July 14, 1942. M. LANGER 2,289,507

TELEPHONE PAYSTATION

Filed April 7, 1939 2 Sheets-Sheet 1

Fig. 1.

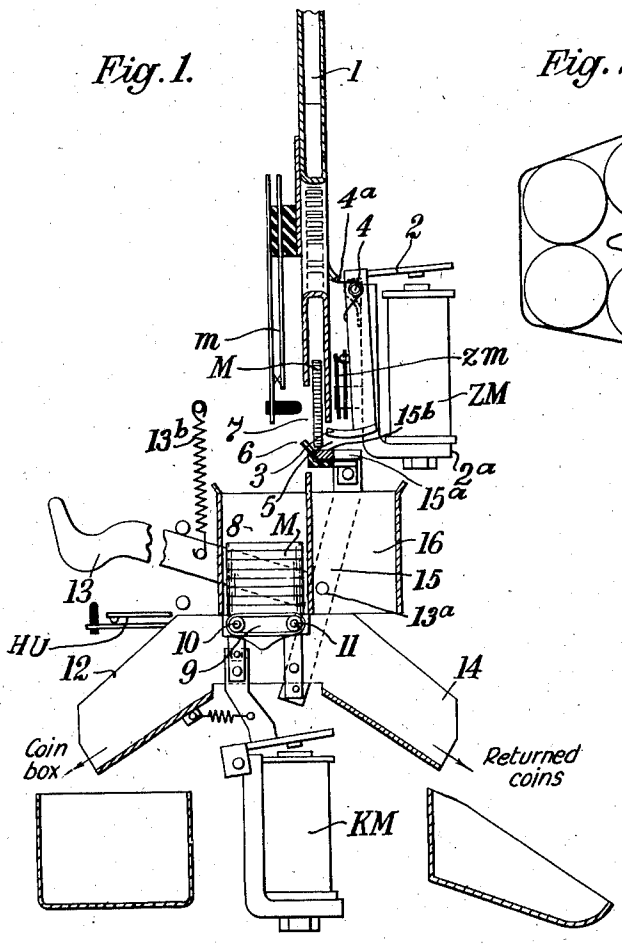
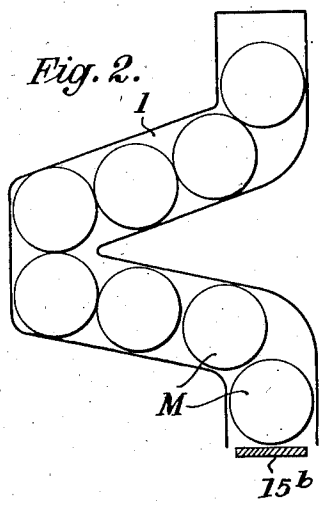


Fig. 2.



Inventor:
MAX LANGER

by Chas. Th. Landy.
Attorney.

