

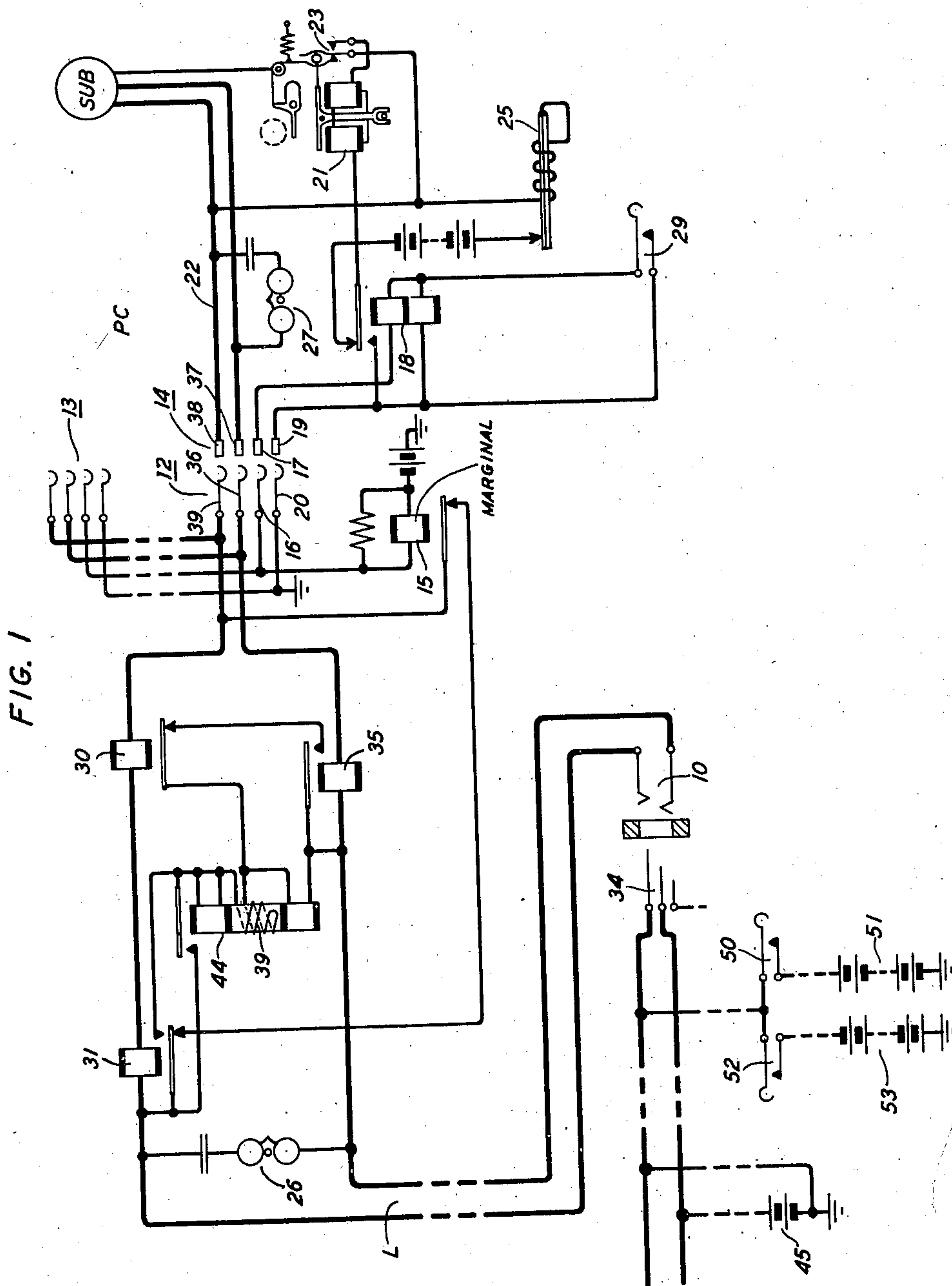
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PORTABLE COIN COLLECTOR FOR TELEPHONE SYSTEMS

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PORTABLE COIN COLLECTOR FOR
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This invention relates to telephone systems and particularly to systems of the type which provide facilities whereby telephone calls may be received and originated by means of portable equipment.

