

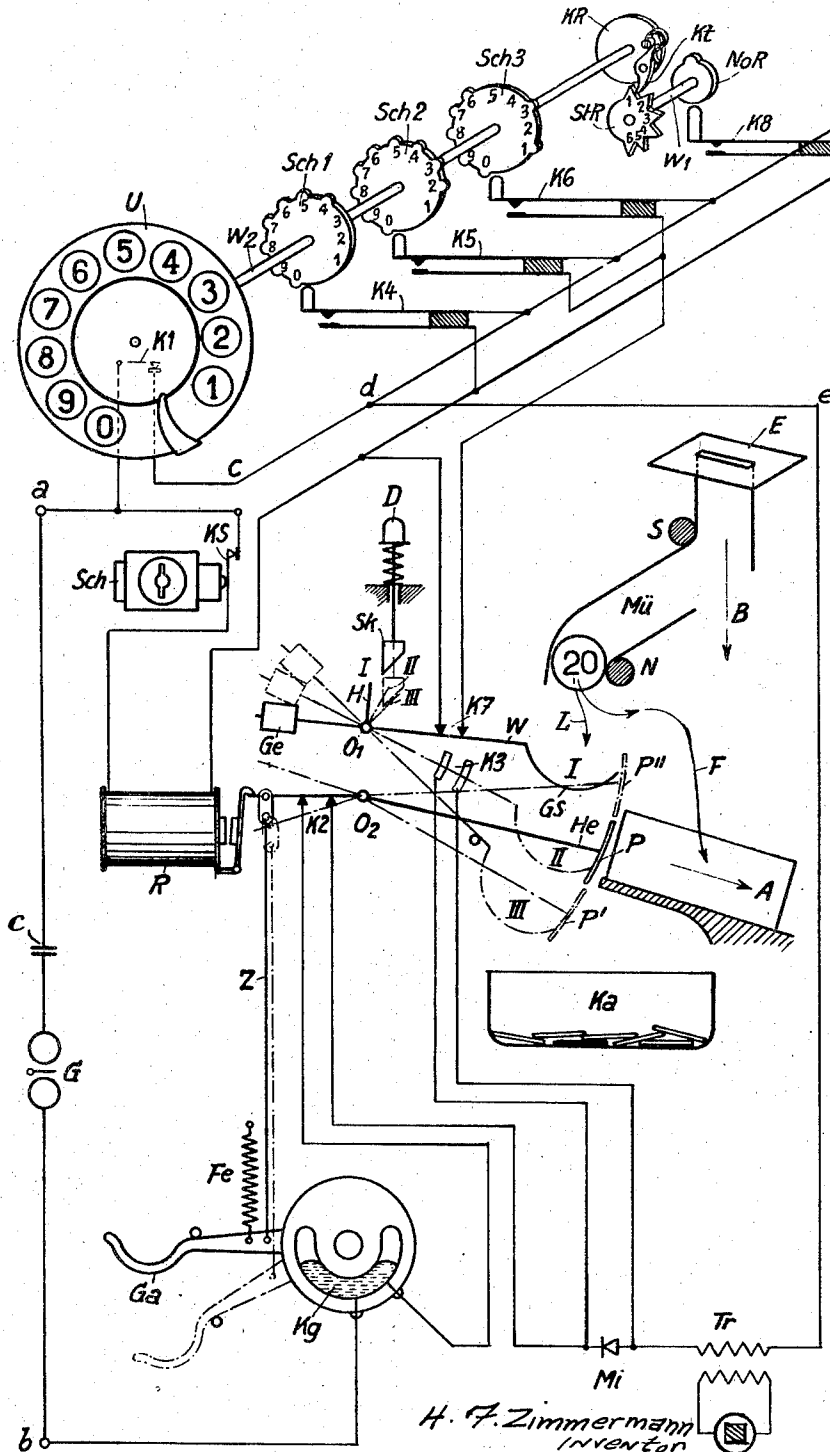
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COIN ACTUATED TELEPHONE APPARATUS

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## COIN ACTUATED TELEPHONE APPARATUS

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The present invention relates to a dial-operated telephone adapted to be rendered inoperative when certain numbers are called and in order to block certain calling numbers, a device is coupled to the impulse dial which, after inserting a coin and on setting one of the blocked numbers, short-circuits the impulse contacts. The apparatus is also arranged so that the calling of certain numbers may be effected without inserting a coin.

