CHAPTER XXII

MISCELLANEOUS CIRCUITS

Prepayment Call Offices. The standard arrangement for a call office in a C.B. or automatic exchange area

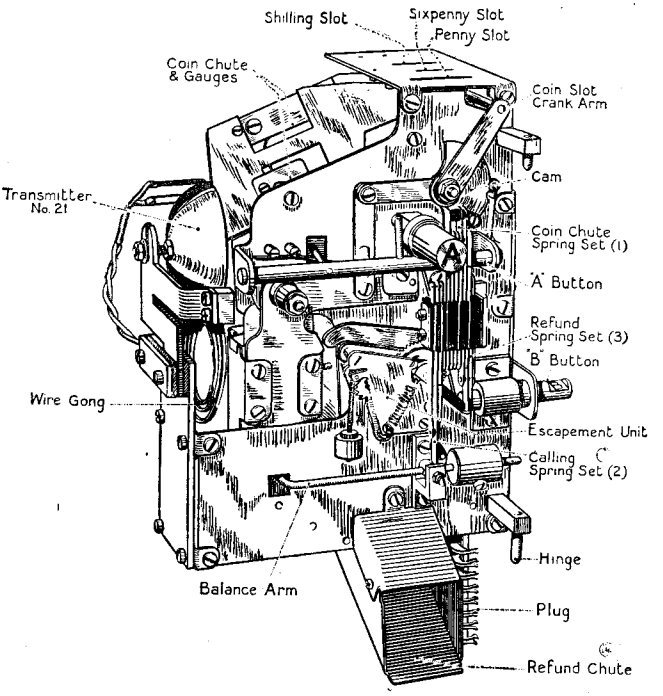


FIG. 695. PREPAYMENT COIN BOX MECHANISM

is the provision of a multi-coin collecting box and a telephone operated on a pre-payment basis. The mechanism of the coin box (Fig. 695) embodies coin gauges

and slots which ensure that coins of correct dimensions and weight shall be effective, any coins not coming within this category being returned to the user through the refund chute. For a local call, the insertion of one penny causes the coin slot crank arm to be moved over, so operating spring set 1. The coin rolls down the coin track and strikes the wire gong at the end of the track before rolling into the coin container. The second penny, following, causes the balanced arm to

