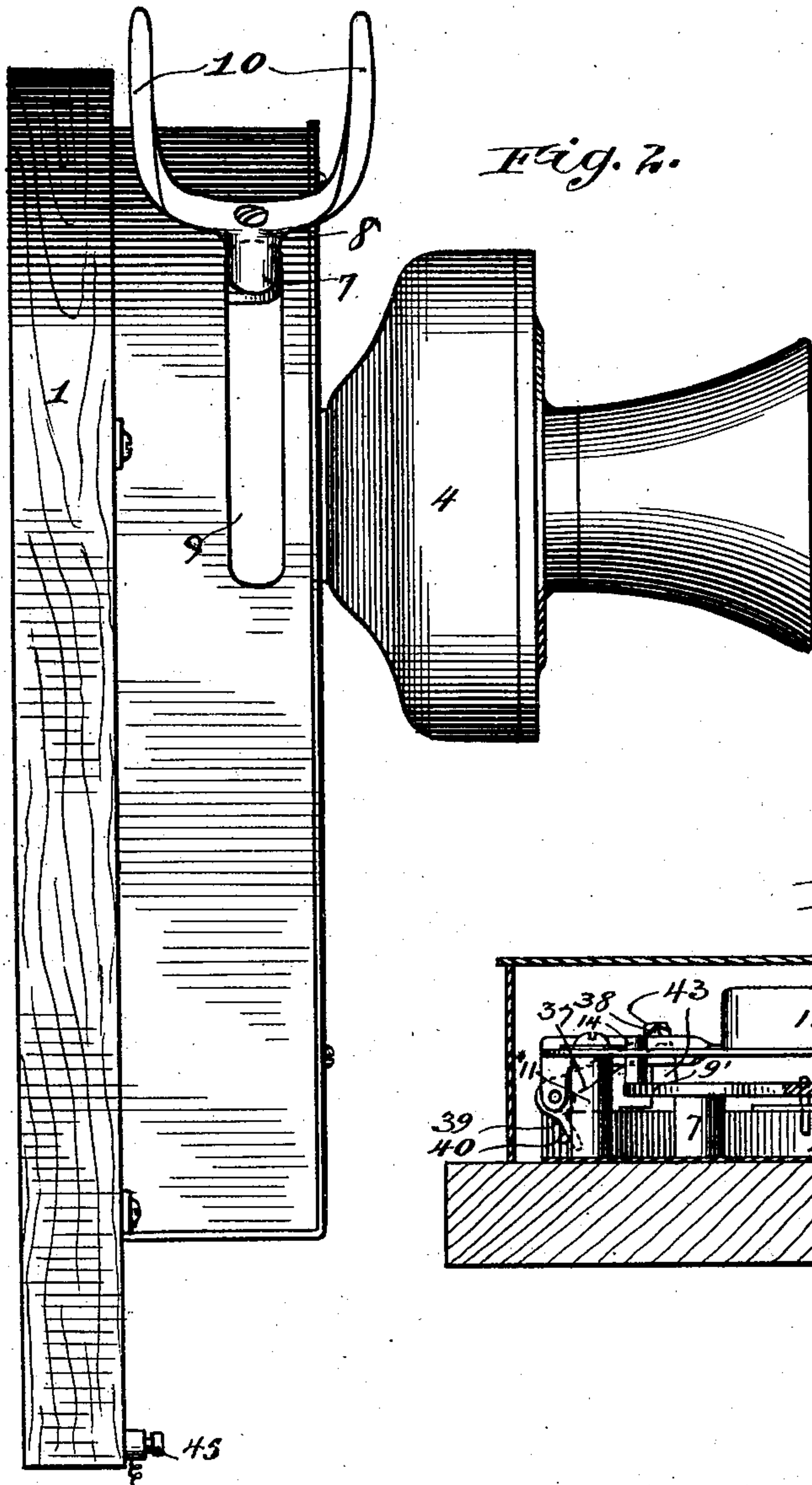
Patented Mar. 25, 1902.

