

CALL-OFFICE INSTALLATIONS, PAY-ON-ANSWER WORKING

Public Call Offices and Subscribers' Coin-box Installations, Using Box, Coin-collecting,
No. 700 and No. 705

Mechanical and Electrical Operation

★1. **General.**—The Box, Coin-collecting, No. 700 is used in conjunction with a 700-type telephone on subscribers' installations. The circuit is shown in Dgm. N 1169 and the coin-collecting box associated with a Telephone No. 706 in Dgm. N 2423. The Box, Coin-collecting, No. 705 is a combined telephone and coin box, the integral telephone being of the 700 type. The circuit is shown in Dgm. N 805.

These coin boxes have been designed to enable users to obtain trunk calls, in addition to local calls, without operator assistance. They are for connexion to public exchanges which provide subscriber trunk dialling facilities. In use the wanted subscriber's number is dialled, and it is not until after the called party has answered that coins are inserted. For this reason the system has been designated 'Pay-on-Answer'.



FIG. 1

The coin boxes accept 12-sided threepenny pieces, sixpences and shillings and signal the value of the coin(s) inserted to the exchange. The coins, if accepted after passing the coin tests, drop straight through to the cash container and are not held in suspense. There are therefore no 'A' or 'B' buttons but a reject chute is provided to return worn or spurious coins.

Fig. 1 shows a general view of the Box, Coin-collecting, No. 705 and Fig. 2 shows, from left to right, the mechanism compartment cover, the mechanism, the self-sealing cash box and the backplate and cash box compartment with the door of the latter dropped into the open position. Fig. 3 shows the general view of the Box, coin-collecting, No. 700 and Fig. 4 shows, from left to right, the mechanism front cover, the cash box, the mechanism, and the Case No. 113 with the cash box compartment cover detached.

★2. **Incoming calls.**—The circuit for the bell is completed via the gravity switch as long as the handset is on its cradle, and the instrument functions as a normal telephone for incoming calls. The coin slots remain locked throughout an incoming call.

3. **Outgoing calls; sequence of events.**—The caller lifts the receiver and dials the wanted number. Until the called subscriber answers the line polarity is such (A-line positive) that relay SU does not operate and the coin slots are locked to prevent premature insertion of coins. When the called subscriber answers the line polarity reverses, and relay SU operates unlocking the coin slots. At this stage there is no speech path but the caller receives pay tone (N.U. tone interrupted at 0.125 second on, 0.125 second off) and should then insert a coin. The insertion of a coin

