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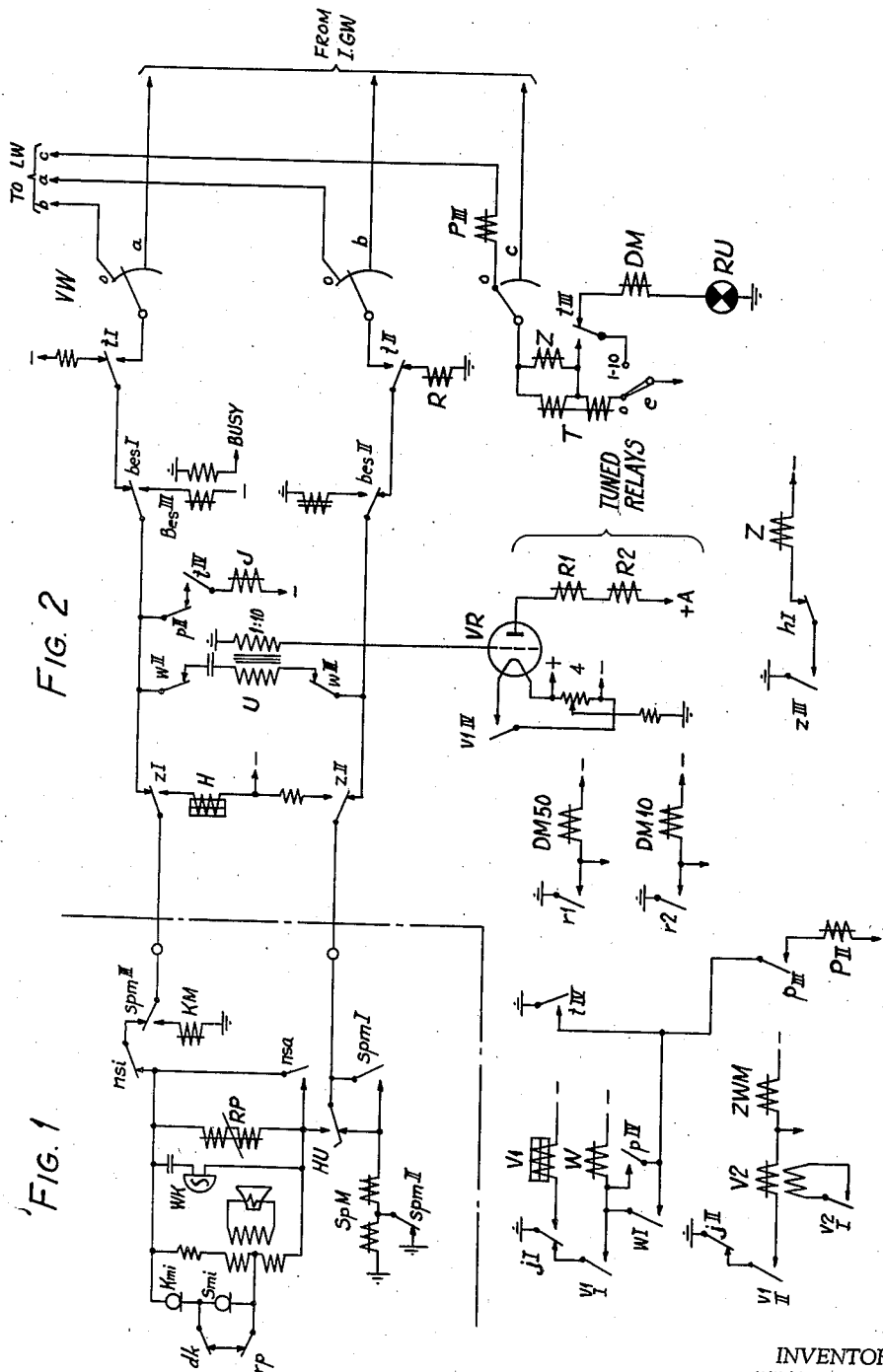
