

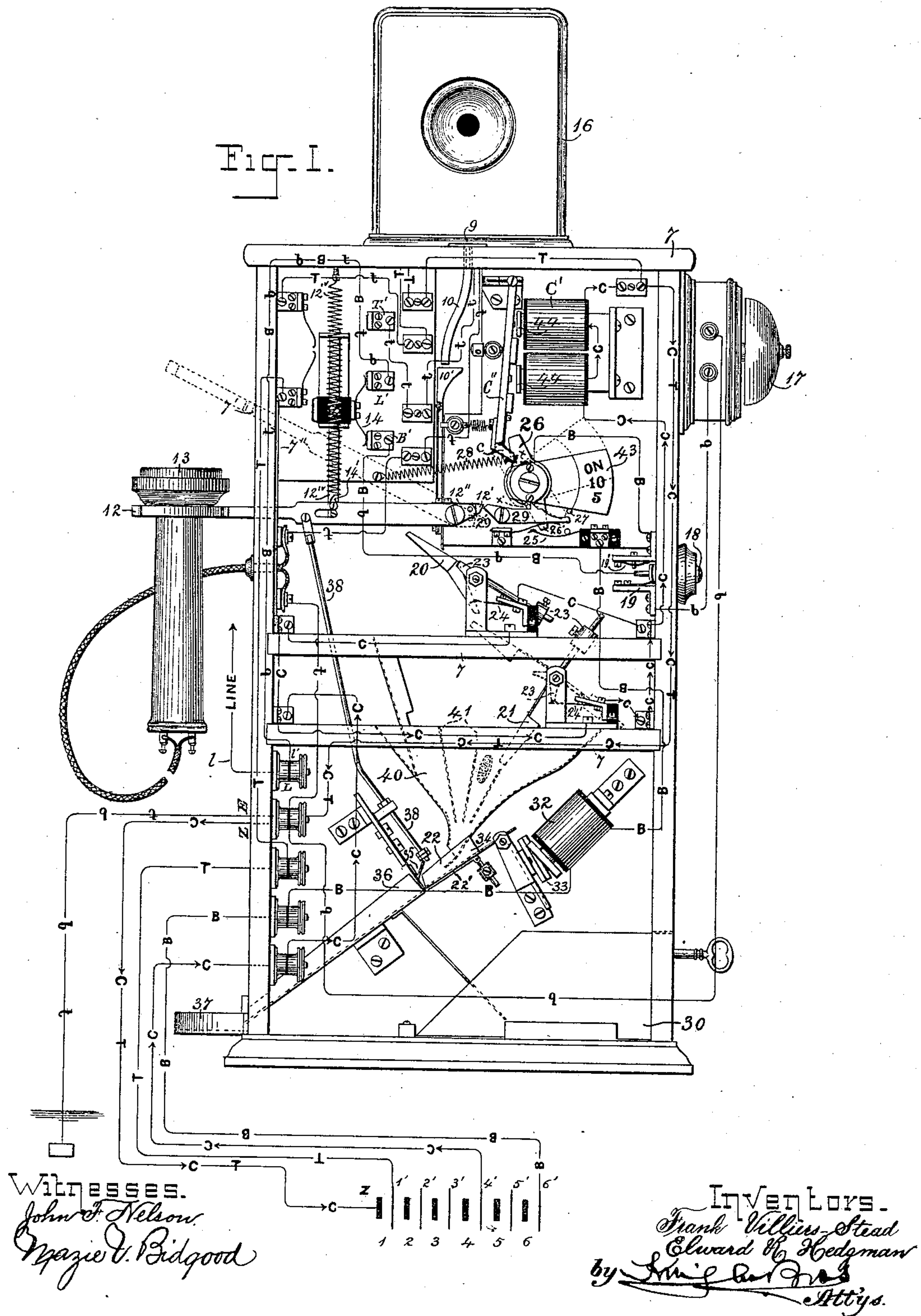
(No Model.)

3 Sheets—Sheet 1.

F. VILLIERS-STEAD & E. R. HEDGMAN.  
TELEPHONE CALL BOX.

No. 451,143.

Patented Apr. 28, 1891.



(No Model.)

3 Sheets—Sheet 2.

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TELEPHONE CALL BOX.

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Fig. II.