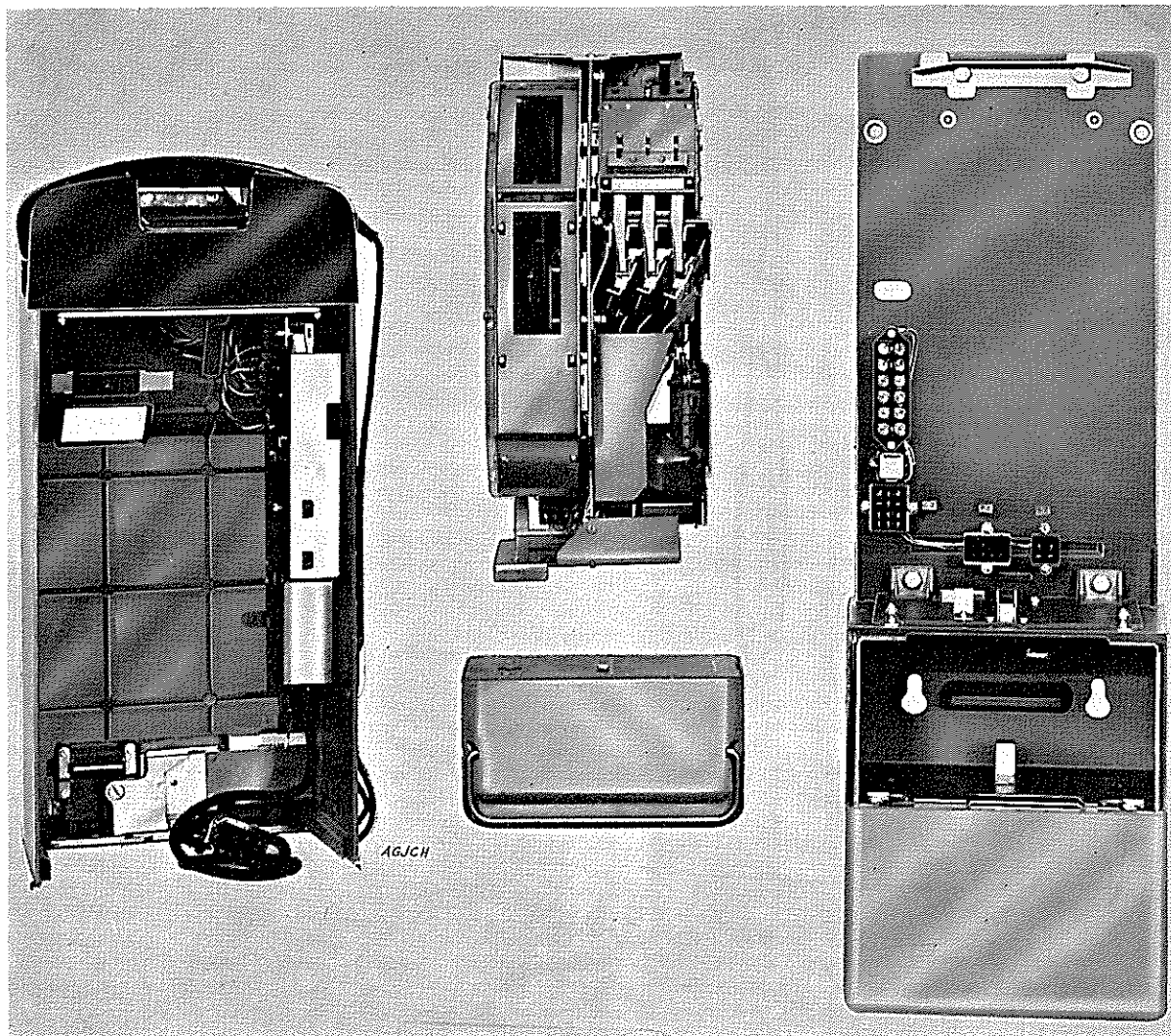


FIG. 2



FIG 3.

causes coin pulses to be sent to the exchange where they are recorded by the coin and fee checking relay-set, which then opens the speech path, so that conversation can proceed. Further coins can be inserted at any time and corresponding coin pulses are sent to the exchange as above. At each termination of paid-for time, pay tone is re-applied to line for three seconds (the speech path is still open during this pay tone). If a coin is not inserted within 10 seconds of the commencement of pay tone, a line reversal re-locks the coin slots and two seconds later the call is force-released at the exchange and N.U. tone returned to the caller.

★4. **Coin value signalling.**—The coin pulses are signalled by increasing the line loop resistance by 5000 ohms. The coin pulses are sent at approximately

4 pulse/sec. with a signalling resistance/loop resistance timing ratio of 1:1.6. Each coin pulse train terminates with a line disconnection of 60 ms and if this final disconnection is absent the pulse train is not accepted by the exchange equipment, i.e. the call is regarded as a fraudulent operation. The energy for generating the coin signals is obtained by the insertion of the coin. When the coin is pressed into its slot it operates a pivoted lever, the movement of which raises a bank of cams. When the coin is fully inserted the cam-bank falls under gravity but at a speed regulated by a dial-type governor. As the cams fall various spring-sets are operated to produce the coin pulses, but the pulses are not sent to line unless the coin has successfully passed through the coin tester and tripped the mask operating lever. The number of pulses sent depends upon the coin used, a 3d. 6d. or 1s. coin sending one,