In many large institutions, particularly those which cater to the sick and disabled, facilities are provided which render it possible for patients to originate and receive telephone calls at their bed-sides. Such facilities involve a portable telephone substation which may be plugged into any one of a plurality of outlets which terminate a telephone line at conveniently located positions near the patients' beds. Heretofore, the patients making outgoing calls in this manner were billed at suitable intervals. This practice made it necessary for the local operator at the institution to record all such calls, and for the accounting department of such institutions to prepare and submit for collection bills for each individual patient. In order to relieve the operators and accounting departments of such tasks and to otherwise accommodate the convenience of the patients, it has been proposed that bedside telephone service be provided on a prepayment basis.

It is the object of this invention to improve and otherwise simplify prepayment telephone systems of the type which provide telephone service through the medium of portable equipment.

This object is attained in accordance with a feature of the invention by the provision of a portable coin collector which adapts itself to the usual central office controls and which, at the same time, precludes the possibility of the usual controls being circumvented. The usual coin collect and refund operations in a prepayment telephone system are initiated at the central office manually, in the case of manually completed connections or automatically, in the case of dial connections. In either case it is necessary that the connection from the central office to the coin disposal equipment at the subscriber's station remain intact until such coin disposal operations have taken place. Where such a connection includes manually controlled connectors, such as plugs and jacks, whereby the portable substation equipment is associated with a telephone line, it is possible for the portable unit to be disassociated from the line before the deposited coins have been disposed of in the usual manner. When this occurs, the coins which have been deposited as toll for a call originated at the portable substation remain in the coin hopper without having been collected or returned as required. When a subsequent call is originated in the usual

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manner and a refund operation is performed at the central office, all the coins in the hopper which includes those which were not disposed of at the termination of a previous call would be deposited in the return chute of the coin box for collection by the party making the subsequent call. To preclude this possibility, the present invention provides means, in a portable coin collector, which functions automatically, in response to the dissociation of the collector from the line to collect the coins deposited in the coin box if such coins had not previously been disposed of in the usual manner. To attain this objective the portable coin collector of this invention includes a local source of coin collect battery and switching means which operate incident to the removal of the coin collector from the line to connect the coin disposal magnet, or relay, of the collector to the battery whereupon the coin magnet, or relay, is operated to effect the collection of the coins in the coin box hopper. A delayed action relay functions, subsequently to the operation of the coin relay in this manner, to disconnect the coin relay from the local battery and to otherwise restore the coin collector to normal condition.

It is frequently necessary, during the pendency of a completed connection to the portable coin collector, that the portable unit be transferred from one line outlet to another line outlet. In order that such transfer may be effected without disturbance to an established connection the present invention contemplates means whereby a central office connection may be held. More particularly, the portable unit is provided with a non-locking hold key which, when operated while the telephone of the portable unit is removed from its support serves to place a holding bridge across the central office line. Once established, this holding bridge is not disturbed when the telephone is restored to its support, or when the portable unit is disconnected from the line, but is automatically removed when the telephone is removed from its support after the portable unit has been connected to the line by way of another line outlet.

These and other features of the invention will be readily understood from the following detailed description when read in connection with the accompanying drawing which illustrates, diagrammatically, a portable coin collector involving the features of the invention, and those portions of a telephone line and operator's cord circuit with which the coin collector functions.

In the drawing the telephone line L is shown terminating in a jack 10 at a telephone exchange and in multiple jacks 12 and 13 at a remote point or local station. While only two jack terminals are indicated at the remote point it is to be understood that line L may have any number of multiple appearances. Only those portions of the central office circuits which are essential to an understanding of the invention are illustrated. The portable coin collector unit embraces all the equipment shown to the right of the jack terminal 12 and is provided with a plug connector 14 by means of which the collector is connected to the line L by way of the multiple jacks.