10 The telephone apparatus is provided with contacts which can be blocked to render the above mentioned device without effect and to change the apparatus into an ordinary telephone, that is one for establishing connections without the insertion of a coin. The apparatus is further provided with devices which break the connections in the case of improper manipulations or insufficient payment, and eject the coin to show the person using the apparatus that he has not handled it correctly.

20 Other and further features and objects of the invention will be more apparent to those skilled in the art upon a consideration of the annexed drawing and the following description wherein an exemplary embodiment of the invention is disclosed.

The single figure of the drawing diagrammatically illustrates structural parts of the apparatus including the connection thereof.

30 The current entering the apparatus at the terminal *a* passes successively through the contacts *K1* associated with the impulse disk *U*, through the conductor *c* to the terminal *d* and through the wire *e* and the primary of the transformer *Tr*. The current then passes through the microphone *Mi*, the contacts *K2* and the switch indicated at *Kg* operably associated with the receiver hook *Ga* and leaves the apparatus at the terminal *b*. A condenser *C* and a bell *G* are connected between the terminals *a* and *b*. The microphone *Mi* is short circuited temporarily by bridging the two contact members *K3*.

45 A third circuit parallel to the impulse contacts *K1* extends from the terminal *d* and includes the switches *K4*, *K5* and *K6* and the last two switches are connected in parallel. When the switch *K4* is closed current passes through the conductor *c* and the switch *K4* through a relay *R* and through the lock contacts *KS* to the terminal *a*. The contacts *KS* are opened and closed by means of a key operated lock *Sch*. When either of the switches *K5* or *K6* are closed current passes from the terminal *a* to one of the contacts *K7* and these contacts are associated with the beam of the coin balance hereinafter described.

The coin balance includes a beam *W* pivotally mounted at *O1* and provided with a counterweight *Ge*. The end of the beam opposite the counterweight is provided with a cup *GS* for receiving a coin and the beam is provided with an arm *H* adjacent the pivot *O1*. A push button *D* is provided for actuating a wedge-shaped member *Sk* which is maintained in an elevated position by means of a spring engaging the button *D*. When the cup *GS* is loaded with a coin the weight thereof moves the beam *W* downwardly to the position indicated at *II* and the arm *H* also assumes the position indicated at *II*.

15 A money box *Ka* serves for receiving the coins when a call has been completed through the apparatus. A coin inserted in the apparatus first passes through a magnetic coin tester which includes a graduated slot *E* and a coin chute *Mu* having magnets *S* and *N* associated therewith. The coin tester is provided for the purpose of preventing counterfeit coins or slugs from entering the apparatus. Counterfeit coins or slugs made of brass are ejected in the direction of the arrow *B* because such coins are not attracted by the magnet *S*. Coins formed of iron move in the chute *Mu* as a result of the magnetic attraction of the magnet *S* and an iron coin will drop and move in the direction of the arrow *F* as a result of the deflection created by the magnet *N*. A genuine coin of the proper dimension will pass downwardly through the chute *Mu* and move therefrom in the direction of the arrow *L* into the cup *GS*.

25 The weight of the coin in the cup *GS* moves the beam *W* downwardly to the position indicated at *II*. The coin is prevented from rolling out of the cup *GS* in this position of the beam by means of a plate *P* carried by a lever *He*. The lever *He* is pivotally mounted at *O2* and held in the position illustrated in full lines by means of a detent carried by the armature of the relay *R*. If the relay is energized the armature is attracted and the lever *He* is released and the end thereof carrying the plate *P* drops to the position indicated at *P'*. If the lever *He* should move to the position *P'* the coin carried in the cup *GS* and held in the position indicated at *II* would roll from the cup through the chute *A*.

40 The switch represented at *Kg* is of a mercury type and is operated by movements of the receiver hook *Ga*. When the receiver (not illustrated) is suspended on the hook *Ga* the switch *Kg* is open and when the receiver is removed from the hook *Ga* the spring *Fe* closes the switch *Kg*.