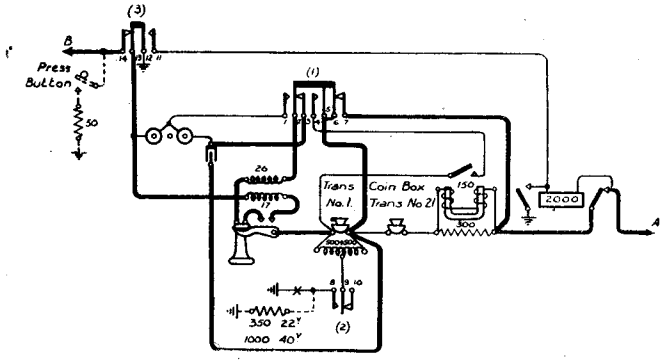


FIG. 696. PREPAYMENT CALL OFFICE CIRCUIT

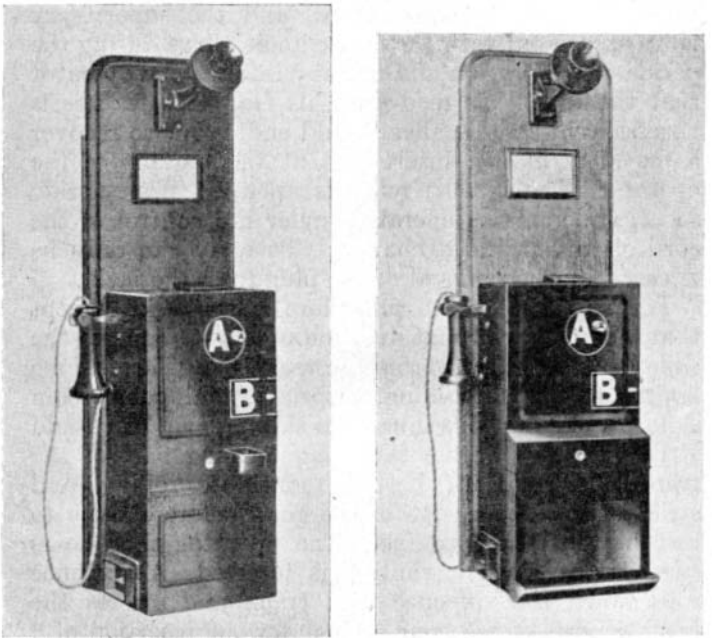
be depressed, so changing over spring set 2. The removal of the receiver connects earth through one of the 500Ω coils of the retardation coil to the *B*-wire (Fig. 696), so giving the calling signal to the operator. When the caller is extended on a local call, the cord circuit reverses the earthed battery and the earth connected to the line, which causes the operation of the polarized relay at the call office. The operation of this relay places a short circuit across the telephone transmitter through the spring set 1. On hearing the called subscriber reply, the caller presses button *A*, so depositing the coins in the cash-box and restoring spring set 1 to normal. This removes the short circuit from the telephone transmitter and connects the line for speaking.

If the called subscriber is engaged or not obtainable, the caller recovers the fee inserted previously by depressing button *B*. This operates spring set 3, which restores to normal under the control of an escapement mechanism taking approximately 7 seconds to restore. Thus, the line is disconnected, and the supervisory lamp associated with the cord circuit glows during the period of restoration and thereby informs the operator that the caller has recovered his fee. This feature is necessary in case a caller should endeavour to recover a fee after having inserted it at the request of the operator. The 2,000Ω relay is operated from spring set 3, and remains operated under the control of the cord circuit at the exchange; this relay can only be released by the removal of the plug from the jack.

For trunk calls, the procedure is the same except that when the call matures, the operator requests the caller to insert the appropriate trunk fee. This is done by means of the shilling, sixpenny, and penny coin slots. A shilling rolls down the shilling coin track and strikes the top of the bell gong forming part of the transmitter No. 21. It then continues rolling, and strikes the bottom edge of the gong before coming to rest in the coin container. The operator thus hears two tinkles when a shilling is inserted. A sixpence rolls down the sixpence coin track and strikes the bottom edge of the gong. Thus, for the insertion of a sixpence, one tinkle is heard. The sound of the wire gong, due to the insertion of pennies, is also transmitted to the operator. Thus, by means of the distinctive signals, the operator is enabled to check the insertion of the correct amount.

Emergency Calling. When a call office stands upon the highway, it is provided with emergency-calling facilities. The addition of a resistance spool connected to spring set 2, a press button, connected as shown dotted in the diagram, and a 50Ω resistance connected

to earth is all that is required. At the exchange, however, the circuit is terminated upon special calling equipment designed to differentiate between a normal call and an emergency one. The press button is marked



No. 115 No. 115A

FIG. 697. TELEPHONES NO. 115 AND 115A

"Emergency Call," and is surrounded by a band of red paint. It is provided as a means of obtaining the operator without the necessity of inserting any coins, in cases of emergency, as, for instance, fire or accident. Depression of the button causes the calling signal at the exchange to flash at busy speed, thereby informing the operator that an emergency call is being made.

Coin Boxes and Telephones. The coin boxes are

known as coin-collecting box No. 13 and 14. The call office instrument is a telephone No. 115, which is a wall pattern C.B. telephone complete with a coin-collecting box No. 13, or is a telephone No. 115A with the coin-collecting box fitted with a modified cash-box (Fig. 697). The cash-box of telephone No. 115A has a glass window, running the whole length of the lower part of the box, through which the refund chute is visible. This modification is designed to defeat mis-

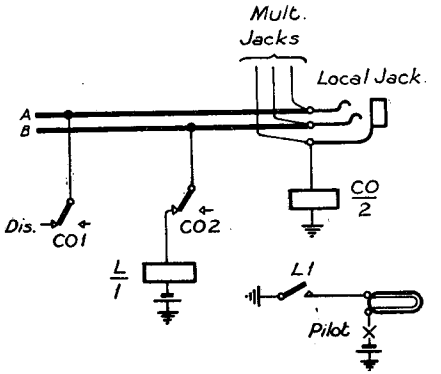


FIG. 698. NORMAL TERMINATION

chievous persons who have a failing for stuffing the refund chute of the box with paper, subsequently removing it and collecting any coins trapped in the chute in this manner.

