

No. 886,497.

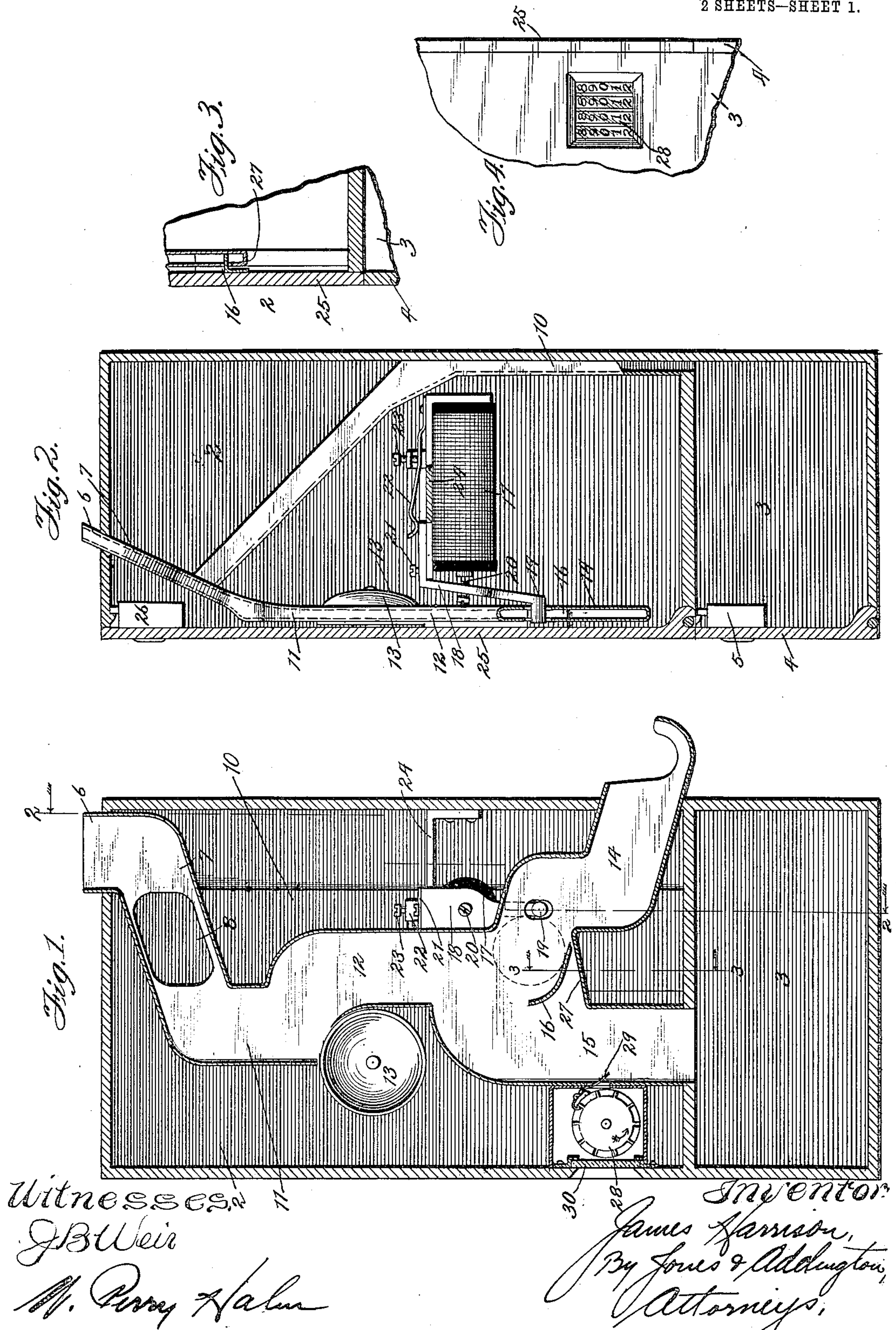
PATENTED MAY 5, 1908.

J. HARRISON.

SYSTEM AND APPARATUS FOR TELEPHONE LOCAL TOLL OR PAY STATIONS.

APPLICATION FILED MAY 10, 1905.