55 The switches *K4*, *K5* and *K6* are operated by

disks *Sch1*, *Sch2* and *Sch3* which are provided with peripheral projections. These disks are coupled with the impulse disk by means of a shaft *W2*. Thus the position of the disks carrying the peripheral projections are moved and the positions thereof are determined by the number called. The disks *Sch1* and *Sch3* and the driving means thereof constitute the subject-matter of an application filed August 18, 1937, Serial No. 159,790 and the driving arrangement is not the invention herein claimed and these elements are disclosed only for the purpose of completing the present invention.

In the example illustrated the disks *Sch1* and *Sch2* are turned when the first digit of a number has been dialed at the same angle as that of the impulse dial *U* and remain in this position until the end of the conversation. The selection of further digits of the called number do not further influence the disks *Sch1* and *Sch2*. The disk *Sch3* rotates only when the second digit of the called number is dialed and this disk moves through the same angle as that of the impulse dial *U* and remains in that position. If further disks are required they may be similarly arranged to successively receive a setting by other digits of the called number. The projections carried by the disks are so arranged that one or more of the switches *K4* or *K5* or *K6* will be closed upon a certain setting of the disks whereby one or the other of the blocking circuits is closed as herein-after more fully described and such a function will always take place when the call number does not represent a free call.

A wheel *KR* is also mechanically coupled with the impulse dial by means of the shaft *W2*. This wheel is intended after the call of a single digit needed for constituting the called number to turn the starwheel *StR* carried by a shaft *W1* to an angular position represented by one tooth of the starwheel. To this end the starwheel *StR* is arranged adjacent the wheel *KR* and in the present example the pawl *Kt* meshes at the starting position with the first tooth of the starwheel *StR*. A cam disk *NoR* carried by the shaft *W1* turns simultaneously at the same angle as the starwheel *StR*. The peripheral projection providing the cam of the disk *NoR* is arranged to close the switch *K8* connected in parallel with the switch *K4* after the starwheel has turned a given number of teeth. The number of teeth carried by the starwheel *StR* and the closing of the switch *K8* depends on the number of digits of the numbers to be called which are required for establishing connections to different exchanges. When the numbers to be called include four digits the starwheel *StR* is provided with five teeth and when the number to be called includes five digits the starwheel will be provided with seven teeth and so on. Every further turn of the impulse dial after the dialing of a calling number turns the starwheel *StR* by a further tooth and causes the closing of the switch *K8* and the short circuiting of the impulse dial contacts *K1* whereby all further impulses thereof are prevented. Thus after the transmission of a call number which has been controlled by the combination of disks and the exchange is free the short circuiting impulse switch will prevent the dispatch of a new number until the starwheel *StR* and the cam *NoR* and the wheel *Kr* are moved back to the starting position.

When the receiver is suspended on the hook *Ga* all disks will be moved back to their starting position by mechanical means (not shown). It is to be noted that every charge unit requires a sepa-

rate combination of disks and switches. Every combination requires as many single disks as there are digits of the called numbers. These digits are often referred to as characteristics and only the first one, two or three digits of a telephone number are characteristics even though the number itself may have four to six digits. Thus all telephone numbers of a town with 20,000 subscribers at the highest are within the range of numbers 20,000 to 39,999. Thus all numbers which present as first digits a digit 2 or 3 belong to subscribers of the same town and may be made accessible by payment of the same charge. In this case it suffices to control the first digit, for which purpose only one disk is needed. In a smaller town of not more than 2,000 subscribers the numbers would remain, for instance, within the range of 41,000 to 42,999. In this case the digits 41 and 42 should be controlled, that is two digit numbers, and two disks are required. On the first disk the projection 4 would be removed and the projections 1 and 2 of the second disk would be absent.

The switch contacts of each set of disks are connected in parallel and constitute together one blocking circuit. The number of blocking circuits is determined by the number of the different charges. Every blocking disk then becomes effective unless the amount provided for it has been inserted in the apparatus which must correspond to the proper charge. The disk then blocks all digits outside of this zone.