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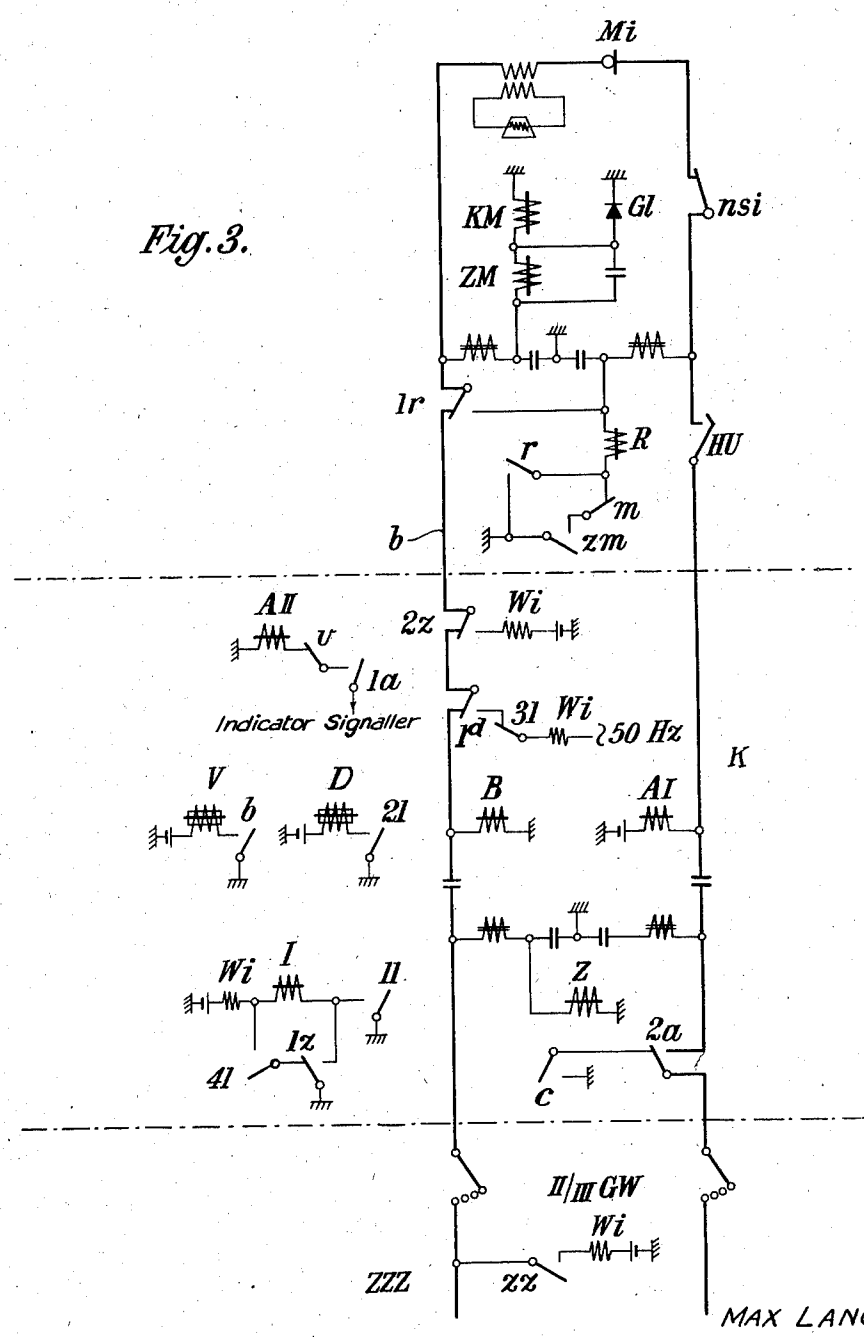
Fig. 3.



Inventor:
MAX LANGER

by Chas. Tu. Candy.
Attorney

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UNITED STATES PATENT OFFICE

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TELEPHONE PAY STATION

Max Langer, Berlin-Hermsdorf, Germany, assignor to Telephon-Apparat-Fabrik E. Zwietusch & Co. G. m. b. H., Berlin-Charlottenburg, Germany

Application April 7, 1939, Serial No. 266,529
In Germany April 16, 1938

5 Claims. (Cl. 179—6.31)

The invention relates to an automatic telephone paystation in which the subscriber at the paystation has an impulse sender or calling device by means of which a switching arrangement in the exchange is operated to extend a talking circuit and which also determines the toll to be charged for the connection and sends back impulses to the paystation for automatic collection of the corresponding toll, switching operations being effected in the telephone paystation corresponding to the charge for the connection.