2 SHEETS—SHEET 1.



Witnesses:
J. B. Weir
M. Perry Halen

Inventor:
James Harrison,
By Jones & Addington,
Attorneys.

No. 886,497.

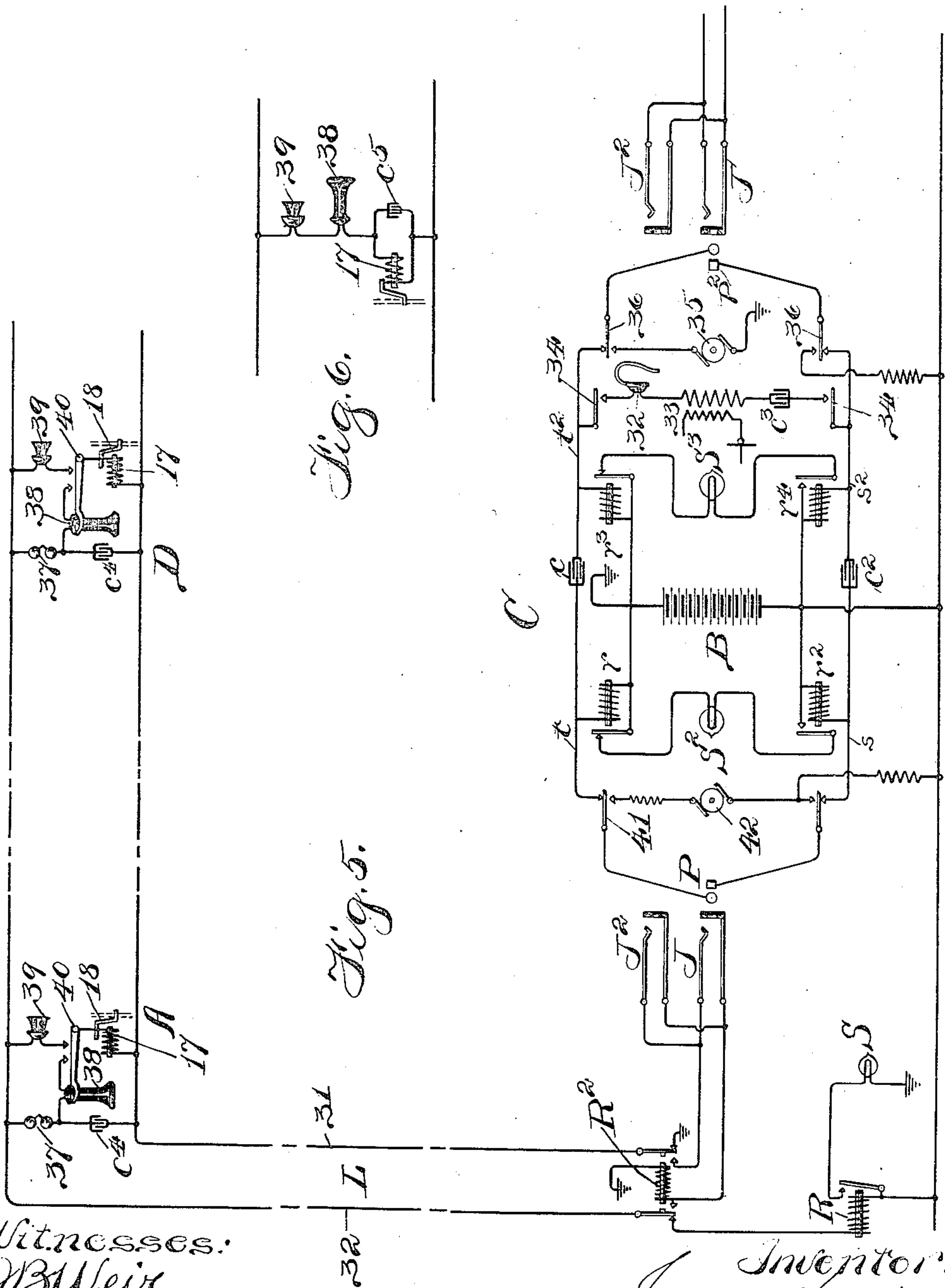
PATENTED MAY 5, 1908.

J. HARRISON.

SYSTEM AND APPARATUS FOR TELEPHONE LOCAL TOLL OR PAY STATIONS.