Automatic coin collection

It will now be assumed that the plug 14 of the portable coin collector PC is inserted in the jack 12 of the line and that a call requiring the deposit of coins in the coin collector has been originated, that a connection over line L has been completed, and that the conversation between the calling and called parties has terminated. It will be further assumed that before the calling party at the portable unit restores the receiver, or handset to its switchhook, the plug 14 is withdrawn from the jack 12. Prior to the withdrawal of the plug 14 from jack 12 the following circuit was established: from battery, over the winding of marginal relay 15, contact 16 of jack 12, contact 17 of plug 14, both windings of relay 18 in series, contact 19 of plug 14, contact 20 of jack 12 to ground. Relay 18 is operated in this circuit and at its armature and front contact connects the coin disposal magnet, or relay 21 between ground at the contact 20 of jack 12 and the tip conductor 22 of the coin collector circuit PC. This connection includes the coin contacts 23 and the contact 19 of plug 14. Relay 15, being marginal, does not operate at this time. Thus it is that the coin disposal magnet 21 is in condition to receive coin control signals from the central office in the usual manner.

When the plug 14 is withdrawn from jack 12, the operating circuit for relay 18 is broken at the jack and plug contacts. Relay 18 is de-energized and releases its armature. A circuit is now completed from the negative pole of local battery 24, back contact and armature of relay 18, windings of coin disposal magnet 21, coin contacts 23, winding and normally closed contacts of thermal relay 25, to the positive pole of battery 24. Coin disposal magnet 21 is energized in this circuit and the direction of the current through its winding is such as to cause it to collect the coins. After a period of approximately one second, the contacts of the thermal relay 25 will open. The opening of these contacts disconnects the windings of coin relay 21 from battery 24 causing relay 21 to release. With the release of the coin relay 21 the coin contacts 23 are opened. After a short interval of time the contacts of thermal relay 25 will again close but no further operations occur as the circuit is now open at the coin contacts 23. Thus the coin collector is restored to its normal condition, which is the condition illustrated in the drawing. Thus it is that, should the portable coin collector be disassociated from the telephone line prior to the disposal of the deposited coins in the usual manner the coin collector is automatically operated to effect the collection of the deposited coins.

Incoming call

On a call incoming over line L, ringing current from the central office operates the line ringer 26 in the well-known manner. If the plug 14 of the portable coin collector is inserted in any of the multiple jacks 12-13 at this time the ringer 27 of the portable unit is also actuated. Ringing is tripped in the usual manner when the switchhook of the portable unit is raised.

It will now be assumed that when the call arrived, the plug 14 of the portable coin collector had been inserted in the jack 12 and that the said call was answered in the usual manner by the party nearest the portable unit.

It will be further assumed that the incoming call is intended for a party other than the party who answered the call and that the party for whom the call is intended is located near the line outlet 13 which is so far removed from the outlet 12 as to require the disconnection of the portable unit from jack 12 and reconnecting it to the line by way of jack 13. In this eventuality it is necessary that the central office connection be held while the portable unit is transferred from the locality identified by jack 12 to the locality identified by jack 13. The party who answered the call therefor, actuates the hold key 29 before the receiver is restored on the portable unit and before the plug 14 is withdrawn from jack 12.

The operation of hold key 29 short-circuits the lower, high resistance winding of relay 18 in the portable unit causing an increase of current in the circuit which includes the winding of marginal relay 15. Relay 15 thereupon operates and removes the short circuit from the windings of relays 30 and 31 thereby permitting these relays to operate in series with relay 35 over the closed subset bridge in the portable unit.

Relay 31 at its left armature and back contact opens the short circuit around relays 30 and 31 at a point other than the point at which it was opened by the operation of relay 15. This is necessary since the hold key 29 is a non-locking key and is only operated momentarily to set up the hold condition.

Relay 30 at its armature and back contact opens the short circuit of the left winding of relay 44 which was completed by the operation of relay 35. A bridge circuit is now established extending from the tip conductor of the line L, over the right armature and front contact of relay 31, non-inductive winding 39 and left winding of relay 44 to the ring conductor of line L. Thus relay 44 operates over the line from battery 45 at the central office. Relay 44 at its armature and front contact establishes a locking circuit for itself independent of the right armature and front contact of relay 31 so that relay 44 is held operated to battery at the central office. The central office connection is thus held by the bridge circuit which includes the left winding and the non-inductive winding of relay 44.