Respecting telephone paystations it is known to include a coin chute or receptacle to hold a plurality of deposited coins and a magnet controlled by impulses from the exchange by means of which single coins are removed at particular time intervals from said receptacle in which they have been inserted by the talking party at the beginning of the conversation. When the coin supply is exhausted the conversation cannot be continued until the magnet has been energised again. The time interval between successive operations of the magnet can be varied according to the rate of charge for the connection. It has also been proposed that the magnet should be operated a number of times in succession according to the charge for the connection whereby a coin is transferred from the first coin receptacle to the cash box each time the magnet is energised and further conversation prevented should the number of coins transferred be smaller than the number of impulses transmitted. Since in such systems the coins transferred are immediately collected, the calling party loses his money when the amount inserted is not sufficient to meet the toll. One such system is shown in United States Patent No. 1,480,403, granted January 8, 1924, and also the general structure of telephone paystations is shown in United States Patent No. 1,043,219, granted November 5, 1912, and in United States Patent No. 917,742, granted April 6, 1909. This disadvantage is avoided by the invention since the coins removed from the first receptacle under the control of the impulses are not transferred directly to the coin box but are first held in a second container or intermediate receptacle located between the coin chute and the coin box and return chute. When the impulse transmission from the exchange is completed the coins transferred to the intermediate container are collected or refunded in dependence upon the agreement between the number of transmitted impulses and the number of coins deposited. The agreement of the number of transmitted impulses with the number of coins deposited is determined according to the invention by contacts which are controlled by the coins as they are transferred from the first to the second container. These contacts in connection with contacts controlled by the magnet cause the operation of an auxiliary relay which prevents the completion of the connection when there are no more coins in the first receptacle when the magnet is energised. The calling party is then forced to hang up his receiver which causes any inserted coins to be refunded at once. When the transmission of impulses from the exchange is followed by a further impulse which is transmitted by a relay arrangement in the exchange the collect magnet is energised but its switching operation is rendered ineffective when the auxiliary relay has already energised owing to there being no more coins in the first receptacle when the magnet is energised.

In the following an embodiment of the invention is described.

Figure 1 represents diagrammatically the mechanical arrangement in the telephone paystation.

Figure 2 is a view of the coin channel which serves as the first receptacle.

Figure 3 shows a circuit arrangement of the telephone paystation in connection with the exchange apparatus.

As the structure and mounting of the various parts of a telephone paystation is well known, as shown by the above referred to patents, the parts of the paystation in Figs. 1 and 2 have been shown only in diagrammatic form so as to avoid complications and these parts will be mounted on the paystation container or on brackets secured thereto in the usual manner. Figs. 1 and 2 show a coin chute 1 in which the coins are first deposited by the subscriber, an intermediate receptacle 8 to which the coins are transferred one at a time from receptacle 1, and a magnet ZM for transferring the coins. The magnet ZM is mounted near the base of chute 1, having the usual heel piece 2*a* supporting the armature 2 pivoted in the usual manner at 4 on the end of the magnet heel piece and carrying a lever 3 by means of which the coins are transferred. At 4*a* is indicated a spring for maintaining the armature 2 in retracted positions. The springs Z*m* are normally out of contact and caused to make contact when magnet ZM is energized. The switch hook 13 is mounted rigid with a pivoted arm 15 at pivot point 13*a* so that when the receiver hook 13 is raised by spring 13*b*, upon

removal of the receiver (not shown), the upper end 15b of arm 15 acts as a closure for the lower end of coin chute 1 as shown. When the receiver is placed on the hook it is lowered against the tension of spring 13b to open springs HU and to move the upper end of arm 15 to the left about pivot 13a to cause an opening 15a in arm 15 to move under the end of chute 1 to release any coins remaining therein. A chute 16 is provided below this opening 15a to guide the released coins into the usual refund chute 14. A platform 9 is provided at the lower side of intermediate receptacle 8 on which the coins fall when transferred thereto. A collect magnet KM is provided below this platform and is arranged to tilt the platform about its pivot point 11, when the magnet is energized, to cause the transferred coins to be dumped from receptacle 8 into the coin box via chute 12. The platform 9 is also tilted in the opposite direction about its pivot point 10 when the receiver (not shown) is placed on the hook to cause the coins in receptacle 8 to be refunded via chute 14. This operation is caused by the switch hook moving the lower end of arm 15 to the right about pivot 13a to lower the right side of platform 9.