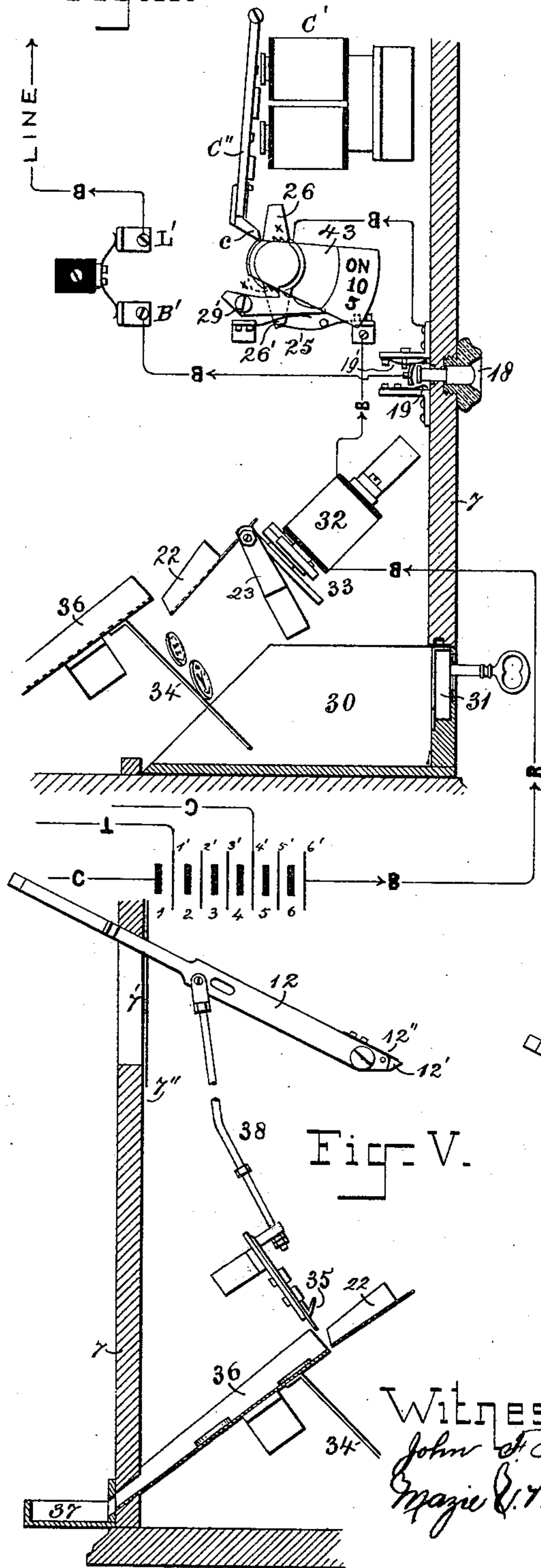


Fig. III.

