

CURRENT COMMENTS

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Telephone Coin Collecting Boxes.

THE provision of unattended public call offices, particularly in densely populated areas, has long been regarded as a profitable investment by the majority of administrations. It introduces an additional and often valuable source of revenue, while promoting the popularity of the service by offering the facility of the telephone to a wider public. It is, moreover, a proposition capable of easy exploitation.

The efficiency of a call office system is obviously determined by the type of coin box used for collecting the appropriate fees from the public when calls are made. These Coin Collectors may be of two types *Postpayment* in which the fee is demanded and checked in by the operator *after* the desired connection has been obtained, and *Prepayment* in which the fee must be deposited in the box *before* the exchange can be called, or in the case of an automatic system, before the required subscriber can be "dialled."

Postpayment. In the case of such equipment the exchange operator must give special attention to the line until she has connected the required number, ascertained that the called subscriber is in attendance, requested the caller to insert the appropriate fee and received the necessary signal to indicate that this fee has been deposited in the cash box. Obviously, this detailed procedure occupies the attention of the operator for a time considerably in excess of that entailed in completing an ordinary call, and therefore

reduces the number of lines she can handle efficiently. Operating costs are consequently increased.

In addition to this serious disadvantage, the postpayment principle cannot be adapted to meet automatic systems, the number of which is rapidly increasing.

Prepayment. The introduction of the Prepayment Collector entirely obviates the operating delay, for before a caller can gain the attention of the exchange the calling fee must first be placed in the box. In the event of the call being ineffective or in the case of a faulty line, means are provided for refunding the payment to the caller. In addition, the facilities given by the prepayment *multi-coin* collector render it practicable to accept additional payments for trunk and junction calls and other fees, and also in a simple and convenient way to provide telegraphic facilities to the public.

It will be clear that the Prepayment Collector reduces the factor of operator's time per call to a figure comparable with that reached in the handling of private subscriber's lines and, therefore, offers a large annual saving to the administration.

An efficient coin collector should be fitted with up-to-date devices for detecting false coins, but due no doubt to the fact that no immediate material advantage is gained and that a more responsible section of the public is concerned, it is interesting to record that

in the experience of telephone authorities in Great Britain and the United States, the losses due to the use of false coins, etc., may be kept to a small fraction of one per cent. of the total sums collected.

The Hall Prepayment Multi-Coin Collecting Box. Two Button Type.

This prepayment type of multi-coin collecting box, in general use by the British Post Office, was designed for use in C.B. manual and automatic exchange areas. Its chief features are —

- (1) In the case of a C.B. manual exchange it requires the insertion of the local fee before the exchange can be called, whilst in an automatic area the insertion of the local fee is necessary before the dial can be used to call any number other than "0" (auto-manual board).
- (2) By means of press buttons operated by the caller it enables any fees inserted to be either deposited if the call is effective or refunded if ineffective.
- (3) It permits such additional fees as may be required for Toll and Trunk calls, or for the transmission of telegrams, to be collected and thus enables other than local fee calls to be dealt with at unattended call offices.
- (4) In addition to pennies, sixpences and shillings can be accepted.

A standard coin box of this type is illustrated in Figs. 1 and 2, the mechanism being shown in greater detail in Fig. 3.

On the top of the collector three slots are provided, marked "Penny," "Sixpence," and "Shilling" respectively. The size of each slot is such as to prevent the use of coins of a larger size than that marked opposite the



Fig. 1.—Prepayment Multi-Coin Collecting Box, two button type.

slot, if smaller coins than those indicated are inserted they will be thrown out by means of the coin gauges and returned to the caller.

The coins after insertion are held in suspense in a pivoted container which is controlled mechanically by the caller by two press buttons A and B. By means of these press buttons the coins may be deposited in the cash box or returned to the caller.

In the case of a successful call the depression of button "A" will deposit the coins in the cash box beyond the further control of the caller and enable the conversation to be carried on.

In the case of an unsuccessful call or in the event of a fault existing in the circuit such as

to prevent the attention of the exchange being gained, the depression of button "B" will return to the caller any coins held in the container

The insertion of coins in excess of the local calling fee, as is required for toll and trunk service, etc., is checked by means of gong signals. Each penny inserted strikes a *wire* gong once, each sixpence strikes a *bell* gong once, whilst each shilling strikes the same bell gong twice. These gong signals are made audible to the operator by means of a small transmitter fitted inside the bell gong and enable her to check the value of the coins inserted in the box. Capacities of the three sections in the coin container of the standard design are ten pennies, eight sixpences and ten shillings respectively

The case is constructed of pressed steel and, as will be seen from Fig. 2, is divided into two compartments, the top for the mechanism and the bottom portion forming the cash box. Independent access to the two compartments is provided, each being fitted with a suitable lock. As a protection against corrosion, the steel case is treated by the latest parkerising process and finally stove enamelled.