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AUTOMATIC GRAVITY SIGNALPHONE.

(Application filed Sept. 20, 1901.)

(No Model.)

2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

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FRANK B. TAYLOR, OF CHICAGO, ILLINOIS.

AUTOMATIC GRAVITY-SIGNALPHONE.

SPECIFICATION forming part of Letters Patent No. 696,198, dated March 25, 1902.

Application filed September 20, 1901. Serial No. 75,973. (No model.)

To all whom it may concern:

Be it known that I, EDGAR E. SALISBURY, of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Automatic Gravity-Signalphones, of which the following is a specification.

This invention relates to improvements in telephone and other call boxes, and refers more specifically to an improved call-box embodying mechanism operating to automatically send out identifying or selective signaling impulses, the present embodiment being a continuation of a subscriber's telephone set and automatic signaling apparatus in which the sending of the signals is accomplished by removing the telephone-receiver from its hook or support.

Among the salient objects of the invention are to provide an automatic impulse-sending mechanism which will operate with greater uniformity of movement and in which the moving member of the circuit making and breaking mechanism will move with a step-by-step movement and with a distinct dwell between each step during its engagement with the respective contact-points, thereby insuring greater certainty of transmission of the signaling impulses; to provide a construction in which an adjustable weight is employed as the motive means, thereby avoiding all of the objectionable features incident to the use of the springs and at the same time securing certain novel results heretofore not attainable, as will hereinafter appear; to provide a contact mechanism which is automatically shifted or switched out of alinement with the contacts at the end of its advance movement, so as to return without wiping over the contact devices; to provide in a mechanism of the character referred to an escapement mechanism so constructed and arranged as to permit the return of the notched or pallet-engaging member without operating the latter during such return movement; to provide an improved construction whereby the pallet mechanism is made adjustable relatively to the actuating member; to provide for a more or less rapid movement and also to compensate for wear; to provide a construction in which the signal-transmitting de-

vice will be invariably returned to zero when the receiver or other actuating member is returned to its normal position, and in general to provide a simplified and improved construction of the character referred to.

The invention consists in the matters hereinafter described, and more particularly pointed out in the appended claims; and the same will be readily understood from the following description, reference being had to the accompanying drawings, in which—

Figure 1 is a front elevation of a call-box embodying my invention, the hinged front casing member, which carries the transmitter and induction coil, being opened forwardly and downwardly in a horizontal position to expose the internal mechanism of the call-box. Fig. 2 is a side elevation of the call-box, and Fig. 3 is a transverse sectional view taken on line 3 3 of Fig. 1 and looking downwardly.

Referring to said drawings, 1 designates as a whole any suitable casing, that shown herein being made to open at its front, the swinging portion 2 being to this end hinged at its lower margin, as indicated at 3 3. Conveniently the swinging front carries upon its outer side the transmitter (designated as a whole 4) and is secured in closed position at its upper end conveniently by means of a screw inserted through the door and into a lug 5 within the casing. Against the inner rear face of the casing is secured a metal base-plate 6, which carries a pivot-stud 7, upon which is journaled the inner end of the receiver-arm 8, said arm being arranged to extend outwardly through a suitable slot 9 in the side of the casing and provided at its end with the usual ear-phone forks 10.

11 designates a second pivot-stud mounted upon the back-plate 6, parallel with the stud 7 and adjacent to the knuckle or enlarged pivoted end 9' of the receiver-arm, and upon the stud 11 is pivotally supported an escapement-segment 12, which lies in a different plane from the plane of the receiver-arm, being in the present instance arranged to overlap the latter. The segment 12 is slotted or apertured, as indicated at 13, and upon the knuckle portion 9' of the receiver-arm is mounted a stud 14, which projects into said

slot 13, the relative arrangement of said stud and slot being such that when the receiver is drawn down in the horizontal position, as indicated by dotted lines in Fig. 1, by the weight of the receiver thereon the segment will be oscillated upwardly to the upper limit of its movement into the position also indicated in dotted lines in Fig. 1.