At this time, that is, prior to the restoration of the telephone to its mounting on the portable unit the line L is also bridged by a multiple circuit which includes the windings of relays 31, 30 and 35 and the substation bridge.

The party who answered the incoming call, after having actuated the hold key 29, restores the telephone to its support on the portable unit. This operation opens the multiple bridge just described and the connection is held by the bridge which includes the left winding and winding 39

of relay 44. Relays 31, 30 and 35 release at this time.

The plug 14 is now withdrawn from the jack 12 and the portable unit is moved to the new location identified by jack 13 and the plug 14 is inserted in this jack. When the telephone is now removed from its mounting on the portable unit the bridge at the substation is reestablished and relay 35 operates. Relays 30 and 31 do not operate at this time since marginal relay 15 is in its normal unoperated condition due to the release of the hold key 29. The left winding of relay 44 is now short-circuited by the armature and front contact of relay 35 and the armature and back contact of relay 30. Relay 44 thus releases since this relay does not hold operated on its non-inductive winding 39. With relay 44 released, the holding bridge is removed from the line L and the connection to the portable subset is in condition for communication purposes.

Outgoing call

When a call is to be originated by means of the portable substation, the plug 14 is inserted in a conveniently located jack, such as jack 13; a coin is deposited in the coin receptacle of the portable unit; and the telephone is removed from its support. The deposit of a coin in the coin receptacle completes a circuit from ground, over contact 20 of jack 12, contact 19 of plug 14, front contact and armature of relay 18, windings of coin relay 21, coin contacts 23, tip conductor 22, contact 38 of plug 14, contact 39 of plug 12, armature and back contact of relay 15, back contact and armature of relay 31 to the tip conductor of line L to cause the operation of a signal (not shown), at the central office, in the well-known manner. The call is answered at the central office in the usual manner. At the completion of the call, the operator, or dial central office equipment will collect or refund the coin in the usual manner. In the event of a manually completed call, the collection of coins deposited in the portable coin collector is effected by the operation of the coin collect key 50. Positive battery 51 is thus connected to the tip conductor of the established connection to cause coin relay 21 to operate in such a manner as to cause the collection of the deposited coins. Coins are refunded by the actuation of coin return key 52 which connects negative battery 53 to the tip conductor of the established connection and causes coin relay 21 to operate in such a manner as to refund the deposited coins.

What is claimed is:

1. The combination in a telephone system of a coin box station, a telephone exchange, a line extending from said exchange to said station and terminating thereat in a jack, a plug connecting said station to said line by way of said jack, coin disposal means at said station, and means comprising a switching relay responsive to the withdrawal of said plug from said jack for completing an operating circuit for said coin disposal means.

2. The combination in a telephone system of a coin box station, a telephone exchange, a line extending from said exchange to said station and terminating thereat in a jack, a plug connecting said station to said line by way of said jack, coin disposal means operable in either of two manners to dispose of coins deposited at said station, means at said exchange for operating said coin disposal means in either of two manners, and means including a switching relay responsive to the withdrawal of said plug from said jack for

causing said coin disposal means to operate in a particular manner.

3. The combination in a telephone system of a coin box station, a telephone exchange, a line extending from said exchange to said station and terminating thereat in a jack, a plug connecting said station to said line by way of said jack, coin disposal means at said station operable in one manner to effect the collection of coins deposited at said station and in another manner to refund said coins, means at said exchange for selectively operating said coin disposal means in either of two manners, and relay switching means responsive to the withdrawal of said plug from said jack for operating said coin disposal means to effect the collection of coins deposited at said station.

4. The combination in a telephone system of a telephone line, a portable coin collector removably connected to said line and including a coin disposal magnet, a source of current and switching means responsive to the disconnection of said portable coin collector from said line for automatically connecting said coin disposal magnet to said source of current.

5. The combination in a telephone system of a telephone line, a portable coin collector removably connected to said line and including a coin disposal magnet operable in either of two manners to effect either of two distinctive coin disposal functions, and circuit control means responsive to the disconnection of said portable coin collector from said line for completing an operating circuit for said coin disposal magnet whereby said magnet operates in a particular manner.