APPLICATION FILED MAY 10, 1905.

2 SHEETS—SHEET 2.



Witnesses:

B. Weir

M. Perry Hahn

Inventor:

James Harrison
B. Jones & Addington
Attorneys.

UNITED STATES PATENT OFFICE.

JAMES HARRISON, OF ST. LOUIS, MISSOURI.

SYSTEM AND APPARATUS FOR TELEPHONE LOCAL TOLL OR PAY STATIONS.

No: 886,497.

Specification of Letters Patent.

Patented May 5, 1908.

Application filed May 10, 1905. Serial No. 259,792.

To all whom it may concern:

Be it known that I, JAMES HARRISON, a citizen of the United States, residing at St. Louis, State of Missouri, have invented new and useful Improvements in Systems and Apparatus for Telephone Local Toll or Pay Stations, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

The object of the invention is to provide a system and apparatus for local toll or pay stations which shall consist of few, simple and inexpensive parts and at the same time permit rapid and efficient service.

In this class of apparatus there are now in use two general types, to wit: those in which the coin signals the operator and which has a refunding device, and those in which there is an audible signal but no refunding device. These are subject to certain disadvantages: In the first, a coin must be wasted by the subscriber to ascertain that the line is out of order; the apparatus at the subscriber's station is complicated and ordinarily comprises a coin race, circuit contacts which affect the talking circuit, a magnet for refunding the coin, and a quick acting relay for signaling purposes; a coin caught or stuck in the coin race may put the telephone entirely out of service, and a ground connection is ordinarily used which renders the apparatus liable to earth current troubles. In the second type the service is exceedingly slow since the calling party is kept waiting while the coin is being inserted, and the operator is kept waiting while the called party answers, so that the operator is unable to handle many lines, thereby requiring a greater number of operators as well as an excess of switchboard equipment. Each of these types however, has certain advantages. In the first for instance, there is quick service for the subscriber and no waiting by the operator. In the second, the apparatus at the subscribers station is simple and does not affect the working of the telephone, so that when the line is out of order no coin need be wasted by the subscriber.

It is the object of the present invention to provide a system and apparatus which will embody not only the advantages of the former types of apparatus so far as simplicity and rapid service is concerned, but which also possesses many advantages distinctively its own.

In the preferred form of the invention an audible signal and refunding device are operatively combined whereby the operator is not kept waiting for the called party to answer, and in case of failure to answer the operator may immediately refund the coin. The apparatus is also preferably arranged so that no ground connection is needed for the magnet of the refunding apparatus, thus avoiding earth current troubles, and so that the device may be used upon single or poly-station lines, thus avoiding the necessity of providing specially arranged lines or specially constructed apparatus for the different kinds of lines. The apparatus is also preferably so constructed as to utilize for its operating magnet, the magnet coil already used for other purposes in some types of circuits, whereby if such types of circuits are to be used in an exchange to which my improved pay stations are also to be applied, a reduction of one magnet coil for each sub-station apparatus results wherever the pay station device is used. This saving is of considerable moment particularly in large exchanges where the number of subscribers may reach twenty or thirty thousand. A suitable meter, visible or concealed, may be combined with the other apparatus, to count the coins as they pass into the till or cash box. Inasmuch as the coin is not used for signaling electrically, the coin race is free from contacts, and the stoppage thereof with foreign matter or sticky coins in no way affects the working of the telephone for signaling, talking or recalling.

In the usual device of this general character employing a refunding apparatus there is a corresponding mechanism under control of the operator for depositing the coin in the cash box or till of the device. This apparatus may comprise an additional magnet in the pay station, or a polarized magnet in place of the two simple magnets besides means at the central office for impressing upon the line current over different paths to the two simple depositing and refunding magnets at the pay station or current of opposite polarity over the same path to operate the polarized magnet in one direction or the other to either deposit or refund the coin. Moreover, such an arrangement requires the operator to throw current upon the line for every call either to deposit or to retain the coin, the former not only requiring the attention and work on the part of the operator but is

always attended by the additional disadvantage of at least annoying the talking subscribers while sometimes the noise in the receiver caused by the high potential current is so loud and sharp as to severely pain and shock the party or parties talking.