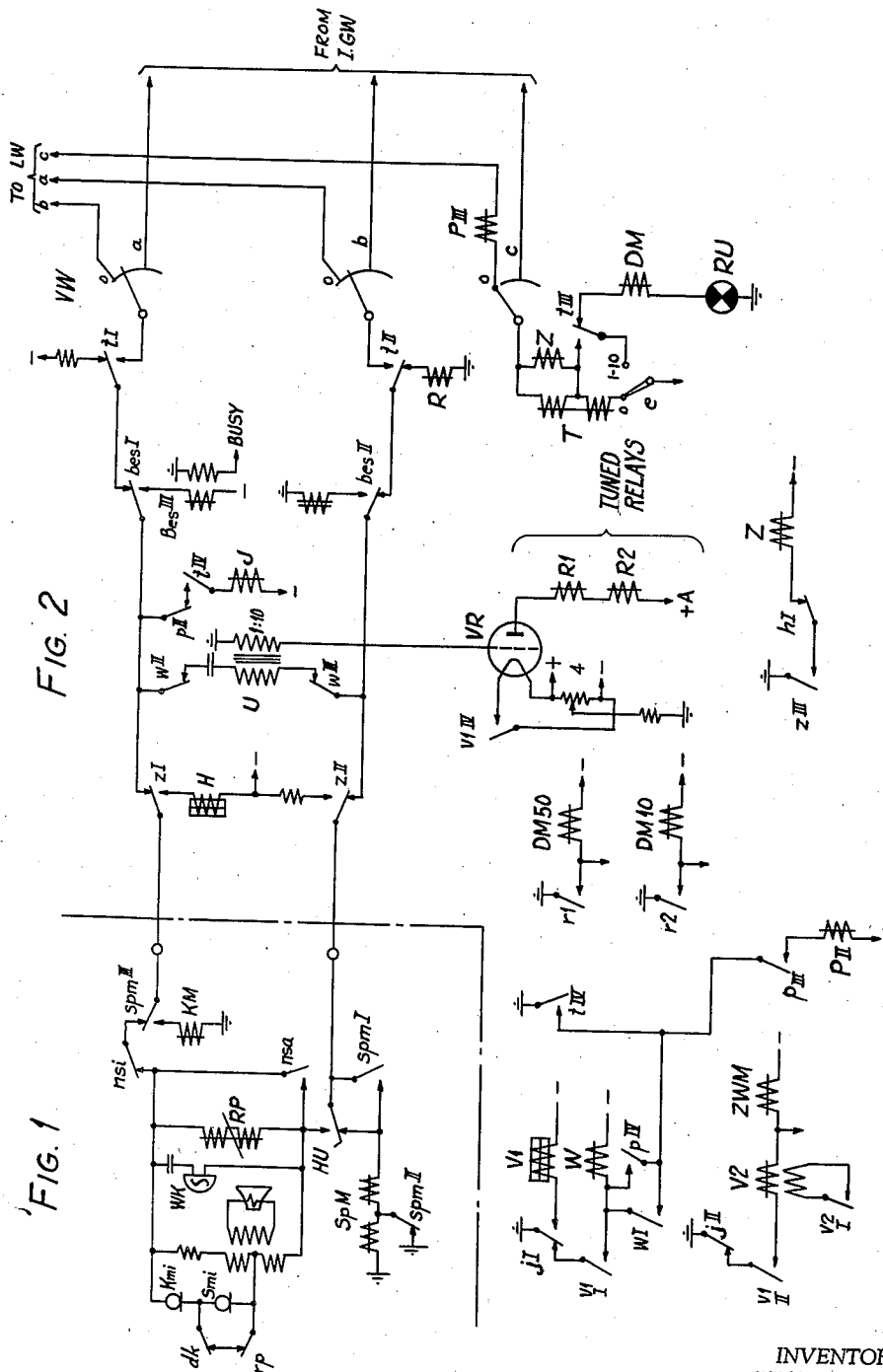
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PAY-STATION TELEPHONE