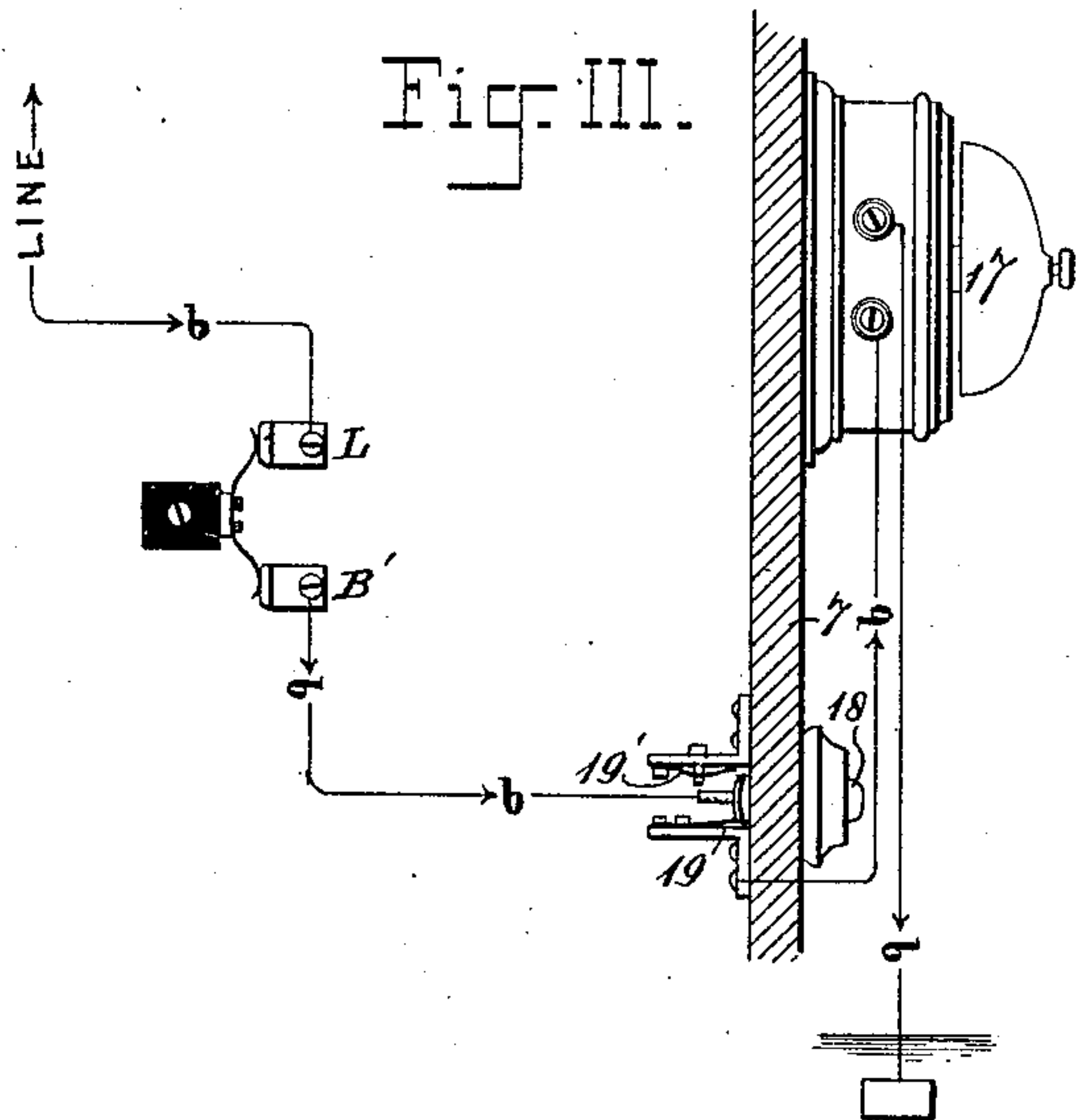


Fig. IV.