The whole of the mechanism is hinged and can either be swung clear of the box or removed entirely for inspection or adjustment. The electrical connections between the apparatus on the hinged and fixed portions of the box are made by means of a special plug and jack.

The mechanical features of the box are the same for either C.B. manual or automatic working, the complete coin collector forming a unit which is suitable, without alteration, for use with either manual or automatic table or wall sets. A typical unattended public call office on a C.B. manual system would consist



Fig. 2.—Cover removed for inspection of mechanism.

of a telephone instrument, the coin collector, and a small auxiliary relay box. In the case of an automatic system no auxiliary apparatus is required.

Modification of Equipment at a Manual C.B. Exchange.

In Fig. 4 the complete circuit arrangements are shown for a call office installation consisting of a **GEOPHONE** instrument, the coin collector and auxiliary relay box. It will be seen that the necessary modifications to the normal exchange equipment are as follows :—
Calling Equipment. Disconnect the "A" line at the cut-off relay.

"A" Position Cord Circuit. Provide a relay in the sleeve circuit of the calling cord to

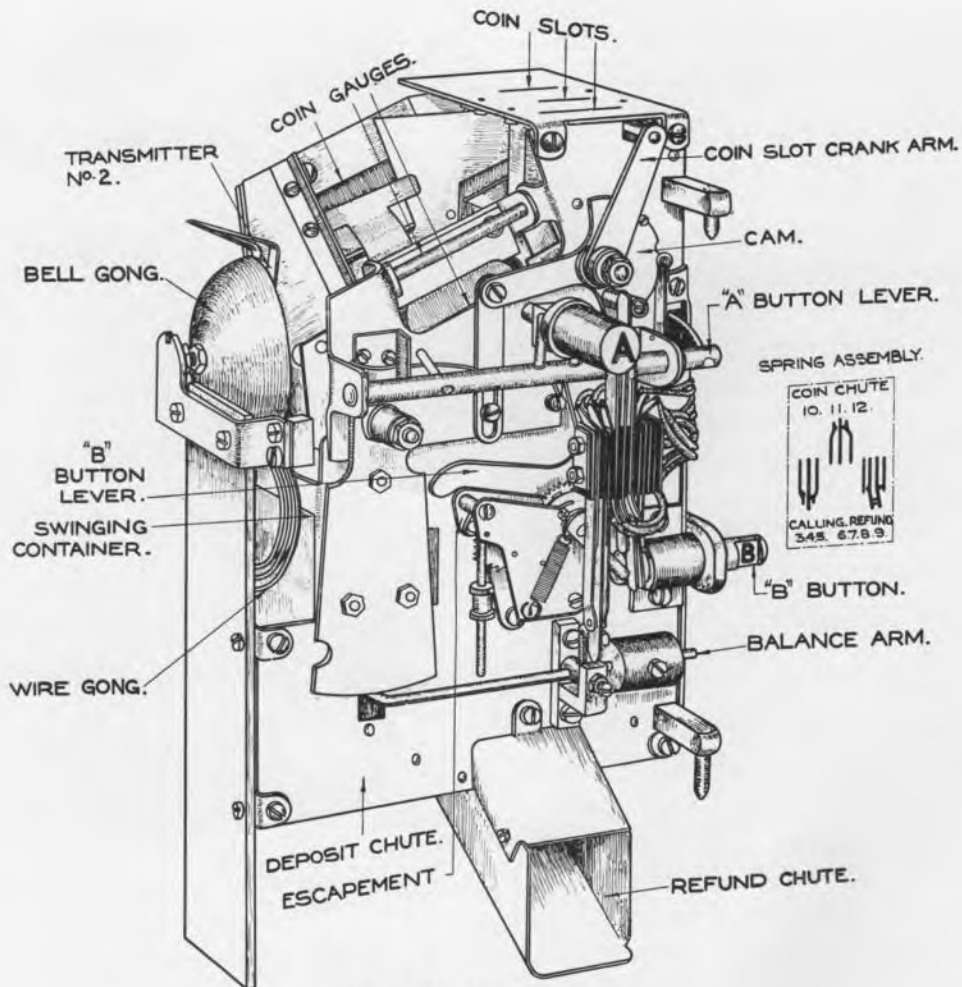


Fig. 3.—Mechanical details.

give a reversal of battery on the answering cord when the calling plug is inserted into a jack.