15 designates an adjustable weight secured to the segment 12 at the point between its pivotal axis and its notched outer periphery, the weight 15 being provided with a plurality of apertures 16, through one of which is inserted a securing-screw 17, which serves to hold it rigidly to the segment. Obviously by changing the position of the weight outwardly and inwardly relatively to the axis of the segment the effective weight brought to act upon the escapement (hereinafter described) which coöperates with the notched periphery of the segment will be changed.

It will be understood from the foregoing description that the upward movement of the receiver-arm 9 permits the descent of the segment, and, vice versa, when the receiver-arm is drawn down the segment is positively lifted. In order to lift the receiver-arm when the receiver has been removed therefrom, and thus to relieve the segment of the weight of said arm, which would otherwise tend to prevent the descent of the segment, a coiled contractile spring 18 is provided, one end of which is secured to the receiver-arm at a point intermediate its length and the other end 19 upon the base-plate located at a point above said arm.

Describing now the escapement mechanism, the outer periphery of the segment 12 is provided with a series of escapement-teeth 20, adapted to coöperate with a pallet 21, which is pivotally hung between the two arms 23 of a U-shaped bracket, (designated as a whole 22.) Said bracket 22 is mounted upon the base-plate by a pivot-stud 24, which is so located that the bracket inclines obliquely and upwardly and toward the escapement-segment, the bracket being held or limited against downward movement after the escapement has passed out of engagement therewith by means of an adjustable stop 25, arranged in position to engage its lower edge. A fixed stop-stud 26 serves to limit the movement of the bracket in the opposite direction before it reaches a vertical position, this stop-stud being provided for emergencies only to prevent the bracket being thrown out of position accidentally.

With the pallet 21 is connected a pendulum-rod 27, carrying at its lower end the usual weight 28, which is adjustably secured upon the pendulum-rod in order that the intervals of vibration may be modified.

It will be noted that the shape of the escapement-teeth of the segment and the coöperating teeth or projections 29 and 30 of the pallet are such that the weight of the segment will act much more effectually to swing the

pendulum when the tooth thereof is in engagement with one of the pallet-teeth—the lower one in the present instance—than when the segment engages the opposite teeth 29 of the pallet, the upper side of the latter tooth or that portion thereof which is engaged by the point of the segment-tooth being rounded or formed in a curve substantially concentric with the pivotal axis of the pallet, as indicated at 31, so that during a considerable portion of the movement of the pendulum—viz., while the pendulum is completing the latter part of its outstroke and until it has returned far enough to oscillate the upper pallet-tooth out of engagement with the segment—the latter will be held practically stationary and will during the time it is thus held stationary be less effective to oscillate the pendulum. The object of this construction is to secure a dwell or pause in the downward movement of the segment, during which pause the moving contact device which closes the circuit and sends out the impulse will be resting in engagement with the fixed contact device, as will hereinafter appear.

Describing now the contact devices which effect the making and breaking of the circuit during the movement of the segment, 32 designates a strip or bar of insulating material mounted upon the base-plate in a position concentric with the periphery of the segment 12, and upon said insulating-strip is mounted a metal strip 33, provided with a series of contact-studs 34, arranged at definite intervals apart, these contact-studs being back of the plane of the segment, so as not to interfere with the movement of the latter.

35 designates an arm secured to the segment by screws, as indicated at 36, and arranged to project beyond the segment at that side of the latter which is in advance during its downward movement, and upon said arm is mounted a spring contact-strip 37, which terminates at its free end in a V-shaped wiper 38, adapted to engage and wipe across the contact-studs 34 during the downward movement of the segment. The contact-strip 37 is pivotally secured to the outer end of the arm 35 and is provided with an angular inwardly-extending arm 39, (see Fig. 3,) which is adapted to engage a fixed contact-stud 40, mounted upon the lower end of the insulating-strip, as the segment approaches the limit of its downward movement, and thus serves to oscillate the contact-strip outwardly and out of alinement with the contact-studs 34. At a point toward the upper end of the insulating-strip a second stud 41 is mounted in such position as to engage the angular arm 39 as the segment reaches the upper limit of its movement and oscillate the contact-strip inwardly into alinement with the series of contact-studs. It will be seen that by means of the construction described the contact-strip 37 will be automatically shifted at the end of the movement in each direction, the return of the segment to its normal uplifted