The latest type of instrument for use in call office installations is the hand microtelephone described on page 307.

Terminations for Prepayment Coin Box Lines. When emergency calling facilities are not required at a call office, the line is terminated in the manner shown in skeleton in Fig. 698. The earth normally connected to the *A*-wire is disconnected at *CO*1 and relay *L* is now operated by the earth applied to the *B*-wire at

transmitter until such time as the *A* button is depressed to deposit the fee. These cord circuits are identified by cerise plug covers, and a proportion of the cord circuits on each *A*-position are of this type. They can be used for completing calls from ordinary subscribers'

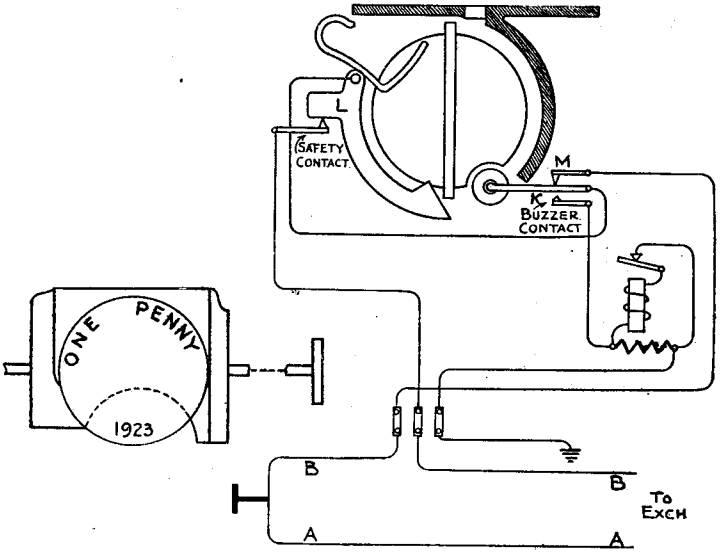


FIG. 702. COIN CARRIER

FIG. 703. SIDE VIEW SHOWING EDGE OF COIN, LEVER, AND ROLLER

lines, but a click will be heard by the calling subscriber when his line is extended.

Post-payment Call Offices. Payment of the fee for calls at unattended call offices in C.B.S. and Magneto Exchange areas is made with the aid of a coin-collecting box, and is checked by the exchange operator. Pennies are inserted in the coin slot of the box one at a time, and the operating handle is twisted and released. On insertion, the penny falls into a carrier (Fig. 702) mounted on the axle of the operating handle, the carrier being so shaped that a coin of smaller diameter than a penny will fall through into the coin receptacle, but the

edge of a penny will project, and when the handle is turned will raise the lever L (Fig. 703) which disconnects the buzzer circuit until the penny has passed the catch. This prevents the withdrawal of the coin and makes it impossible for the same penny to operate the buzzer more than once by slight movement of the handle. The axle carries also a circular disc shaped so that when turned the contact M breaks and K is

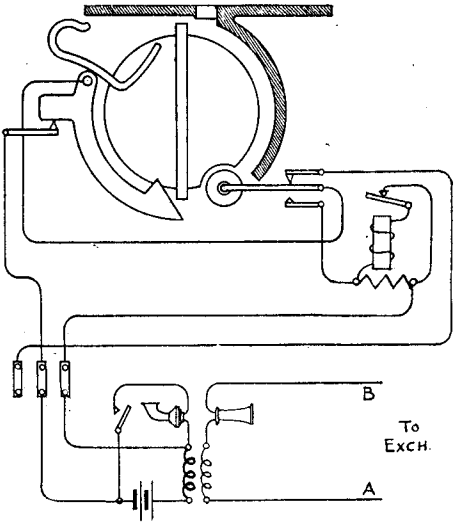


FIG. 704. COIN BOX CONNECTED TO A MAGNETO INSTRUMENT

made; the buzzer is then joined up. The turning of the handle upends the carrier and the coin falls into the receptacle.