The modified cord circuits may be distinguished from the ordinary cord circuits by means of specially coloured plug covers and key tops. "Hold Jacks" may be provided on the operators' positions as explained later

Circuit Operation on a Manual C.B. Exchange. Calling fee—2 pennies.

Calling the Exchange. The removal of the receiver operates the usual switch-hook con-

nections but as the line relay circuit is disconnected at the cut-off relay, the line relay is not operated. The insertion of the first penny breaks contacts 11-12 and makes contacts 10-11 (Figs. 3 and 4). The penny rolls down an inclined chute and rests on the balance arm but does not operate it.

The second penny rolls down the inclined chute in a similar manner and the combined weight of the two pennies depresses the balance arm and closes contacts 3-4. The circuit of the line relay at the exchange is completed by the earth on contact 3, via 4,

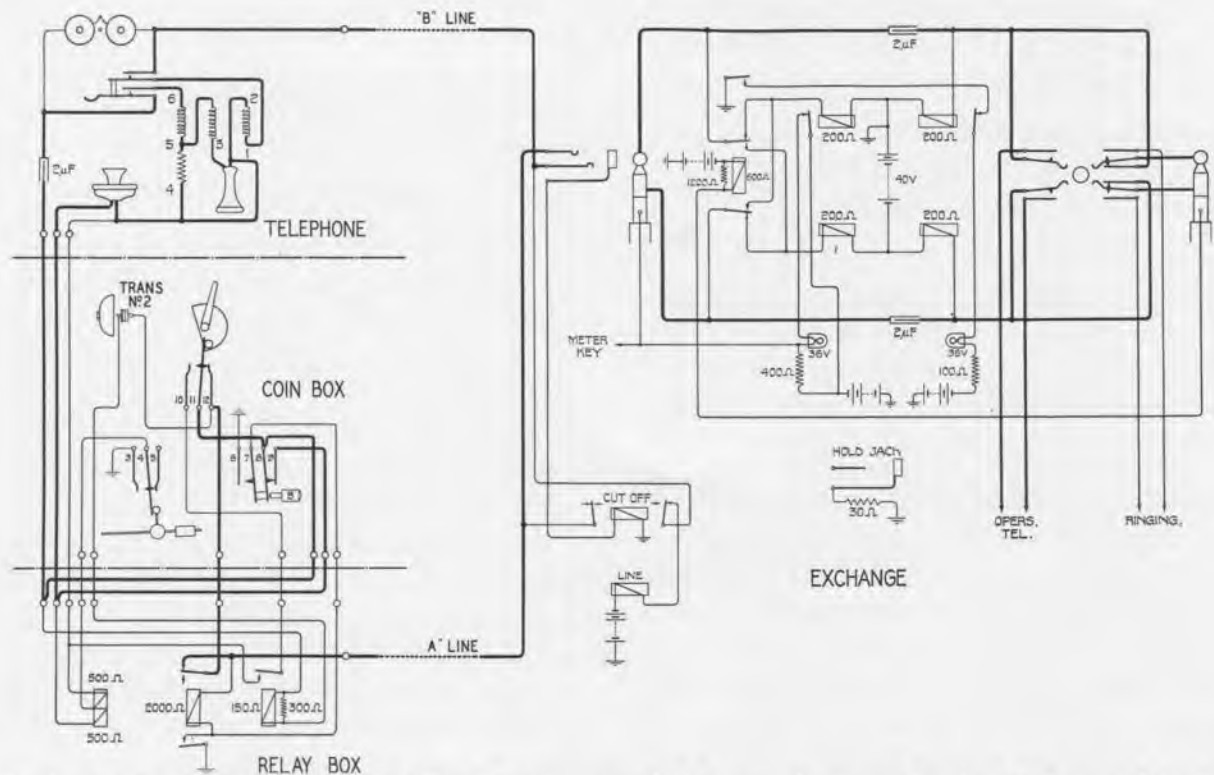


Fig. 4.—Circuit arrangements at a typical public call office on a manual C.B. System, showing modification of exchange cord circuit.

one 500 ohm winding of retardation coil, primary of induction coil, switch hook contacts, "B" line, cut-off relay contacts, line relay and battery to earth. The line relay is operated and gives the calling signal to the operator

Exchange Answers. When the operator inserts the answering plug the cut-off relay is operated and battery is connected to the "B" line, and earth to the "A" line, from the cord circuit. The 150 ohm relay at the call office, which is of the polarised type, is now in circuit but as it is arranged to operate only with the negative pole of the exchange battery on the "A" line it does not operate and consequently both the speech transmitter and the coin box transmitter (No. 2) are in series in the line.