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2 Sheets-Sheet 1



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PAY-STATION TELEPHONE

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6 Claims. (Cl. 179-6.3)

The invention relates to a circuit arrangement for pay stations from which variously rated calls may be established and relates in particular to such pay stations in which payment control is either effected by an operator or automatically by switching devices in the exchange in accordance with the kind of call set up. Hitherto in pay stations of this kind the operator has been able to determine the value of the fee paid in by audible signals produced by the insertion of the coins. For automatic payment control contacts are operated by the insertion of coins over which impulses are transmitted to the exchange for influencing fee controlling devices. In order to prevent the audible signals produced by the insertion of coins from being interfered with on account of the operation of contacts, special devices are required in the pay station. The invention obviates the necessity for these devices. This is achieved according to the invention in that the audible signals which are converted by a microphone into alternating currents of corresponding frequency in the case of calls of a particular kind indicate to the supervisory operator the value of the fee inserted while in the case of other calls (toll calls having automatic fee control in the exchange) the audible signals influence switching devices serving to establish the amount of the fee inserted in various ways according to their frequency.

An embodiment of the invention is shown in the drawings.

Fig. 1 represents the switching devices in the pay station, and

Fig. 2 those in the exchange.

Fig. 3 shows the details of the zone switch and the coin operated switch operated by the magnets shown in Fig. 2.

The invention is based on a known pay station in which the money inserted is forwarded to the collecting chamber by the magnet KM at the end of the call, while if the call does not materialize it is resorted to the calling party when the receiver is replaced after a blocking magnet SpM which is deenergized in dependence upon the devices in the exchange, frees the coin channel. The pay station possesses two microphones namely a speech microphone SM_i and a sound microphone KM_i whereby the audible signals which are produced on the insertion of a coin by the latter striking a gong and which indicate the value of the coin are transformed into alternating current of a definite frequency. The dial plate whose impulse sending contact is indicated by *nsi* and whose dial off-normal con-

tact is indicated by *nsa* is further provided with an off-normal contact *dk* which opens when the dial plate is first drawn off-normal and remains open until the receiver is replaced. In parallel with the speaking leads is disposed a polarized relay RP which opens its contact *rp* when an incoming call is received at the pay station. Payment control in the case of long distance calls takes place in the usual manner. After the called party has replied to his long distance call the pay station is called from the distant exchange and the calling party is requested to insert a fee corresponding to the value of the distant call. By hearing the audible signal the operator can determine whether the calling party has complied with the request. For automatic payment control in the case of toll calls two switches are used in the exchange, of which one switch is set in accordance with the value of the fee inserted while the other switch is set in accordance with the zone dialled. The call is only switched through if the setting of the two switches correspond. According to the invention the switch characterizing the value of the fee inserted is controlled by the audible signals produced on the insertion of the coins.

An example of a toll call will now be considered for which the fee of 60 pfgs. has to be paid, a 50 pfg. piece and a 10 pfg. piece being inserted. The calling party first takes up the receiver in order to gain access to the coin slot which is covered when the receiver is in position. The public exchange loop and relay R in the preselector VW are first subjected to current over the switchhook contact HU and the preselector is started up in the known way and tests on a free first group selector whereupon relay T energizes. Relay T connects the auxiliary impulse relay J to the *a*-lead in parallel with the control relay of the first group selector at contact *zIV*. Relay VI pulls up over *zI*. The filament circuit of the amplifying valve VR is completed at contact *ViIV*. In the exchange the speaking leads are bridged by a repeater *Ü* having a high input resistance and large transmission ratio. In the primary circuit is disposed a condenser which prevents direct current flow.

When the calling party inserts the fee for the call he wishes to set up in the apparatus one or more tones are generated for each coin on account of the latter striking a gong. These tones are received by the sound microphone KM_i and are transformed into alternating current of frequency corresponding to the pitch of the tone. These alternating currents pass from the sec-

ondary of the repeater $\bar{U}$ to the grid of the amplifying valve VR and by raising the grid potential cause a flow of anode current. In the anode circuit are disposed two tuned relays R1 and R2. The one tuned relay R1 is tuned to a low pitched tone which is produced by a gong when for example a 50 pfg. piece is paid in, while the other tuned relay is tuned to the high pitched tone which is produced by a gong when for example a 10 pfg. is inserted. A tuned relay can only energize when the amplified current possesses the frequency to which it is tuned. Thus when one 50 pfg. piece and one 10 pfg. piece are inserted contacts r1 and r2 of the tuned relays R1 and R2 are each transitorily energized and operate the rotary magnets DM50 and DM10, which each displace their associated wipers W50—I—II and W10—I—IV by one step. After the subscriber has inserted the fee of 60 pfgs. he operates his dial switch. It will be assumed that the call number of the wanted party starts with a 6 and that this digit determines the zone of the call. On dialling the digit 6 the group selector GW is set in the known way and at the same time the rotary magnet ZWM of the zone switch ZW is correspondingly energized by relay J. When relay J falls back for the first time relay W is brought up over contacts jI and vI—I. Relay VI is slow-to-release so that it does not de-energize during dialling. Relay W locks up over contact wI independently of contact jI. By opening contacts wII and wIII relay W disconnects the repeater $\bar{U}$ required for transmitting the tone signals from the line. The rotary magnet ZWM is stepped forward over contacts jII and vI—II and in the same circuit the rapidly operating but slow-to-release relay V2 is energized. At the end of the first selecting stage which serves to characterize the zone, relay V2 releases while relays VI and W remain up. Earth is now connected to wiper I of switch W50 over wIV and v2II in order to test as to whether the fee inserted corresponds to the zone dialled. Since in the present case the correct fee was in point of fact inserted relay P can energize over winding PI over position 1 of switch W50, position 1 of switch W10, wiper II, and position 6 of the zone switch ZWI. At pI relay P prevents the slow-to-release relay Q from operating. Contact pII disconnects the auxiliary impulse relay J from the speaking leads since this is no longer needed. Relay P locks up over its winding PII at contact pIII and through contacts iIV. The further establishment of the call proceeds in the normal way. After relay J has released relay VI also releases and over contact vI—III connects the relay interrupter RU (Fig. 3) in succession to the rotary magnets DM10, DM50 and ZWM. The switches W10, W50, and ZW accordingly restore to normal. On the replacement of the receiver the metering relay Z is energized over the c-lead by the metering impulses when the first group selector is released. This relay locks up over contact zIII. Battery is applied to the apparatus over contacts zI and zII in the two speaking leads, and thereby on the one hand the blocking magnet SpM and on the other hand the collecting magnet KM are energized and the inserted fee is collected. Relay H energizes over the collecting magnet KM and disconnects the metering relay Z.