After the receiver has been removed from the hook a number of coins are deposited in receptacle 1 and they rest on the upper end of 15b of arm 15 which holds the coins in the position shown. After the talking circuit has been extended and charging impulses are delivered to the paystation, the magnet ZM is operated once for each impulse to attract its armature 2. Each time magnet ZM is operated the lever 3 on armature 2 is pushed through the opening 5 in the channel 1 and pushes single ones of the coins M over the resilient projection 6 mounted on the upper end of rod 15. Thus the coin falls through the opening 7 in the side wall of the channel 1 into the second or intermediate coin receptacle 8. The coin M opens the contacts *m* as it is pushed through the opening 7 by the lever 3. Contacts *zm* are closed by the armature 2 which is adjusted so that they are closed only when the contacts *m* have already been opened under the control of the coin M. The circuit of contacts *m* and *zm* is shown in Fig. 3 and will be later described. The coins transferred by the magnet ZM into the receptacle 8 form a pile on the plate 9 which can rotate about the pins 10 and 11. When the collect magnet KM is operated the plate 9 is tilted about point 11 and takes up such a position that the coins M piled on the plate 9 fall into the collecting chute 12. If the receiver is hung up on the receiver hook 13 before magnet KM is operated the plate 9 is tilted about point 10 by a rod 15 connected to and tilted by the receiver hook 13 and the coins in the receptacle 8 are thus allowed to fall into the refund chute 14. The rod 15 actuated by the receiver hook 13 moves the member 15b which normally rests below the chute 1 laterally when the receiver is hung up in such a manner that the coins in the chute 1 drop down through the opening 15a and through the chute 16 into the refund chute 14. The method of operation of the telephone paystation will now be explained with reference to the circuit shown in Figure 3.

The circuit arrangement of Fig. 3 is only shown as one method of operating the transfer magnet ZM and the collect magnet KM and is of known type it being understood that any similar circuit arrangement could be utilized. This figure shows the paystation above the dotted line in the upper part of the figure, a repeater K in the central part thereof and indicates diagrammatically an equipment ZZZ in the exchange for sending back charging impulses. The equipment ZZZ may be of any desired type similar to that shown in Patent 1,480,403 wherein impulses are returned to a calling line varying in number in accordance with the charge for extending a particular connection.

Prior to the extension of a connection the subscriber at a paystation lifts his receiver (not shown) and deposits as many coins as he believes will be sufficient for the connection which he intends to extend and these coins are held in receptacle 1 (Fig. 1) as described. The lifting of the receiver from hook 13 operates the usual hook switch springs HU to complete the line circuit and energize the usual line relays A and B in the repeater K which feed battery to the paystation. The circuit of relays A and B extends from ground through battery, relay A, springs HU, sender springs *nsi*, transmitter M*i*, induction coil winding, springs 1*r*, springs 2*z*, springs 1*d*, and relay B to ground. Relay A closes springs 2*a* in the line circuit, closes springs 1*a* to prepare a circuit for a second winding of relay A, and relay B closes the circuit of slow acting relay V at springs *b*. The subscriber now operates the usual impulse sender or calling device which opens its springs *nsi* in the line circuit to thereby control line relays A and B to repeat impulses via contacts 2*a* of relay A to the selecting devices in the exchange (not shown) to extend the connection. As soon as the called subscriber has replied, a number of impulses, corresponding to the charge for the connection set up are transmitted by contact *zz* under the control of the equipment ZZZ over the line by which the relay Z in the repeater K is operated a corresponding number of times. These impulses of current are transmitted over one side of the line circuit from battery through contacts *zz* to the relay Z in repeater K. On the first energization of relay Z its contacts 1*z* and 2*z* are closed, contacts 1*z* completing a circuit for relay I and contacts 2*z* completing a circuit from battery, resistance W*i*, contacts 2*z*, contacts 1*r*, impedance, transfer magnet ZM and rectifier GL to ground. The rectifier GL is so poled that a current from this circuit passes freely through it and it thus acts as a short circuit for collect magnet KM so that said magnet is not energized at this time. On each operation of relay Z the magnet ZM is thus energized to transfer a coin from chute 1 to receptacle 8 as shown in Fig. 1. After completion of the operation of contacts *zz* of the charging equipment ZZZ relay Z falls back and opens its front contacts. When contacts 1*z* were first closed, relay I operated and closed its contacts 1I, 2I and 4I and opened its contacts 3I. Contacts 2I complete a circuit for slow relay D which operates and operates its contacts 1*d*. Now when contacts 1*z* restore to the position shown, although relay I still has its circuit closed through contacts 1I, the contacts 4I are also closed and when the back contacts 1*z* close the relay I is short circuited from ground over contacts 1*z* and 4I and the relay I falls back. Contacts 2I of relay I are therefore opened and contacts 3I are closed. Contacts 2I open the circuit of relay D which is slow to release and before it releases a circuit is completed momentarily from any 50 cycle alternating current source as indicated through resistance W*i*, contacts 3*i*, contacts 1*d*, contacts 2*z*, contacts 1*r*, through mag-