Caller Connected. The insertion of the calling plug into the required subscriber's line operates the 600 ohm relay in the "sleeve" circuit of the plug and reverses "tip" and "ring" connections of the answering plug so that the negative pole of the battery is now connected to the "A" line, and earth to the "B" line. The polarised relay at the call office is therefore operated and short-circuits the telephone speech transmitter. The call office is now in a position to listen but not to speak. When the caller hears his correspondent he presses button "A" which deposits the coins in the cash box, open contacts 10-11 and closes contacts 11-12. The former contacts remove the short circuit from the speech transmitter and the latter contacts short-circuit the polarised relay and the coin box transmitter.

When the coins are deposited (or refunded in the case of an ineffective call) the balance arm is released and contacts 3-4 are opened.

The call may now proceed in the ordinary way and standard conditions exist for supervisory and clearing signals.

If when the operator takes particulars of the number required it is found that additional fees are necessary, she inserts her calling plug into the "hold" jack whilst the value of the coins inserted is checked by the gong signals.

Ineffective Calls. If the call is ineffective either due to a faulty line or the inability of the operator to obtain the attention of the subscriber required, the caller obtains the return of his coins by pressing refund button "B." This operation opens contacts 10-11 and closes contacts 11-12 as in the case when button "A" is depressed. It also opens contacts 8-9 and closes contacts 6-7. The closing of the latter contacts applies earth to the 2000 ohms relay connected to the "A" line which operates and locks up via its own contacts, disconnecting the line and thus giving the clearing signal at the exchange. This relay remains locked and the clearing signal continues until the operator takes down the connection.

Misuse of the "B" (Refund) Button. It will be seen from Fig. 4 that in the event of the caller depressing the "B" (refund) button *after* the operator has answered but *before* the calling plug has been inserted in the jack of the required subscriber the 2000 ohms relay will not be operated as there will be no battery on the "A" line at the exchange. Also the polarised relay will be short-circuited by contacts 11-12, these having been restored to their normal positions by the operation of button "B" and therefore cannot operate

A momentary clearing signal only will be given on the supervisory lamp (whilst contacts 8-9 are open) and unless further precautionary measures are taken the fact that the refund button has been depressed might pass unnoticed by the operator

In order to prevent any attempt by a caller to obtain a call in this way without payment a small clockwork timing device is provided in connection with the refund button "B" which keeps contacts 8-9 open and contacts 6-7 closed for a period of approximately seven seconds and during this period the clearing signal is maintained at the exchange. If during this seven seconds interval the calling plug is inserted into the required subscriber's jack, thereby connecting battery to the "A" line, the 2000 ohms relay will operate and lock up, thus permanently disconnecting the line until the operator takes down the connection by withdrawing the answering plug.

Hold Jack. A hold jack—an ordinary jack with the sleeve circuit connected to earth through an appropriate resistance—is provided as a further precautionary measure on each operator's position dealing with prepayment coin collecting box circuits, for use in operating calls when it is not possible or desirable to connect the calling plug immediately to a subscriber's jack. In such cases the calling plug is inserted in the hold jack, which produces the same conditions as when this plug is inserted into an ordinary jack. Any attempt by a caller to obtain a call without payment by pressing button "B" during the interval before the required connection is established is thus defeated as already explained.