In the present invention, I seek to avoid the necessity of such magnetically operated depositing apparatus and to provide an apparatus in which although the refunding of the coins is under the control of the operator or of current sent from the central office, the depositing of the same is automatically accomplished independently of the operator. This apparatus therefore not only renders the pay station device simpler, cheaper and better, since no additional or polarized magnet and more or less complicated apparatus is needed, but the system as a whole is improved since the operator is not required to perform the work of depositing the coin, no additional generator, circuits, keys or apparatus need be provided for her to accomplish such depositing, and the subscriber is not subjected to the annoyance of the interrupted conversation and the shock of the noise in the telephone. It is to be noted in passing that such interruption ordinarily occurs at the most important part of the conversation, that is, just as the parties talking are introducing themselves or the subject of the conversation, which usually requires starting the conversation over again.

In order to accomplish this result of automatically depositing and at the same time making a refund possible in case the connection for conversation fails for any reason, the apparatus in the preferred form is so arranged that the coins in their passage through the coin race naturally fall or tend to fall into the return or refund chute or in position to be delivered into the refund chute by the electromagnetically operated refunding device, where if it is first coin, or if the preceding coin has been refunded, it is caught by the refunding apparatus and is held in suspension in position to be refunded whenever the said refunding device is operated by current sent over the line from the central office. If the call is not completed the coin is returned by the refunding apparatus in the usual manner, but if the call is completed the coin remains in suspension undisturbed by the operator or by current from the central office and prevents the succeeding coins from lodging in the same place as long as it remains unrefunded. Therefore, if another coin is inserted it is prevented from being caught in the refunding position and instead of being suspended is automatically directed into the depositing channel and into the till or cash box. If the connection for which the last coin was deposited cannot be completed, the refunding device is operated and the coin previously suspended is delivered to the calling party.

The next coin inserted is caught and held in suspension as before described, and as long as it is so held the succeeding coins are automatically deposited.

It is apparent that various means may be employed to accomplish these results, but in the particular form that I prefer to employ, a stationary stop in the nature of a supporting member or deflecting plate is placed in the coin race adjacent the mouth of the return or refund chute in such position that a descending coin will be caught thereby and would roll out the return chute except for a movable stop projecting into the latter which catches and prevents the coin from rolling out. This coin is held in such position in the race that if the said movable stop is not withdrawn, the succeeding coins in descending the race will strike said stopped or suspended coin and be thereby directed beyond said stop and into the deposit chute leading to the till and are thus deposited. The said movable stop is preferably withdrawn by a magnet energized from the central office. This mechanism is therefore reduced to an exceedingly simple form since no magnetically operated depositing apparatus is required, and no movable parts and more or less complicated mechanism are necessary to effect the depositing as distinguished from the refunding operation. It is obvious that various means may be employed to thus cause the suspended coins to effect the depositing of the succeeding ones, or to automatically deposit the coins. The said stationary stop is preferably withdrawn with the side of the box when the latter is opened as for inspection or repairs, so that a suspended coin cannot be abstracted but will roll down into the till, which preferably is opened by a different door and lock.

My invention further consists in the novel parts and combinations of parts hereinafter described and particularly pointed out in the appended claims.

Referring to the accompanying drawing, Figure 1, represents a side elevation of the pay station box with parts removed; Fig. 2 is a sectional elevation view of the same taken at right angles to that shown in Fig. 1; Fig. 3 is a detail view of the stationary stop in the coin race; Fig. 4 is a detail view of the coin meter; Fig. 5 is a diagram of a telephone system to which the device may be applied, and Fig. 6 is a diagram of a modified arrangement of the substation apparatus.