position bringing the contact-strip in position to wipe across the contact-studs during its descent and said strip being shifted out of alinement with said studs, so as to return without engaging the latter. In the present instance the contact-strip 37 is caused to close a separate circuit at the end of the downward movement of the segment—i. e., during the time the receiver is removed from the receiver-arm and the instrument is in use. To this end a fixed contact device consisting of a plate 42, provided with an integral outwardly-extending contact-strip 43, is mounted upon the insulating-strip 32 in position to underlie and be in engagement with the contact-strip 37 while the segment rests in its lowermost position. It may be mentioned at this point that the limit of downward movement of the segment is determined by the engagement of the upper side of its slot 13 with the stud 14 of the receiver-arm, and the upward movement of the latter is determined by a fixed stud or stop 44 upon the base-plate.

The circuit connections through the transmitter and receiver of the telephone are the same as usual and need not, therefore, be traced in detail. In order, however, to make clear the arrangement of the circuits through the signaling mechanism, these will now be described. 45 and 46 designate two binding-posts mounted upon the call-box at a convenient point, as best indicated in Fig. 2, with which are connected the two main lines of the telephone system. From one of these terminals an extension 47 leads into the call-box and is connected with the metal base-plate 6, as shown clearly in Fig. 1, thereby placing the base-plate and all of the metal parts directly mounted thereon in circuit with the main line. The segment 12, which is mounted upon the stud 11 of said base-plate, is therefore in electrical connection with the main line and likewise the contact-arm 35, which is mounted upon said segment and the contact-strip 37, carried by said arm. From the other binding-post 46 a second extension of the main line 48 leads to and is connected with the contact-plate 33, which carries the series of contact-studs 34, so that whenever the V-shaped projection 38 of the contact-strip 37 is in contact with one of said studs 34 an electrical circuit will be completed from one main line through the signal mechanism to the other. This circuit will obviously be interrupted when the segment is in its normal uplifted position, since the contact-strip 37 will at that time be in a position beyond the upper end of the series of contact-studs 34, as indicated in dotted lines in Fig. 1. At the time the contact-segment reaches its lower limit of movement and the contact-strip 37 is brought into bearing with the fixed contact-strip 43 a second circuit is closed, which circuit is, as before, from one main line through the extension 47 to the base-plate, then through the segment, arm 35, and contact-strip 37 to the

contact-strip 43. From the plate or base portion 42, upon which the contact-strip 43 is formed, a conductor 49 leads to one terminal of the induction-coil 50, the remainder of the circuit through the apparatus to the opposite main line being the usual one—viz., through the primary of the induction-coil, and thence by way of a conductor 51 to the transmitter, through the latter, and thence to the contact-strip 33, bearing the contact-studs 34, by conductor 52, and from said strip to the main line over conductor 48.

The operation of the device has been substantially indicated in connection with the description of its construction and need not, therefore, be repeated. It will be noted, however, that the construction is such as to secure the several objects aimed at in a simple, practical, and reliable manner. It will be noted that in the traverse of the segment across the contact-studs it moves with a distinct step-by-step motion, pausing for a distinct interval at each step, and that the relative arrangement of the contact-strip 37 is such that it will be in bearing with the contact-stud 34, opposite which it happens to be during this pause. This insures great certainty of operation of the signaling device at the remote point connected with the circuit. It will also be noted that the construction is such that the segment is invariably returned to its initial position by placing the receiver upon the receiver-hook whether the segment has been allowed to complete its advance movement or not. This is a feature of considerable importance, inasmuch as it often happens that a subscriber will return the receiver to the hook before the signaling device has had time to operate, and if the construction be such that the signaling device is not thereby returned to zero a succeeding operation will result in sending out an incomplete and incorrect series of signals.