If instead of 60 pfgs. for example only 50 or none at all had been inserted relay P would not have been able to energize. Accordingly relay Q would have drawn up again and would

have energized the busy relay Bes over winding BesI at contact qI. On energizing relay Bes breaks the leads for the first group selector at contacts besI and besII, so that the first group selector is released. At the same time the busy relay locks up over contact besI and besIII in dependence upon the switchhook contact HU. The busy signal is transmitted to the subscriber over winding II of the busy relay. When the receiver is replaced the busy relay releases and releases the line. When the group selector is released relay T also falls back so that relays J and VI deenergize.

In the case of incoming calls battery is applied to the b-lead and earth to the a-lead through the switching over of the leads proceeding from the final selector LW, while over the c-lead relay P energizes over winding PIII together with relay T. Relay T switches the speaking leads through and relay P brings up relay W at contact pIV. The repeater $\bar{U}$ and relay J are now disconnected from the speaking leads. The ringing current proceeds uninterruptedly to the pay station and operates the bell WK. On removing the receiver the loop is closed and on account of the reversal of polarity the polarized relay RP now energizes and removes the short-circuit from the speech microphone Smi. In the case of outgoing calls the short-circuit about the speech microphone is removed by the opening of contact dk when the dial plate is first drawn off-normal. When the final selector LW is released relays T and P and the line restore to normal.

What is claimed is:

1. In a pay-station telephone system, having a substation with coin operated means thereat for producing audible signals, the provision of means operated by each audible signal for transmitting an alternating current to the exchange, together with switching means in the exchange, and means responsive to said alternating current for controlling said switching means in accordance with said alternating current to indicate the amount of the fee paid.

2. In a telephone system, lines having coin collectors, means for extending connections to other subscribers directly or through operators, means controlled by the deposit of different coins in the coin collectors for transmitting different tone signal currents to the operator when the connection is extended therethrough to indicate proper payment of toll, and switching means operated by the tone signal currents when the connection is to be extended directly to another subscriber for controlling the extension of a connection.

3. In a telephone system, pay-station lines each having coin operated means for transmitting tone signals differing in accordance with the value of a deposited coin, means for extending connections from said lines, and relays each tuned to the frequency of a particular tone signal and operated thereby in response to the insertion of a coin for controlling the extension of said connections.

4. A telephone system as claimed in claim 3 wherein there is means for blocking the talking transmitter of a line to prevent transmission of confusing tone signals while said first tone signals are being transmitted, and means for at times removing said blocking means on an incoming and an outgoing call.

5. A telephone system as claimed in claim 3 in which there is means for rendering said tuned relays non-responsive to the insertion of coins

after the dialling of a called number to extend one of said connections is started.

6. In a telephone system, pay-station lines, means for extending connections therefrom operated by impulses transmitted from a line, means on each line for transmitting tone signals of different character when coins are deposited dependent on the type of coin, switching means

operated by the tone signals, other switching means operated by the impulses transmitted from a calling line, and means for preventing the extension of a connection when the positions of the switching devices are not in correspondence.

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