The buzzer itself consists of a very small electromagnet with a light armature joined up in the same way as a trembler bell. The coin box circuit is inserted in the primary circuit and is operated by the speaking battery (Fig. 704). The receiver having been raised to call the exchange, and the operator having obtained the called subscriber, the caller is told two, three or more pennies as the case may be. Each penny earths the buzzer which gives the distinctive tone to the operator, who checks the number and then connects the called subscriber.

With the post-payment coin box of the type described in the foregoing paragraphs, callers are put to the inconvenience of paying for trunk calls in pennies inserted one at a time and, in consequence, only restricted trunk facilities can be given at such a call office. To overcome this disadvantage and provide full trunk facilities at call offices in C.B.S. and Magneto Exchange areas, a multi-coin post-payment coin box has been designed, and is the standard fitting in these call offices. In construction and appearance it is similar to the coin box mechanism illustrated in Fig. 695, and

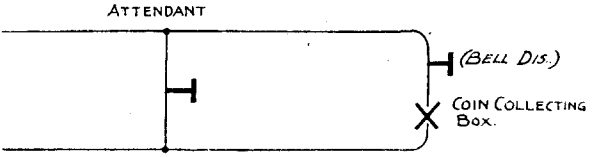


FIG. 705. CALL OFFICE CIRCUIT

provides for the acceptance of pennies, sixpences, and shillings.

Unattended call offices are connected in the same way as an ordinary subscriber, but with the addition of a coin-collecting box. A silence cabinet is generally provided to ensure privacy, and in rural post offices is often fitted with two doors, one on the office side and one on the public side of the counter, so that the telephone may be used for the transmission of telegrams as well as for telephone calls.

In other cases a second telephone is provided for the use of the attendant (Fig. 705), so that trunk calls may be given in and the fee collected at the counter. The attendant's telephone and that in the cabinet are joined permanently across the exchange line, but the bell in the cabinet is disconnected.

When the circuit is used also for sending telegrams from a telephone placed in another part of the office, or where the circuit serves also other rural offices

en route, the various stations are joined up as party lines.

Kiosks. Public call office telephones are usually housed

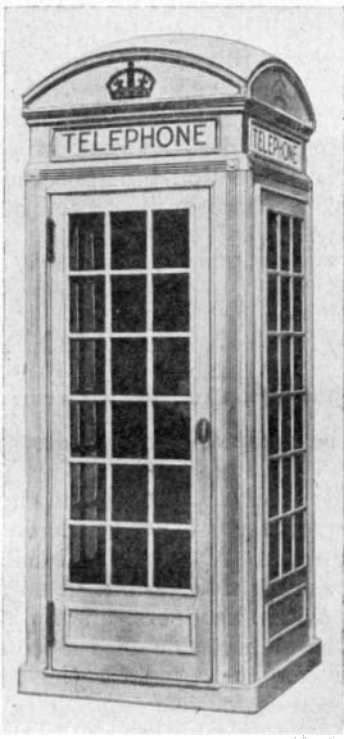
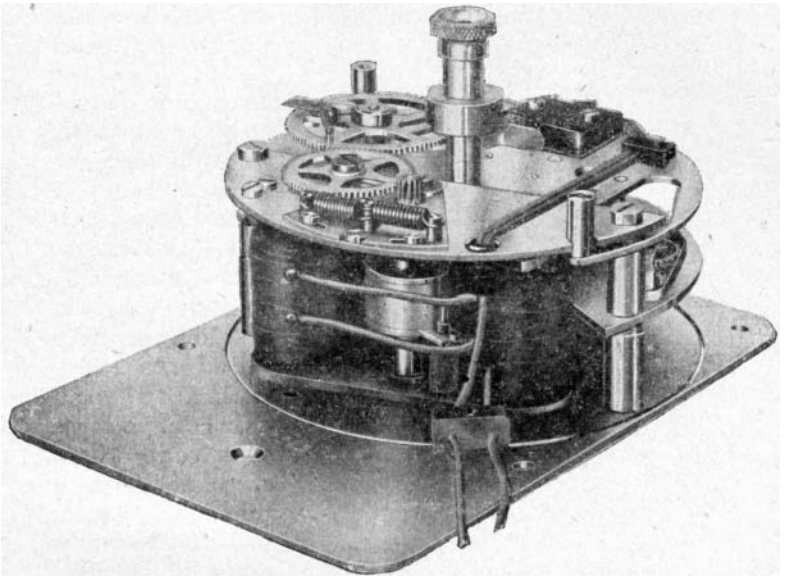