The arrangement whereby the mechanism may be adjusted so as to operate more or less rapidly and may also be adjusted to compensate for wear is a feature of importance, for the reason that it frequently happens that one and the same call-box will be used at times to send in signals rapidly and again to send in very slowly.

The provision of the gravity-weight and its construction whereby it may be adjusted to operate the segment with a greater or less leverage, as required, is a feature of importance, inasmuch as it affords a simple and practical means of adjusting the mechanism to suit receivers of different weights and to compensate for retracting-springs of different tension, while at the same time it avoids the uncertainty of operation incident to the use of springs for actuating the contact mechanism.

The automatic switch device whereby the segment may be returned without closing contact with the several contact-studs is obviously a feature of much importance, not

only because it prevents unnecessary wear between the contact devices, but for the more important reason that it avoids the making and breaking of the circuit during the return movement of the segment, and therefore prevents operation of the signaling device.

The embodiment of my invention in combination with a subscriber's telephone set is a feature of importance in that it enables a subscriber to automatically transmit to central a definite signal by simply removing the receiver or ear-phone from its suspending-arm, and thereby inaugurating the movement of the signal-phone. The construction and arrangement of my improved signaling apparatus are such that it lends itself to embodiment in combination with the subscriber's telephone set in a most economical and convenient manner, the receiving hook and arm of the apparatus forming a most convenient operating member for actuating the segment, and the case, which is a necessary part of a subscriber's instrument, serving at the same time to inclose the operating parts of the signaling mechanism. While, therefore, the invention is not limited to the combination with a subscriber's telephone set, it is nevertheless particularly well adapted for embodiment in such combination.

It will be understood from the foregoing that the details of construction may be modified without departing from the invention, and I do not, therefore, wish to be limited to the details of construction shown, except to the extent that they are made the subject of specific claims.

I claim as my invention—

1. In an automatic electric signaling device, the combination of a pivotally-supported escapement-segment provided with a series of escapement-teeth concentric with its pivotal axis, an oscillatory weighted pallet arranged to cooperate with said escapement-segment, a contact device carried by the segment, a series of relatively fixed contact devices over which said contact device carried by the segment wipes during the movement of the segment in one direction, electrical circuit connections and a switch mechanism cooperating with the contact device carried by the segment to prevent electrical contact of the same during the return movement thereof, substantially as described.

2. In an automatic electric signaling device, the combination of a pivoted escapement-segment provided with a series of escapement-teeth concentric with its pivotal axis, a pallet arranged to control the movement of said segment in one direction, a contact device carried by the segment, a series of relatively fixed contact devices over which said contact device carried by the escapement-segment wipes during the movement of the segment in one direction and means cooperating with said segment to shift the contact device carried thereby out of alinement with the rela-

tively fixed contact devices at the end of the movement of the segment in one direction whereby the latter may return without carrying the contact-strip into engagement with the relatively fixed contact devices.

3. In an automatic electric signaling device, the combination of a pivotally-mounted escapement-segment provided with a series of escapement-teeth concentric with its pivotal axis, a pallet mechanism arranged to cooperate with said segment, a contact device pivotally mounted upon the segment, a series of relatively fixed contact devices with which said pivotally-mounted contact device cooperates during the movement of the segment in one direction, and stops arranged to engage said pivoted contact device as the segment approaches its limit of movement in each direction to oscillate the contact upon its pivotal axis, whereby said contact device is alternately moved into and out of alinement with the relatively fixed contact devices.

4. In an automatic electric signaling device, the combination of a pivotally-mounted escapement-segment provided with a series of escapement-teeth concentric with its pivotal axis, a pallet mechanism arranged to control the movement of said escapement-segment, a contact device carried by the segment, a series of relatively fixed contact devices arranged to cooperate with the movable contact device and a weight adjustably mounted upon said segment and capable of adjustment toward and from the pivotal axis of the latter, as and for the purpose set forth.