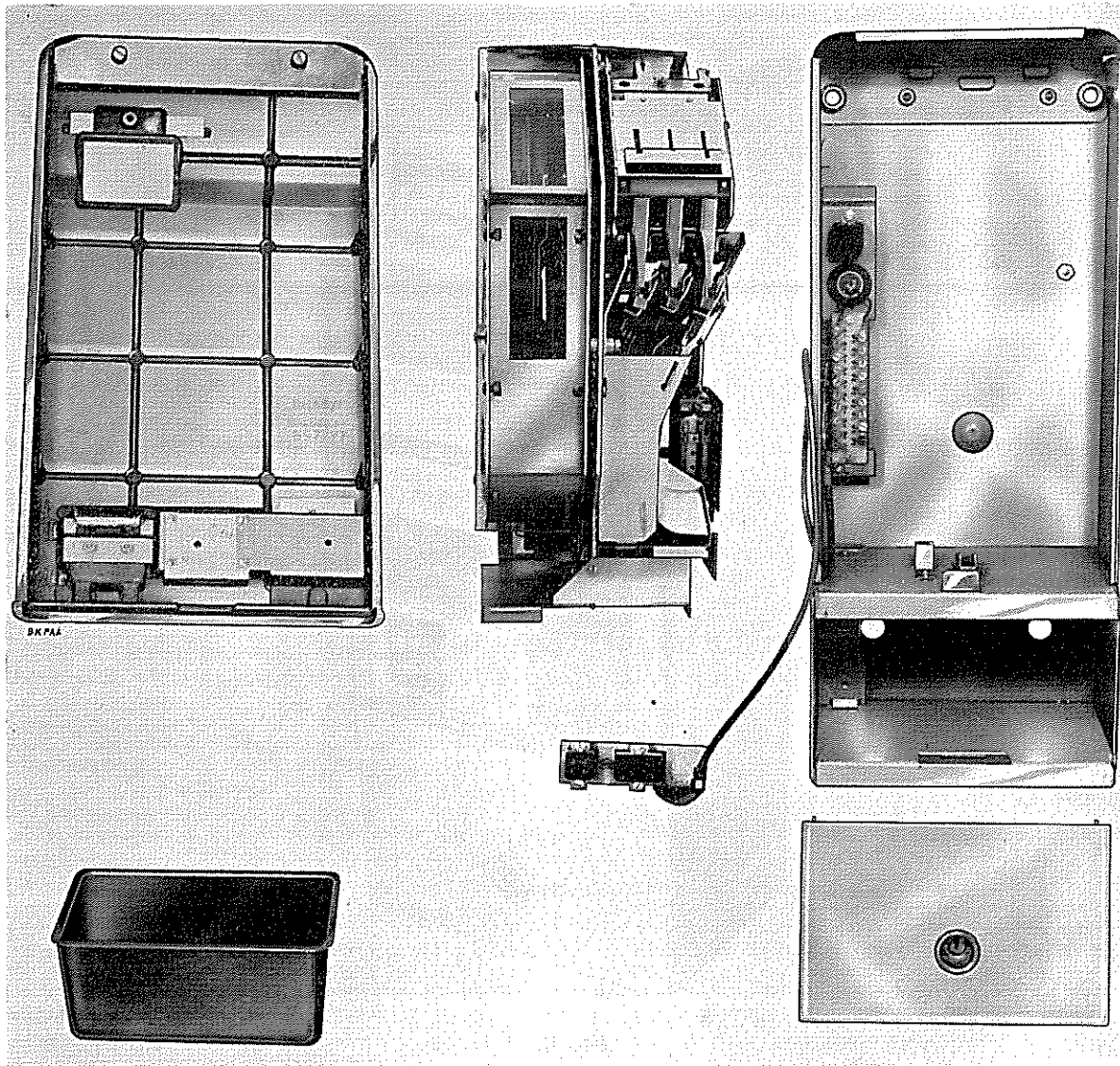


FIG. 4

two or four pulses respectively. Generation of the correct number of coin pulses for the particular coin inserted is effected by moving a pivoted coin-pulse spring-set to be opposite the appropriate cam on the cam-bank. With reference to Dgms. N 805 and N 2423, the spring-sets produce coin pulses as follows:—

- (a) CPON3 makes and prepares a circuit for CP.
- (b) The mask contact opens, leaving the telephone loop held via CP and CPON3.
- (c) CPON1 makes, and short-circuits the receiver.
- (d) CP opens and introduces 5000 ohms into the loop—this being the first coin pulse.

(f) CPON2 makes and prevents operation of the gravity switch interfering with coin pulses.