Referring to Figs. 1 to 4, 2 designates the device as a whole, the lower part 3 being the till or cash box into which the deposited coins are dropped and which may be provided with the usual door 4 and lock 5, and only opened when it is desired to remove the coins. The coin race or chute as here arranged consists of a flattened tube of the proper width and thickness to accommodate a

coin of the size that is desired to be used. The upper end 6 of the race leads to the upper end of the box to receive the coins; the part 7 of the coin race is inclined longitudinally and sidewise, as indicated in Figs. 1 and 2 so that as the coin inserted at 6 rolls down the same it passes an opening 8 in the lower side wall of the tube, said opening being of such size as to permit a coin of less diameter than the standard coin intended to be used to drop out the chute and into the upper part of the box or by way of a chute 10 into the till below. The coin race then extends by the vertical portion 11, to the offset portion 12, at the lower edge of the junction of which portions a gong or any distinctive sounder 13, audible to the operator, is located with its edge projecting into an opening in the edge of the said race and in position to be struck by the coin descending through the said race. At the lower end of portion 12 of the coin race, the return or refunding chute 14, and the depositing chute 15 branch in opposite directions. Immediately beneath the portion 12 a preferably stationary stop 16 is located in such position and is of such a form as to catch a coin passing downwardly through the portion 12 of the race, and to direct it into the return chute 14. The refunding magnet 17 is located at the back of the said race and is provided with an armature 18, the lower end of which terminates in a pin 19 extending through an aperture in the side walls of the return chute 14, and in such position to stop and hold in suspension any coin that may be resting upon the stop 16. This magnet armature may be provided with an adjusting screw 20 and holding screw 21, with an operating spring 22 to return it to normal position, provided with an adjusting screw 23 to vary the tension of the spring. The magnet may be supported from the side of the box by the bracket 24 or in any desired manner. The magnet 17 is suitably connected in the electric circuit so as to be operated by current from the central office.

Sufficient room at the left of the stationary stop 16 is provided for coins to pass into the deposit chute 15. The stop 16 is preferably carried upon the removable side 25 which may be hinged at its lower end and locked at the upper by lock 26, so that the said stop is withdrawn from the chute whenever the box is opened for inspection or repairs, and the coin held in suspension is permitted to roll down the sloping edge 27 of the chute or race into the till. The return chute 14 is preferably made crooked as shown or in any other desired form to prevent releasing the suspended coin by passing a wire or other object up the chute from the outside.

A meter 28, to register the number of coins as they pass into the till, may be provided, said meter being operated in any desired

manner either mechanically or electrically by the coins, the means shown consisting of an escapement, the lever 29 of which projects into the deposit chute 15 where it is engaged by the coins as they pass down the chute, thus releasing the escapement wheel and permitting the spring to rotate the meter disks. This meter may be visible through an aperture and glass cover 30 or be concealed and only readable when the box is open. A cover is preferably also provided to prevent interference with the meter by a trouble man or inspector.

When a coin of the proper size is inserted in the race, it rolls through the portion 7, past the opening 8, and thence drops down the portion 11, striking the gong 13; it then falls through the portion 12 to the stop 16 where it is held by the stop 19 of the refunding device. The sound of the gong transmitted through the telephone, indicates to the operator that the coin has been inserted. If the call is not completed, the refunding magnet 17 is operated and the pin 19 withdrawn, permitting the coin to roll down the return chute 14, to the calling party. In case the call is completed in the usual manner, the coin remains suspended upon the stop 16 at the upper end of the chute 14. The next coin dropped into the device will sound the gong 13 in the usual way, but after passing through the portion 12 it strikes the suspended coin and by it is directed to the left through the portion 15 into the till, and is thus deposited. If the connection cannot be completed, the refunding magnet 15 is operated by the operator at the central office and the suspended coin is delivered to the party.

In Fig. 5, I have shown one well-known type of telephone circuit to which the invention is applied, said circuit comprising the line L extending in two limbs 31 and 32 from one or more subscribers' stations, such as A, B, etc., to the central office C, where it terminates in the usual spring jacks J, J², in any desired number. The line is fitted at the central office with the usual line signal S, a line relay R controlling said signal and a cut-off relay R² having its winding legged to the ground from one side of the switchboard section of the line.