net ZM and condenser F in parallel, and magnet KM and rectifier GL in parallel to ground. Magnet ZM is short circuited in this circuit to alternating current by the condenser F. The cash magnet KM is energised by this alternating current and, as explained in connection with Fig. 1, transfers the money in the receptacle 8 to the coin box.

If, however, the coin supplying channel 1 is exhausted when the metering magnet ZM operates, there is provided a relay R associated with the paystation which is energized over a circuit from ground through the contacts *zm* and the rest contacts *m* through relay R, contacts HU, and relay A to battery. When relay R is energized the relay B is disconnected by contacts *1r* opening the original line circuit while the relay A holds over the above circuit through relay R. The slow relay V which was energized by contacts *b* of relay B when the line circuit was first closed and which does not restore during the impulse transmission when the circuit of relay B is opened by contacts *nsi* now deenergizes and connects an indicating signal (not shown) over contacts V and contact *1a* to a second winding AII of the relay A. Since the transmitter *Mi* is disconnected from the feeding current at the contact *1r* the calling party hears only the busy signal in his receiver and is compelled to hang up. Finally, as already explained, by the hanging up of the receiver on the switch hook 13 and the consequent movement of rod 15 to tilt the platform 9 about pivot 10 the money in the intermediate container 8 is refunded to the calling party.

I claim:

1. In a telephone paystation, a coin chute for holding deposited coins, means for extending a connection therefrom and for transmitting toll assessing impulses thereto, a receptacle therein for receiving coins transferred from said chute, means operated responsive to the impulses received at the paystation for transferring deposited coins from said chute to said receptacle to assess toll for the connection, means for collecting the transferred coins in case the number of coins transferred is equal to the number of assessing impulses received, and means for preventing the operation of said last means in case there are more assessing impulses received than there are coins deposited.

2. A telephone paystation such as claimed in claim 1 wherein the means for preventing comprises a relay for opening the circuit of said collecting means, a circuit for said relay and contacts in the circuit of said relay operated each time a coin is transferred.

3. In a telephone paystation, a coin chute containing a plurality of deposited coins, means operated intermittently for moving said coins one at a time from said chute into a receptacle, a collect magnet for collecting the coins from the receptacle, a relay for preventing operation of said magnet, said relay only operated when said first means is operated a greater number of times than the number of coins deposited.

4. In a telephone paystation, a coin chute carrying deposited coins, a receptacle, a transfer magnet, means for transmitting toll assessing impulses to said magnet to operate it to transfer the coins one at a time to said receptacle, a collect magnet operated at times to collect the coins transferred to said receptacle, a relay for preventing operation of said collect magnet, a circuit for said relay, contacts controlled by each operation of the transfer magnet in said circuit, and contacts controlled by each coin when transferred, and means for refunding the transferred coins in case said relay is operated.

5. In a telephone paystation having means for extending connections therefrom, a supply of deposited coins, an intermediate receptacle, a magnet, means for transmitting toll assessing impulses to said magnet to operate it for transferring deposited coins one at a time from the supply to said receptacle, a collect magnet, a circuit for the collect magnet completed after the toll assessing impulses are received, a relay for opening said circuit, contacts controlled by said transferring magnet for closing a point in said circuit each time the transfer magnet is energized, other contacts in said circuit opened each time a coin is transferred to said receptacle, said circuit completed only when the transfer magnet energizes and a coin is not transferred thereby.

MAX LANGER.