6. The combination in a telephone system of a telephone line, a portable coin collector removably connected to said line and including a coin disposal magnet, a battery, means responsive to the disconnection of said portable coin collector from said line for connecting said coin disposal magnet to said battery, and means operable a predetermined time after the connection of said coin disposal magnet to said battery for disconnecting said coin disposal magnet from said battery.

7. The combination in a telephone system of a telephone line terminating at a remote point in a jack, a plug-ended coin collector connected to said line by way of said jack, said collector comprising a source of power, a coin disposal magnet, and means controlled over said line for maintaining said coin disposal magnet disconnected from said battery, said means functioning automatically in response to the disconnection of said portable coin collector from said line for connecting said coin disposal magnet to said battery.

8. The combination in a telephone system of a telephone line, a jack terminating said line, a portable coin collector, a plug associated therewith and inserted in said jack whereby said coin collector is connected to said line, said coin collector including a coin disposal magnet, a battery, means responsive to the withdrawal of said plug from said jack for connecting said coin disposal magnet to said battery, and slow operating means for disconnecting said coin disposal magnet from said battery a predetermined period of time after its connection thereto.

9. The combination in a telephone system of a telephone line extending from a central office to a remote point, a portable coin collector at said remote point including a coin disposal magnet, connecting means for connecting said portable

coin collector to said line, and means responsive to the operation of said connecting means to disconnect said portable coin collector from said line for operating said coin disposal magnet.

10. The combination in a telephone system of a telephone line terminating in a jack, a coin collector having a plug for insertion in said jack, said coin collector including coin operated contacts, a coin disposal magnet, and a battery, said coin operated contacts operating in response to the deposit of a coin in said collector for preparing a connection from said battery to said coin disposal magnet, and means responsive to the withdrawal of said plug from said jack for completing the said prepared circuit.

11. The combination in a telephone system of a telephone line outlet, a coin collector having a plug connected to said outlet, a source of power, a coin disposal magnet, contacts actuated by the deposit of a coin in said collector, and means responsive jointly to the deposit of a coin in said collector and to the withdrawal of said plug from said outlet for connecting said coin disposal magnet to said battery.

12. The combination in a telephone system of a coin box station, a telephone exchange, a line extending from said exchange to said station, a source of power at said exchange, a source of power at said station, a coin disposal magnet at said station operable in either of two manners, means at said exchange for selectively connecting said coin disposal magnet in either of two manners to the source of power at said exchange, and means at said station for causing the connection of said coin disposal magnet in a particular manner to the source of power at said station.

13. In a telephone system, a central office line, a portable telephone substation removably connected to said line and including a telephone, a hold key in said portable substation, a holding bridge for said line, means responsive to the operation of said hold key while said portable substation is connected to said line and while the telephone thereof is removed from its support for connecting said holding bridge to said line, means for locking said holding bridge to said line independent of the connection of said portable substation to said line whereby said portable substation may be disconnected from said line without disturbing the connection of said holding bridge to said line, said key responsive means functioning incident to the reconnection of said

portable substation to said line to prepare a short-circuiting path for said locking means, and means responsive to the removal of the telephone of said substation from its support subsequently to the reconnection of said substation to said line for completing the short-circuiting path for said locking means.

14. In a telephone system, a central office, a local station, a portable substation at said local station, a line extending from said central office and terminating at said local station in a plurality of outlets, means associated with said portable substation for connecting said substation to said line by way of any of said outlets, a holding bridge for said line, a holding key at said substation, normally short-circuited relay means in said line circuit for controlling the connection of said holding bridge to said line, means responsive to the operation of said hold key while said portable substation is connected to said line by way of one of said outlets and while the telephone of said substation is removed from its support for removing the short circuit from said relay means whereby said holding bridge is connected to said line, means independent of the connection of said portable substation to said line for locking said holding bridge to said line whereby said portable substation may be disconnected from said line and the telephone thereof restored to its support without disturbing the connection of said holding bridge to said line, said short circuit removing means being adapted to reoperate to restore the short-circuited condition of said relay means when said substation is reconnected to said line by way of one of said outlets, and means responsive to the removal of the telephone at said substation subsequently to the reconnection of said substation to said line and cooperating with said relay means for short-circuiting said locking means whereby said holding bridge is disconnected from said line.

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