The operator's connective apparatus is of the usual type and includes a plurality of cord circuits each having an answering plug P and a calling plug P² provided with tip and sleeve contacts adapted to register with the corresponding contacts of the spring jacks of the telephone lines when inserted therein. The tip contacts of the two plugs are joined by flexible strands *t* and *t*², and an interposed condenser *c*, while their sleeve contacts are similarly joined by the strands *s* and *s*² and the interposed condenser *c*². Supervisory relays *r* and *r*² are bridged across the answering end of the cord circuit upon opposite sides of

the central common battery B, and together control the local circuit of the supervisory lamp S^2 associated with the answering plug P. Similar relays r^3 and r^4 are in like manner bridged across the calling end of the cord circuit and together control the supervisory lamp S^3 . The operator's head receiver 32, the secondary of her induction coil 33, and a suitable condenser c^3 are adapted to be bridged across the calling end of the cord circuit by the usual listening key springs 34, 34, her transmitter and primary winding of the induction coil 33, being charged from any suitable source of current. The ordinary ringing generator 35 is adapted to be suitably connected with the cord circuit by the ringing key springs 36, 36, to call the wanted subscriber in the usual manner.

At the subscriber's station in the particular arrangement shown in this figure, a call bell 37, and condenser c^4 , are normally bridged across the line, while the circuits through the receiver 38, transmitter 39 and a suitable retardation coil, which is indicated as the magnet 17 of the pay station device, are normally opened at the switch hook 40. When the receiver is taken up, a path for battery current is completed through the transmitter and retardation coil, and another path for voice currents is established through the transmitter, the receiver, and the condenser c^4 between the line wires. The bell 37, may or may not be disconnected at this time. In the use of the telephone line for conversation therefore, the current to charge the transmitter 39 passes through the retardation coil 17 and is prevented from passing through the receiver by the condenser, while the voice currents are forced to pass through the receiver on account of the retardation coil 17.

In using my pay station device in connection with the present circuit, I may make use of the retardation coil already utilized in such circuit for talking purposes, for the operating magnet of the refunding device. Thus in Fig. 5 I have indicated the armature 18 and the coin race, although it is apparent that an entirely separate magnet may be employed, and that so far as some features of the invention are concerned, may be connected in other relations.

In order to call the central office the subscriber takes up the receiver thereby completing a path for current from battery B over the telephone line through the substation devices including the magnet 17, thereby lighting the line signal S, and indicating to the operator that a connection is desired. The magnet 17 should be so adjusted in any well-known manner as by the tension of spring 22 as not to be operated by the current from battery B and hence at the present stage of the operation remains quiescent. Upon observing the signal the operator in-

serts the plug P of her cord circuit into the answering jack J, of the telephone line, thereby establishing a path for a current through the cut-off relay R^2 , in the usual manner and operating the same to retire the line signal S. At the same time she connects her telephone with the cord circuit and upon learning the number of the party wanted, tells the calling subscriber to drop the coin into the box. The subscriber then drops the coin into chute 6, and as it passes through the same strikes the gong 13, the sound of which is transmitted to the operator and informs her that the coin has been inserted. The operator then completes the connection in the usual way.

In case the previous coin has been refunded, the present coin is caught upon the stationary stop 16, and is held by the pin 19 in the position indicated in Fig. 1. In case the previous coin has not been refunded, the present coin strikes the coin held in suspension and then passes to the left into the portion of the slot 15 leading to the till. In case the call cannot be completed, or the called subscriber does not respond, the operator depresses a key, 41, 41, in the answering end of her cord circuit thereby connecting the high potential generator 42, with the said cord circuit this sending out a strong current over the telephone line which passes through the magnet 17, and transmitter 39, to which current the magnet 17 is adjusted to respond, thereby operating the said refunding magnet and allowing the coin to roll down the return chute 14 to the waiting subscriber. The next coin deposited will be caught and held in suspension as before described, while the succeeding coins pass into the till. It is thus apparent that this system and arrangement results in quick service for the subscriber since the taking up of the telephone is all that is required to signal the central office, and in very little waiting by the operator since the coin is inserted while the called party is being obtained and she is not required to perform any act to deposit the coin. Moreover, there are no mechanisms or contacts which can interfere in any way with the talking circuit so that when the line is out of order no coin need be wasted by the subscriber. The apparatus does not require a ground connection, thus not only cheapening the installation, but relieving the device from the effects of earth currents. The operator is enabled to handle more telephone lines which results in a reduction in the switchboard and apparatus at the central office, a less number of operators, and a simplification and reduction of the apparatus at the subscriber's station.

In applying the invention to the particular subscriber's circuit shown, the retardation coil may be utilized as a refunding mag-

net. It is also obvious that the device may be used on either single or party lines, since the refunding magnet is operated only when the telephone is off the hook.