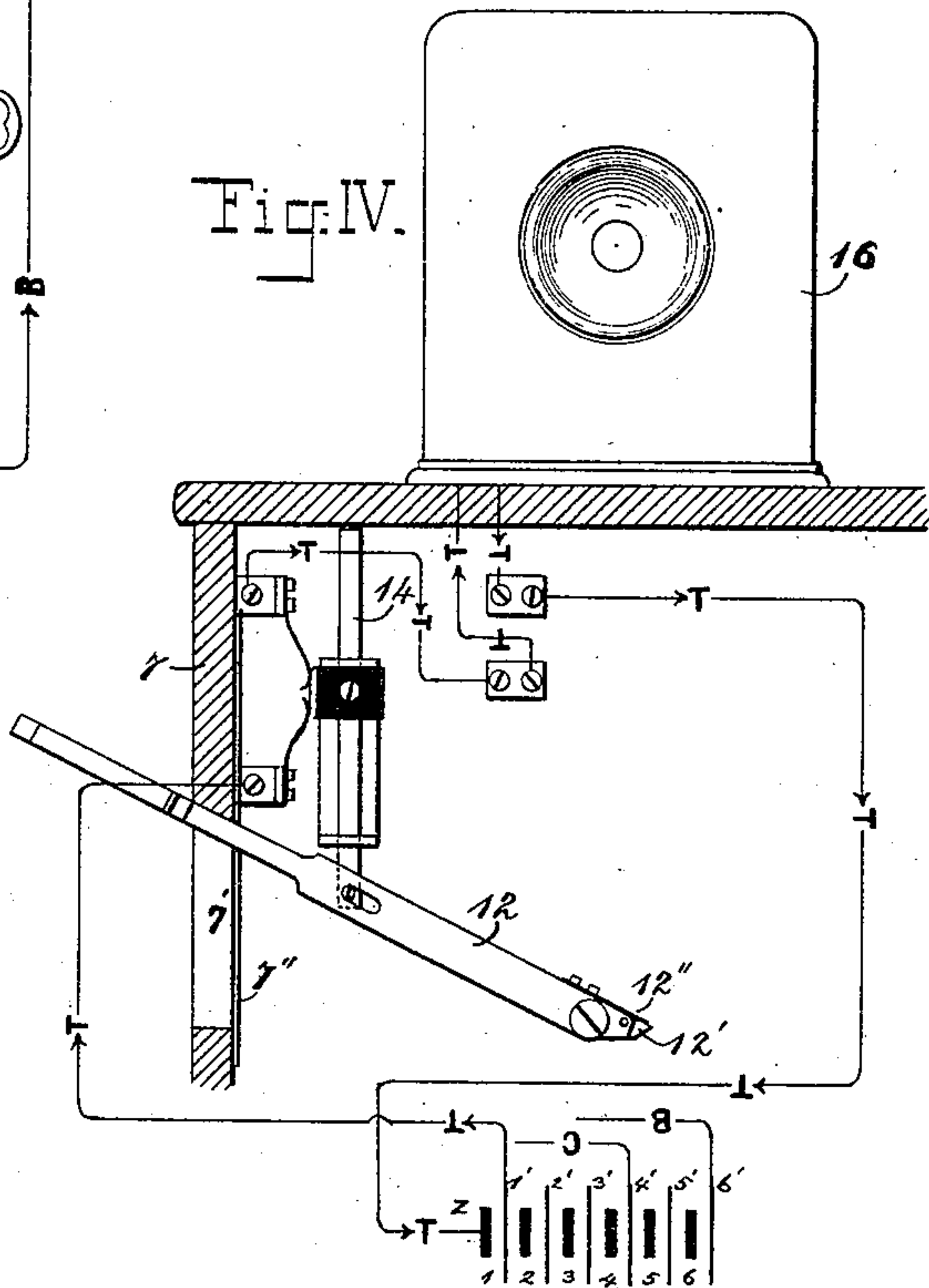


Fig. V.

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by *Knigh & Co.*  
Attys.

(No Model.)

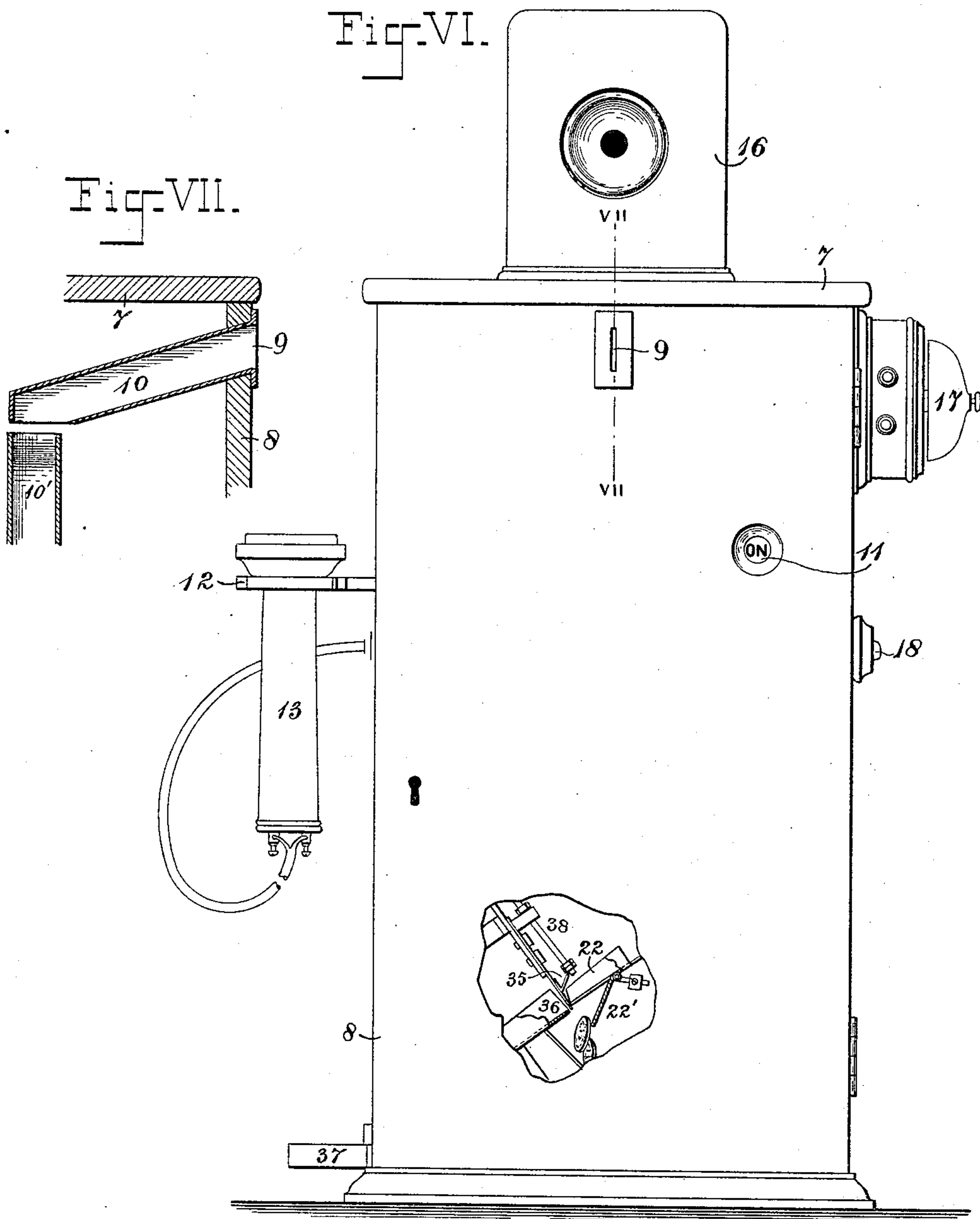
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# UNITED STATES PATENT OFFICE.