For the sake of simplifying the disclosure, only two blocking circuits are represented in the drawing, one for the chargeable calls having numbers with but one characteristic actuated by the disk *Sch1* and the switch *K4* and a second for free calls having numbers with two characteristics actuated by the two disks *Sch2* and *Sch3* and the switches *K5* and *K6*. The drawing thus represents an automatic device with only one zone of taxes, for instance, an automatic telephone station for a local exchange at a local charge of one coin and the possibility of calling certain numbers free.

If the numbers of the local zone are within the above mentioned example between 20,000 and 39,999 and the free numbers are 12, 14 and 15, the apparatus functions in the following manner. When the receiver is lifted from the hook *Ga* the connection to the exchange is established. A genuine coin is then inserted in the slot *E*. This coin passes the coin tester and drops into the cup *GS* and moves the beam *W* from the position *I* to the intermediate position *II*. In this position the beam *W* closes the contacts *K3* and opens the contacts *K7*. The microphone *Mi* will be short-circuited by the contacts *K3* and the blocking circuit through the switches *K5* and *K6* will be opened by breaking of the contacts *K7*. Now the desired number assumed to be between 20,000 and 39,999 is dialed in a known manner. The number may be assumed to be a number beginning with 3, for example 31,000. At first the digit 3 on the impulse dial is transmitted and number 3 of the disks *Sch1* and *Sch2* are moved to positions adjacent the fingers of the switches *K4* and *K5*. The disk *Sch1* does not have a projection at 3 and the switch *K4* remains open. The blocking circuit completed by the relay *R* controlled by the switch *K4* remains open and therefore without effect.

The disk *Sch2* has a projection at 3 so that the switch *K5* will be closed which however is without effect, because the contacts *K7* have al-

ready been opened by the coin. The digit 3 therefore will be transmitted to the exchange by three openings of the impulse contacts K1 caused by the return of the impulse dial. When dialing the second digit the disk Sch3 with the projection 1 will close the switch K6 but the circuit through the relay R will not be completed because the contacts K7 are open. The connection with the number 31,000 will thus be established.

The downward movement of the beam W to the position II will cause the contacts K3 to be closed whereby the microphone is short circuited and the called person cannot hear the calling person. Therefore the calling person must press the button D whereby the coin will be cashed. Since the beam W is now in the position II and the arm H has assumed the position II and the wedge member SK moved by the pressure on the press button D will engage the arm H and move it to the position III. The cup GS also assumes the position III and the coin then rolls into the box Ka since the plate P carried by the lever He has remained in its normal position. If the button D is released the beam W under the force of counterweight Ge swings back to the position I, whereby the contacts K3 are opened and the microphone is free so that the conversation may take place. If the called person does not answer, the caller hangs up his receiver and a mechanical connection is provided between the hook Ga and the lever He so that when hanging up the receiver the hook Ga is moved to the dotted line position and plate P is raised into the position P''. The consequence of this is that the coin which is still in the cup GS will be ejected through the chute A to the outside. This mechanical connection is diagrammatically represented at Z. Thus the calling person gets his money back if the conversation has not taken place.

If the calling person has not inserted a coin and tries to call the same number 31,000 the following operation will take place. The contacts K7 remain closed, because they are only opened by downward movement of the beam W. The projection 3 of the disk Sch2 closes the switch K5 at the moment when the impulse dial U is operated to the digit 3. Thereby the blocking or shunt circuit including the switch K5 and the contacts K7 is connected in parallel with respect to the impulse contacts K1. As soon as the impulse dial is released, returns and opens the impulse contacts K1 the current instead of passing over the contacts K1 passes through the shunt circuit and the relay R. The three interruptions of the contacts K1 will not be transmitted to the exchange because the current can pass through the shunt circuit and will not be interrupted. The relay R however attracts its armature immediately after the first interruption of the contacts K1. Thus the lever He which is normally held by the armature of relay R becomes free for a moment and the plate P drops to the position P'. The contacts K2 are thus opened and the connection with the exchange is interrupted.

If the calling person chooses one of the tax free digits 12, 14, 15, the switches K4, K5 and K6 all remain open and the connection will be established since the disks Sch1 and Sch2 have no projections at 1 and the disk Sch3 has no projection at 2, 4 and 5.