(g) CP closes and completes the first coin pulse. If the coin inserted is 3d., CP operates once only, if 6d. CP operates twice and if 1s. CP operates four times.

(h) CPON3 opens and gives a line disconnection ('coin train complete' signal).

(j) The mask contact closes and re-establishes the loop.

(k) CPON2 opens, CPON1 opens and the circuit is restored to normal.

5. Coin slot locking.—The slot locking is controlled

(a) electromagnetically by the exchange equipment, relay SU being used for this, and

(b) mechanically within the coin-operated mechanism itself.

The coin slots are normally locked but are unlocked when the distant subscriber answers and, in general, remain unlocked for the duration of the call. The full sequence is:—

(i) The slots are locked when there is no line current (handset on its cradle, circuit faulty, etc.) or when the line polarity is normal.

(ii) Relay SU unlocks the slots when the called subscriber answers and the line polarity reverses.

(iii) The slots are relocked momentarily during the signalling of a coin (a period of approximately two seconds) to prevent the premature insertion of a second coin. They are also interlocked to prevent the simultaneous insertion of two or more coins, or the last-moment substitution of one coin by another (for example by withdrawing a 1s. and inserting a 3d. coin, in a fraudulent attempt to obtain 1s.-worth of time for 3d.).

(iv) Finally, relay SU relocks the slots two seconds before forced release at the end of pay tone to prevent coins being inserted too late during the 12-second pay period to be recorded at the exchange.

★6. Circuit details.—

(a) *'Emergency service' facility.*—If the mechanism is removed and taken away, e.g. to a coin-box maintenance centre, the telephone circuit can be retained for emergency service by coupling a 4-point jack to a 4-point plug (connector SJ, see Note 3 Dgins. N 805 and N 2423). A label that the telephone is available for emergency calls only is then fitted over the coin plate aperture. The 4-point jack (Jack No. 77D) and the label (Label No. 360) used for this purpose are housed in the mechanism compartment of each coin box.

(b) *CPON3 contact.*—This contact is made as soon as the cam-bank starts to move downwards after a coin has been inserted. It must make before the mask contact opens. If it fails to do so, the telephone line is open-circuited and the call is released. A failure here may occur due to incorrect adjustment of the CPON3

spring-set assembly so that it fails to latch, or incorrect positioning relative to the cam-bank so that the operating mechanism is not prepared on the upward movement of the cam-bank.

(c) *The telephone regulator.*—This is part of the 700-type telephone and is used to reduce the sensitivity of the telephone on short lines. If a regulator fails, and a spare is not to hand, the telephone circuit can be temporarily restored (but without regulation) by withdrawing and reversing the regulator end-for-end in its jack. In the reversed position the contacts on the regulator bridge jack points B, D and C.

(d) *Rectifier MR2.*—This is a selenium double-diode having the purpose of minimizing the clicks in the receiver during the progress of a call, especially those arising from the line current reversals used to control slot locking.

(e) *SU relay.*—This is a 3000-type relay used to perform mechanical work only; bias spring-sets are provided to control the armature, but the springs have no electrical contacts. The relay is 'polarized' by the use of a rectifier, so that with the initial conditions (A-line positive), the series element does not conduct and therefore relay SU does not operate. When the line polarity is reversed, e.g. called subscriber answer, the series element does conduct and relay SU operates. The shunt element is provided to maintain the line current when the series element is not conducting.

(f) *The mechanism test jack.*—An 8-way jack, T.J., is provided, at which access to the isolated contacts of the pulser unit can be obtained for maintenance purposes. The strappings required for normal working are provided by a plug which is normally inserted in the jack. The jack enables faulting to be carried out and is used for the setting up of the mechanism in coin-box maintenance centres, in conjunction with a Tester SA 9129.

(g) *Earthing of coin-box casing.*—The earth connected to the appropriate coin-box terminal is extended to the mechanism framework and the metal casing or cover. This is done to ensure that if low insulation conditions arise, shocks will not be experienced by users. In addition, contacts to the frame or casing will show up as definite earth faults instead of giving rise to low insulation or noise faults which may be difficult to trace.

Reference:—None
(SI/2)

END