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## TELEPHONE CALL-BOX.

SPECIFICATION forming part of Letters Patent No. 451,143, dated April 28, 1891.

Application filed July 28, 1890. Serial No. 360,149. (No model.)

*To all whom it may concern:*

Be it known that we, FRANK VILLIERS-STEAD and ELWARD RADFORD HEDGMAN, subjects of the Queen of Great Britain, residing  
5 at London, county of Middlesex, England, have jointly invented certain new and useful Improvements in Telephone Call-Boxes, of which the following is a specification.

In this specification the word "telegraphic"  
10 is used in the sense which includes any device which employs an electric circuit for verbal communication between distant stations; and our invention primarily includes a normally-open call-circuit provided with a  
15 make-and-break mechanism in which such circuit is made available for use (with an ordinary push-button) by deposition of coin.

Our invention is more especially designed for use in and is here shown in connection  
20 with what are known as "public telephone-stations," and is intended to dispense with the necessity of a personal collector of telephone-fees at such station. The arrangement of our instrument is such that any one by  
25 dropping in a slot coins of certain stated denominations and aggregate value obtains customary telephonic facilities. The connections are such that although exchange can at any moment sound the box-bell and carry on  
30 conversation with a person at the call-box, communication cannot be initiated from call-box to exchange until after the required coin has been deposited. With these objects in view we combine with a customary telephone  
35 (operative freely at the exchange end) a call-box mechanism whose push-button is connected with a normally-interrupted and consequently for the time being inoperative local circuit or shunt, which can be put in condition whereby it can be operated by the  
40 push-button only by the insertion of coins, as stated.

In order to illustrate our said invention we have arranged and herewith present a means  
45 whereby such local circuit is rendered operative by the deposition of coin of the aggregate value of fifteen cents. The particular coins for which the machine is adjusted are nickels and dimes, and the instrument is so  
50 contrived as to work equally well whether such

coin-value be deposited in the form of three nickels or in the form of a nickel and a dime. In order that the user may be enabled to call exchange it is necessary that the receiver occupy its place on the switch, or, if not there, 55 that it be so placed before attempt is made to ring up the exchange. For the coin-operated portion of the apparatus we provide a series of suitably-poised tilting trays, which bear some analogy to the tilting trays described in our 60 patent, No. 422,326, granted February 25, 1890, for an automatic vending apparatus. The oscillation of these trays by the descending coin energizes thrice in succession the electro-magnet of a local circuit in the call-box, and through 65 said magnet's armature brings a revolving contact-piece into a position which, by closing a break in the exchange-bell circuit, enables exchange to be called up in the customary way—namely, by depressing the push-button. 70 Such depression, by energizing an electro-magnet in the call-circuit, trips a tray which until that moment had detained the coin and dumps said coin into the till or money-drawer. From and after this deposition of the coin in the till 75 the user's facilities are in all respects the same as those possessed by one who has access to a private telephone. The push-button being permitted now to return to its normal position said return breaks for the time being the 80 exchange-bell circuit and puts the box-bell again in line with exchange. On hearing his bell sounded it becomes the central operator's duty to respond by answer on the box-bell in the manner familiar to telephone users, and 85 to place the line of this particular box in connection with any station the user may call for. The user of the call-box, in order to converse with the central operator, necessarily lifts the receiver off of its switch; and when he has 90 done talking returns the receiver to the switch, whereupon said switch automatically takes a position that operates to trip the revolving contact-piece, and to thus reduce the call-circuit to its normally-inoperative condition. 95 The poise of the tilting trays is such that money of other denominations than nickels and dimes simply accumulates on the detaining-tray without action on the call-circuit. The arrangement of the instrument is further 100