A third operating sequence is possible and if a genuine coin is inserted in the slot E and a digit is chosen outside of the above described example

such as a number beginning with 5, such a setting on the impulse dial U moves the projection 5 of disk Sch1 over the finger of the switch K4 and closes the same. Now the shunt circuit connected in parallel with the contacts K1 is closed. The five interruptions of the contacts K1 compel the current to pass through the relay R by impulses. The relay will thus release the lever He and the contacts K2 are thereby opened. The line is interrupted and the coin rolls from cup GS through the chute A to the outside of the apparatus since the plate P drops to the position P' when the lever He is released. Thus the calling person cannot establish an improper connection since the apparatus does not function if the chosen digit is prohibited or if the coin inserted does not agree with the prescribed fee.

It is evident that by providing further blocking circuits the possibility is provided of controlling different combinations of digits. Every blocking circuit will be connected then with separate coin balances such that with each additional insertion of a coin a further zone will be made available. By means of lock Sch the contacts KS may be opened, whereby all blocking circuits become ineffective. The apparatus is then like a normal telephone without the functions of a coin. The addition of a mercury switch Kg is made for the purpose of retarding the opening and the closing of the line. This retarding prevents short interruptions such as are created by impulse contacts K1 from being produced by rapid oscillations of the receiver hook. If this was possible digits could be called with the hook instead of with the impulse disk whereby all control of the numbers would be avoided.

While the invention has been described by reference to specific structural details it is apparent that modifications may be made therein. Such modifications may be made without departing from the spirit and scope of the invention as set forth in the appended claims.

I claim:

1. In a telephone pay-station the combination of, a device adapted to render certain call numbers inoperative comprising a dial having impulse contacts associated therewith, a shaft coupled to said dial, a number of disks attached to said shaft and corresponding to the number of inoperative call numbers and having projections thereon, circuits including said impulse contacts, switches each included in one of said circuits and arranged to be controlled by said projections, a relay included in said circuits, coin operated means arranged to control said relay, a coin-holding lever associated with said means and a receiver hook connected to said lever, and said lever being arranged to be controlled by said relay.

2. In a telephone pay-station the combination of, a device adapted to render certain call numbers inoperative comprising a dial having impulse contacts operated thereby, a shaft coupled to said dial, a number of disks attached to said shaft and corresponding to the number of inoperative call numbers and having projections thereon, circuits including said impulse contacts, switches each included in one of said circuits and arranged to be controlled by said projections, a relay included in said circuits, a coin tester device, a balance beam arranged to receive the tested coin, contacts controlled by the balance beam and connected with the circuit of one of said switches and arranged to energize the relay when dialing, and means for breaking a line cir-

cuit through the apparatus upon the energization of said relay.

3. In a telephone pay-station the combination of, a device adapted to render certain call numbers inoperative comprising a dial having impulse contacts associated therewith, a shaft coupled to said dial, a number of disks attached to said shaft and corresponding to the number of inoperative call numbers, said disks having projections thereon, circuits including said impulse contacts, switches each included in one of said circuits and arranged to be controlled by said projections, a relay included in said circuits, a coin tester device, a balance beam arranged to receive the tested coin, contacts closed in the rest position of the balance beam and connected with the circuit of at least one of the switches, a pivoted lever having a coin-holding plate maintained in the position of rest by said relay, contacts controlled by said lever, a receiver hook and a switch controlled by said receiver hook, and said last mentioned switch having a mercury load

adapted to retard the movements of the receiver hook.

4. In a telephone pay-station the combination of, a device adapted to render certain call numbers inoperative comprising a dial having impulse contacts associated therewith, a shaft coupled to said dial, a number of disks attached to said shaft and corresponding to the number of inoperative call numbers, projections carried by said disks, circuits including said impulse contacts, switches each included in one of said circuits and arranged to be controlled by said projections, a circuit extending from the circuit of the switches including a microphone, a coin tester, a balance beam arranged to receive a tested coin and to be moved thereby, contacts closed in the rest position of the balance beam and contacts closed in the operative position of the beam, said last mentioned contacts being adapted to short-circuit the microphone, and means arranged to tilt the balance beam to deliver the coin therefrom.

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