FIG. 706. PUBLIC TELEPHONE KIOSK

in a small kiosk easily accessible from the public highway. The kiosks are of four types, the No. 2 type being illustrated in Fig. 706. The largest size is the No. 4 type, and at the rear of this kiosk is a stamp-vending machine and a letter-posting box. The No. 3 kiosk is constructed from pre-cast concrete sections. The kiosks are usually lighted from the public electricity

supply mains, and the lighting is controlled by a time switch or a selenium cell. In erecting kiosks, it is necessary to ensure a satisfactory earth connexion for the emergency-calling circuit (*vide* Fig. 696), and an earth plate is buried adjacent to the site of the kiosk.

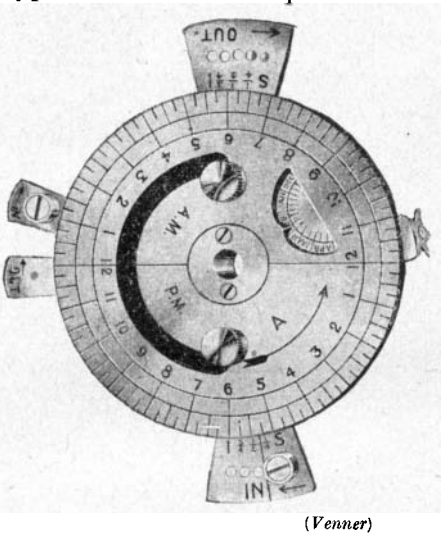


(*Venner*)

FIG. 707. VENNER TIME SWITCH
Cover removed

A typical time switch is illustrated in Fig. 707. It is a spring-driven, electrically-wound, single-pole, 1 amp. switch fitted with a solar dial, and switches the lamp on at dusk and off at dawn. The clock winds itself every eight hours by means of a small electric motor. To guard against stoppage due to failure of the power supply, the clock is provided with three days' spring storage and, should such a failure occur, the clock winds itself fully immediately the supply is resumed,

irrespective of the duration of the failure. The solar dial (Fig. 708) is a device that automatically follows the rising and setting of the sun, day by day, and alters the position of the operating hands of the time switch accordingly. For the British Isles, ten different types of solar dial are provided to cater for the variations in solar time.



(*Venner*)

FIG. 708. VENNER SOLAR DIAL

Two fuses are incorporated in the box to protect the whole of the electrical system. A special hand switch, which remains on only so long as it is held in position, is provided for lamp testing.

In later patterns of these time switches, the containing box has an inspection window in the lid to enable the clock time to be checked by means of a fixed pointer, marked "Time," and the markings on the revolving dial.

The only disadvantage of a time switch is that, should the natural light fail during the day period, due, say, to fog, the light of the kiosk is not switched on. To overcome this disadvantage, a control circuit embodying a selenium cell has been devised. With this arrangement, the illumination is provided whenever the state of the light warrants, and, when the light improves, the lamp is extinguished.

Party Lines. When two or more subscribers share