such that should the money deposited fall short of the required value in coins of the prescribed denominations the call-circuit will not be put in condition capable of completion by the act of depressing the push-button, and consequently the entire deposit will be held on the detaining-tray, and on lifting the receiver off of the switch will be discharged into a receptacle from which it can be recovered by the user. In like manner the deposit will be detained and can be recovered in event of improper coin being used or of the call-circuit failing to act or should the user lift the receiver off of its switch before calling. To guard against a choking of the detaining mechanism by neglect of users to recover inoperative deposits, the detaining-tray is so adjusted as to automatically deposit an overload in the till.

In the accompanying drawings our invention is illustrated diagrammatically in several stages of its operation, to wit:

Figure I represents the revolving contact-piece advanced from its normal position (see dotted lines) to the position of two-thirds of its effective stroke, (see strong lines,) in consequence of the deposition of one dime. In this diagram the slot for deposition of coin is shown in the top of the case. Fig. II shows the revolving contact-piece fully advanced and the push-button depressed so as to call up exchange and at the same time to deposit the money in the till. Fig. III represents the call-circuit restored by release of push-button and return-call being sent to box. Fig. IV represents receiver lifted for transmission of a message to exchange. Fig. V illustrates the automatic restoration of inoperative coin by a temporary elevation of the telephone-switch. Fig. VI is a front elevation of the closed box, a portion of door being broken away. In this view the slot for deposition of coin is located in the door. Fig. VII is a section taken on line VII VII.

In the above diagrams the several current functions successively brought into service are indicated by symbols, thus: C, coin-controlled current closing call-circuit; B, current which dumps coin in till and calls exchange; b, customary current of return-call; T, telephone message to exchange or to respondent, and t telephone response from exchange or from respondent.

1 2 3 4 5 6 may represent as many elements of a local voltaic battery of "agglomerate" or "cumulative" type whose terminal zinc Z is connected through binding-post Z E with "earth" and whose carbons 1' 4' 6' are respectively connected with the telephone, the coin-operated, and the call departments.

7 may represent a suitable case and interior framing for support, attachment, and protection of the various operative parts.

8 is a door which is ordinarily kept locked and can be opened only by a key in keeping of the superintendent. This door preferably constitutes the entire front of the case, so that,

being opened, as shown in Fig. I, access is afforded to the entire interior of the case, or, being closed, as shown in Fig. VI, the operative parts are completely protected from dust, moisture, and from interference by irresponsible persons. A slot 9, (which may be in the top of the case, as shown in Fig. I, or in said door, as shown in Fig. VI,) whose dimensions are such as to just easily permit the insertion and passage of the larger coin (nickel) to be used, affords communication with a descending trough or chute 10, that leads to a hopper 10', which conducts the coin to the desired place of operation. The said door has a window 11, for purposes hereinafter explained. The external line-wire b enters the box at post L, from which a wire l' conducts to contact L', which, when the telephone-switch 12 is held down to normal position by the weight of the receiver 13, (see strong lines in Fig. I,) communicates through sliding contact 14 with contact B' of the bell-circuit, and which, when the switch 12 assumes its tripped position, (see dotted lines in Fig. I,) communicates through said sliding contact with contact T' of the telephone-circuit. The switch 12 is prolonged beyond its fulcrum, and said prolongation 12 has, for a purpose hereinafter explained, a flexible toe 12', provided with a retractile spring 12''. The portion of the switch 12 which extends outside of the case has the customary forked extremity or yoke for reception of a receiver 13 of the accustomed type, whose weight operates in usual way to hold down the switch whenever not needed for conversation. A slot 7' in the case-wall (having the usual sliding guard 7'') permits and controls the vibrations of the switch 12. Whenever relieved of the weight of the receiver the switch 12 is automatically raised to its upper position (see Fig. IV) by customary spring 12<sup>iv</sup>.

16 may represent a transmitter of any suitable type—for example, a "Blake microphone."

17 may represent the return-call bell.

18 may represent a customary spring-retracted push-button, which, when not depressed by the user, has the usual normal contact with contact-spring 19 of the return-call. (See Figs. I and III.) Depression of the push-button by the user breaks contact with said return-call spring and makes contact with contact-spring 19' of the circuit, which, after being closed by deposition of coin, sends call into line and rings up the exchange-bell. (See Fig. II.) The means whereby such coin-deposition becomes effective to render operative the exchange-bell circuit will now be explained.