5. In an automatic electric signaling device, the combination with an escapement-segment provided with a series of escapement-teeth, a contact device carried thereby, a series of relatively fixed contact devices adapted to cooperate with the movable contact devices, and a pallet mechanism arranged to control said segment and comprising an oscillatory pallet and pendulum connected to move with said pallet, one of the escapement-teeth of the pallet having its segment-engaging surface formed substantially concentric with the pivotal axis of the pallet, whereby the segment is held substantially immovable during that part of the oscillation of the pallet in which the segment engages said pallet-tooth, as and for the purpose set forth.

6. In an automatic electric signaling device, the combination with an escapement-segment provided with a series of escapement-teeth, a contact device carried thereby, a series of relatively fixed contact devices adapted to cooperate with the movable contact devices, and a pallet mechanism arranged to control said segment and comprising an oscillatory pallet and pendulum connected to move with said pallet, one of the escapement-teeth of the pallet having its segment-engaging surface formed substantially concentric with the pivotal axis of the pallet, whereby the segment is held substantially immovable during that part of the oscillation of the pal-

let in which the segment engages said pallet-tooth, and the other tooth of said pallet being provided with a segment-engaging surface formed to extend approximately radially to the pivotal axis of the pallet whereby the advance of the segment acts thereon effectively to oscillate the pallet, as and for the purpose set forth.

7. In an automatic electric signaling device, the combination with a pivotally-mounted oscillatory segment provided with a series of escapement-teeth concentric with the pivotal axis of the segment, of a pallet mechanism arranged to control the movement of said segment and comprising a pivotally-mounted bracket arranged adjacent to the segment, a pallet pivotally mounted in the swinging end of said bracket in position to cooperate with said segment, a pendulum connected and moving with said pallet and means for positively limiting the movement of said bracket toward the segment while permitting it to swing freely away from the latter, as and for the purpose set forth.

8. In an automatic electric signaling device, the combination with a pivotally-mounted oscillatory segment provided with a series of escapement-teeth concentric with the pivotal axis of the segment, of a pallet mechanism arranged to control the movement of said segment, and comprising a pivotally-mounted bracket having its swinging end arranged to extend obliquely upwardly and toward the segment, a pallet pivotally supported in the swinging end of said bracket in position to cooperate with said segment, a pendulum rigidly connected with and depending from said pallet and an adjustable stop arranged to limit the downward movement of said bracket under the weight of the pendulum and pallet mechanism thereon, as and for the purpose set forth.

9. In an automatic electric signaling device, the combination of a metal base-plate, an escapement-segment pivotally mounted thereon

and carrying a contact device in electrical connection with said base-plate, an escapement mechanism arranged to control the movement of said segment, a series of relatively fixed contact-studs mounted upon, but insulated from said base-plate concentric with the path of movement of said contact device carried by the segment, a telephone-receiver arm pivotally mounted upon the base-plate adjacent to the segment and provided with a stud arranged to act upon the segment to lift the latter when the receiver-arm is depressed, and electrical connections connecting said metal base-plate and the series of contact-studs respectively with opposite sides of a telephone-circuit.

10. In combination with a subscriber's telephone set, comprising the ear-phone or receiver, the transmitter and the case therefor, an automatic electric signaling device comprising a pivotally-mounted oscillatory segment provided with a series of escapement-teeth concentric with the pivotal axis of the segment, a pallet and pendulum mechanism arranged to control the movement of said segment, a contact device carried by the segment, a series of relatively fixed contact devices arranged to cooperate with the contact device carried by the segment, an actuating-arm provided with supports for the telephone-receiver pivotally mounted adjacent to the segment and operatively connected with the latter in such manner as to lift the segment positively when said arm is moved downwardly under the weight of the receiver, and electrical circuit connections connecting the contact carried by the segment and the series of relatively fixed contact devices respectively with opposite sides of the telephone-circuit, substantially as described.

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