It will be clear from Fig. 4 that the call

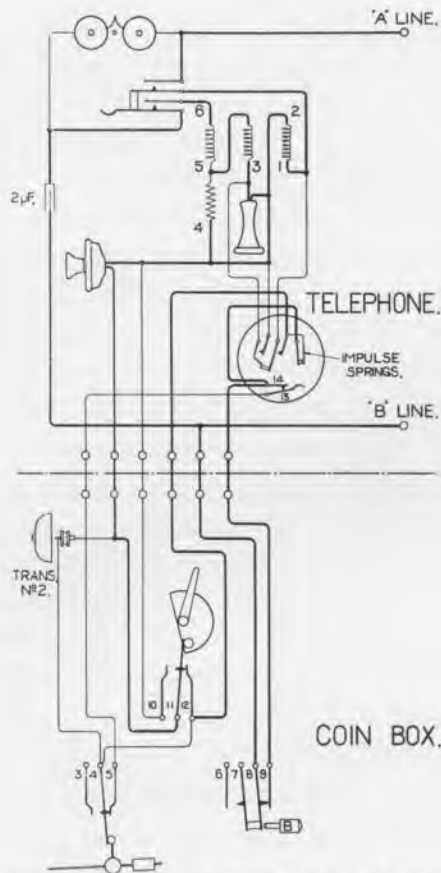


Fig 5.—Circuit arrangements at a public call office operating on an automatic system.

Circuit Operation on an Automatic Exchange. Calling fee—2 pennies.

As already stated the mechanical features of the Coin Collector are exactly the same whether used for manual or automatic working, the circuit arrangements only being modified. No modifications are required at the automatic exchange and as will be seen from Fig. 5 no auxiliary relay box is required and only springs 8-9 of the refund button are used.

The telephone set shown in Fig. 5 is fitted with a special dial to permit of the operator being called without prepayment when "0" is dialled. The dial modification consists of

spring contacts 13-14 and a controlling cam. The cam is mounted loosely on the main spindle of the dial and is operated by the switching lever but is so arranged that this operation only takes place when "0" is dialled. When "0" is dialled the contacts 13-14 are opened and remain open until the tenth impulse has been completed, *i.e.*, until the dial has returned to normal when they again close.

The normal conditions are shown in Fig. 5 and the method of operating is as follows—

The first penny inserted closes contacts 10-11 and opens contacts 11-12, thus short-circuiting the speech transmitter and removing the short circuit from the coin box transmitter. The penny comes to rest on the balance arm but does not operate it as explained under manual conditions. The weight of the second penny added to that of the first operates the balance arm which in turn operates contacts 4-5 and removes the short circuit from the impulse springs of the dial. The caller is now able to dial the number of the subscriber he requires. When the called subscriber answers the caller depresses button "A" which deposits the coins, opens contacts 10-11, and closes contacts 11-12 and 4-5, thus transferring the short circuit from the speech transmitter to the coin box transmitter and, by means of contacts 4-5, restoring the short circuit across the dial impulse springs. The circuit is thus restored to normal and conversation can proceed, the connection at the exchange being released when the receiver is replaced on the switch hook.

In the case of emergency, *i.e.*, Fire, Police and Ambulance calls, or in other circumstances when the attention of the operator

without previously inserting coins in the box. When the dial is revolved to its full extent the short circuit across the impulse springs is removed as already explained, the calling signal is thus given to the manual operator and she takes particulars of the call. When the call matures the operator requests the caller to insert the appropriate fee. (Emergency calls are, of course, usually permitted without charge). The first penny inserted breaks contact 11-12 and makes contacts 10-11, and the coin box transmitter is thus placed in circuit and enables the value of the coins inserted to be checked by the operator in the usual way. When the required fee has been collected the caller is requested to press button "A" which deposits the coins in the cash box and transfers the short circuit from the speech transmitter to the coin box transmitter. The circuit is thus restored to the normal speaking condition; the conversation can proceed and the standard conditions exist for supervision and clearing.

If the call is ineffective the caller obtains the return of his money by pressing the refund button "B." This operation opens contacts 10-11 and closes contacts 11-12 as described when button "A" is depressed but, in addition, it opens contacts 8-9 and disconnects the line, and by means of the clockwork timing device already mentioned these contacts are kept open for about seven seconds which is a sufficiently long interval to clear any connection set up automatically at the exchange.

Hall Prepayment Multi-Coin Collecting Boxes are also made with four chutes to take up to four denominations of coins. A typical example would be a collector to take values of 2, 4, 5 and 10, the calling fee being either one coin of value 4 or two coins of value 2, the 5 and 10 values being for trunk or similar services. The gong signals in this case would be :—

Value 2 would strike the *wire* gong once.
 „ 4 „ „ „ „ „ twice.
 „ 5 „ „ „ *bell* gong once.
 „ 10 „ „ „ „ „ twice

To be continued.