20 21 22 are tilting trays or pans, which are maintained in their normal positions by adjustable counterpoises 23.

C is a coin-controlled normally-open battery-circuit. C' is an electro-magnet in said circuit, having a spring-retracted armature C''. Except when temporarily energized by



a tilting action of one of the trays the circuit C remains open and the armature C'' in its retracted position. Each of said trays 20 21 has a rigid tongue or projection 23 in the circuit C, which the tilting of the trays brings in contact with a spring 24, (or 24'), so as to close said circuit and cause the armature C'' to momentarily seek its magnet. In the case of the lower tray 21 the tilt of the tray and the form of contract-spring have such relative adjustment as to cause two closures of the armature, once at the direct and a second time at the return stroke of the tray. The two trays 20 21 are respectively so poised that a nickel dropping on tray 20 causes it to tilt fully so as to make one contact, and impel the revolving contact-piece one tooth, and that a dime so dropping will not move, but will simply slip backward off of tray 20 onto the lighter and lower tray 21, which it will fully tilt, so as to make two successive contacts and to shift the revolving contact-piece a distance of two teeth. It is thus manifest that the break in the call-circuit will be closed by insertion of either three nickels or of a nickel and a dime.

25 is a spring-terminal at the break or place of interruption of the call-circuit B.

26 is a spring-retracted rotary contact-piece or circuit-closer, which constitutes the other terminal at said break. Complete vibration of said contact-piece to the position shown in Fig. II brings its tongue 26' in contact with spring 25, and by closing the break puts the call-circuit in the precise condition of such circuit in an ordinary telephone-station—that is to say, capable of being brought to activity by a simple depression of the subscriber's push-button. The contact-piece 26 is normally held back against a stop 27 by means of a retractile spring 28. The revolving contact-piece 26 has three ratchet-teeth  $\alpha$   $\alpha'$  at each end of one of its diameters. The armature C'' terminates in a pawl c, which, at each closure of the armature, engages with one of said ratchet-teeth and advances the revolving contact-piece the angular distance of one tooth. To such advanced position the said piece is held by engagement of a spring-catch or detent 29 in the corresponding tooth on the other side. The catch 29 has a heel 29', over which upward flexibility of the toe 12' of the telephone-switch 12 causes it to easily slip on passing to the position shown in Fig. IV; but on said switch being brought back to the position shown in Fig. I said toe's rigidity in reverse enables it to lift the catch-heel, so as to disengage the catch from and thus trip or discharge the revolving contact-piece, and by so doing reduce the call-circuit B to its normal inoperative condition. The replacing the receiver in the telephone-switch will be seen to bring this state of things about. Such replacement should have been made by each user on conclusion of his communication, but should he neglect so to do the receiver will be

necessarily replaced by the next user, because it is one of the indispensable preliminaries for calling up exchange.

The poise of the tilting trays is such that attempted use of other coins than nickels and dimes is inoperative. For example, the dimensions of twenty-five-cent pieces and large copper cents preclude insertion in the slot. A common copper cent-piece, or a three-cent German-silver piece, tip shovel 20 just sufficient to escape off of its front edge, but not sufficiently to effect electrical contact. The five-cent silver piece simply slides through the rear apertures of both trays and does nothing.

The coin is collected in a till or money-drawer 30, which can be reached only by the officer who has control of its lock 31.

To enable a user to receive a deposit in event of failure to call exchange, whether arising from use of improper coin or of proper coin in insufficient amount, or from any other cause, our instrument contains a provision whereby, on the telephone switch being relieved of the weight of the receiver, the entire deposit is ejected from the box into a receptacle of convenient access to the user. With this intent we place in the call-circuit an electro-magnet 32, and connect its armature 33 with a detaining and dumping tray or pan 22. So long as no current is passing in the call-circuit the armature is held aloof from its magnet either by its own gravity or by retractile spring, and in this position holds the said pan to the untilted condition. The front edge of the pan is flush with a chute 36, which delivers into a locker 37 outside of case. Such external delivery is, however, ordinarily prevented by a gate 35, connected by a rod 38 to the telephone-switch. The elevation of the telephone-switch therefore lifts gate 35, and should said switch be elevated before call is sent through circuit B the entire contents of the detaining-pan escape into said locker.

To guard against the overloading of pan 22 by money which users have neglected to recover, thus endangering the choking of the passages, the floor of said pan has an opening or pitfall which is normally closed by a specially-counterpoised hinged trap-door or supplementary dump 22', so adjusted on its fulcrums as in such event to tilt automatically and unload itself into the till through the passage thus momentarily opened in said floor.

To guide the coin onto the pan 22 we provide a hopper 40, which is preferably divided into several converging passages by means of partitions 41. A chute 34 guides the dumped coin into the till.

In order to enable the user to observe at any instant the condition of the coin-operated mechanism, we provide in the door a window 11 and attach to the revolving contact-piece 26 a wing 43, marked or imprinted with the characters "5 cents," "10 cents," "On." The appearance of the word "On"



at the window informs the operator that use of the instrument may be commenced in the usual way by pressing the push-button and thus calling exchange.

5 The switch mechanism for optional connection of the line either with the bell-circuit B or with the telephone-circuit T may be of customary sliding type; but in order to avoid the loose contacts and imperfect transmissions which take place when the slide is made  
10 a part of the conducting mechanism, our slide 14' is insulated from the contact-spring 14, so that its functions are the merely mechanical ones of supporting and guiding said spring.  
15 All the contacts being rubbing ones are perfectly metallic and substantially free from loss and sparking.

In order to combine a long magnetic pull with adequate armature vibration for the mechanical functions spoken of, we employ projective pole-pieces 44 and give the armatures the represented E form, so as to embrace said pole-pieces.

It is manifest that our invention is not necessarily restricted to the specific embodiment here illustrated, but is applicable to any form in which a means of distant communications through the agency of an electric circuit is dominated by a make-and-break mechanism brought into action by deposition of coin.  
30 For example, such coin-controlled mechanism may obviously be associated with a normally-open call-circuit of a "Morse" or other telegraph or of a messenger-service. Furthermore the revolving contact-piece could be adapted for use with a higher value, such as twenty, twenty-five, thirty cents, or other multiple of five cents, by adding a tooth for each additional nickel.

40 Having thus described our invention, the following is what we claim as new therein, and desire to secure by Letters Patent:

1. The combination, with a normally-open telephone-circuit, of a catch or detent 29 and  
45 the flexible toe 12' on the telephone-switch 12, the same constituting a catch tripping or discharging mechanism brought into automatic operation by the act of preparing the instrument for another message, substantially as  
50 set forth.

2. The combination of an electric circuit which communicates with a distant station and has a break closable by an ordinary or any suitable "switch" or "button" and another break closable by deposition of coin  
55 through the instrumentality of an electro-magnet in a local circuit, an armature thereof, a normally-retracted contact-piece adapted to be advanced step by step by said armature

to contact position, one or more balanced trays adapted to be tilted by the impact of falling coin and to close said circuit-break, a catch or detent which maintains said closure, and a means of automatically releasing said detent and restoring the circuit-break, substantially as set forth. 60 65

3. A telephone call-box whose call-circuit has (besides the break closable by the ordinary push-button) an additional break or interrupted portion, combined with a normally-retracted revolving circuit-closer having ratchet-teeth  $x x'$ , an actuating-pawl thereof upon an armature of an electro-magnet in a local circuit, one or more coin-operated tilting trays having contact-pieces which make and break said local circuit, a self-acting catch or detent, and a flexible toe on the telephone-switch, whereby said catch is withdrawn and said circuit-closer discharged by the act of restoring the receiver to its switch, substantially as set forth. 70 75 80

4. In a telephone call-box having a coin-operated and telephone-discharged make-and-break mechanism in the call-circuit, the combination of a normally-open cumulative battery or current source, a circuit-closer, the armature actuating the same step by step, and the electro-magnet of said armature in the circuit of such current source, substantially as set forth. 85 90

5. In the coin-operated release mechanism of a telephone call-box, the combination, with the coin-tilted tray or trays and located below the same, of the detaining-gate connected with the telephone-switch, the ejecting-chute, the external locker, the dumping-pan, the coin receptacle or till, the electro-magnet in the call-circuit, and an armature thereof adapted to trip and discharge said pan on use of the push-button, substantially as set forth. 95 100

6. In the coin-operated release mechanism of a telephone call-box, the combination of till 30, detaining-gate 35, the dumping-pan 22, dominated by the electro-magnet 32, and the trap-door or supplementary dump 22, whereby said pan is rendered capable of discharge into the till either optionally by the use of the telephone or in event of an overload becomes automatically released, in the manner explained. 105 110

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