5 In Fig. 6, a method of connecting the refunding magnet in any circuit is shown, that is, by connecting it directly in the path of current in the telephone line, with a condenser in parallel therewith to permit the
10 passage of the rapidly alternation voice currents. The magnet of course, should be adjusted not to respond to current upon the line for talking or signaling purposes, but
15 should be adjusted to respond to the high potential current impressed upon the line when it is desired to refund the coin.

An aperture covered with a transparent covering may be provided in the side walls of the box and chute at the place where the
20 coin is suspended to show whether a coin or slug is in suspense. While a coin is referred to herein, the term is intended to be used in its broad sense to include slugs, tokens, etc.,
25 used in place of coins for the operation of such devices.

While the invention has been described with reference to the details of construction of one commercial form and the specific arrangement with one type of circuit it is ob-
30 vious that various arrangements and modifications may be made therein and that the same may be used in various circuits without departing from the scope or principles of the invention.

35 Having thus described my invention what I desire to claim and secure by Letters Patent is:

1. In a coin collecting or pay station for telephone systems, the combination with a
40 supporting member in the line of movement of the coins for receiving the impact of the coins and to suspend the first coin in position to effect the deposit of succeeding coins into a suitable depository, and means associated
45 with the supporting member for holding the coin thereon and which when moved permits the suspended coin to pass from the supporting member and be refunded.

2. In a coin collecting or pay station for
50 telephone systems, the combination with a fixed supporting member in the line of movement of the coins for receiving the impact of the coins and to suspend the first coin in position to effect the deposit of succeeding
55 coins into a suitable depository, a stop for holding said suspended coin on the supporting member, and means for moving the stop to permit the coin to pass from the supporting member and be refunded.

60 3. In a coin collecting or pay station for telephone systems, the combination with a coin chute leading to a suitable depository and having a lateral refunding chute, a fixed supporting member for receiving the impact
65 of the coins and adapted to support the first

coin in such position that succeeding coins will be deflected thereby into the depository, the said supporting member being inclined so that the coin supported thereon tends to move by gravity into the refunding chute, a
70 stop in the path of the supported coin to obstruct the passage of the same through the refunding chute, and means for moving the stop to permit the coin to move into the refunding chute.

4. In a coin collecting or pay station for telephone systems, the combination with a main chute having a refunding chute, a supporting member adjacent the entrance of the refunding chute for suspending a coin in po-
80 sition to deflect succeeding coins into a suitable depository, a stop normally in position to hold the coin on the supporting member and obstruct its passage through the refunding chute, and electromagnetic means for
85 withdrawing the stop to permit the coin to pass into the refunding chute.

5. In a coin collecting or pay station device, for telephone exchanges, the combination with a coin race for the passage of the
90 coins through the device, said race terminating at its lower end in a refunding chute and a deposit chute, of a relatively stationary supporting member at the mouth of the refunding chute upon which the coins tend to
95 fall in passing through the coin race, a movable stop to hold a coin in suspension upon said stationary supporting member, said suspended coin when held in suspension being
100 in such position that the succeeding coins falling through the race strike the same and are thereby directed beyond the stationary supporting member and into the depositing channel, whereby they are deposited in the
105 till or cash box, and electromagnetic means under the control of the central office for withdrawing said movable stop to permit the suspended coin to move from the supporting member and be returned to the calling party.

6. In a coin collecting or pay station de-
110 vice for telephone exchanges, the combination with a coin race for the passage of the coins through the device, of means for holding the coin in suspension in said device and in position to be refunded when desired, said
115 means being so arranged that when the device is opened the suspended coin is automatically released and passes into the till of the device.

7. In a pay station telephone system, the
120 combination with a central station, of a telephone line extending therefrom, a subscriber's station connected to the line, means for the reception of coins at the subscriber's station, means controlled from the central
125 station for governing the course of coins in said receiving means, and means whereby an audible signal may be transmitted to the central station by the passage of a coin in said receiving means before said coin reaches
130

a position where it may be affected by said governing means.

8. In a pay station telephone system, the combination with a central station, of a telephone line extending therefrom, a subscriber's station connected to the line, a coin race for the passage of coins therethrough at the subscriber's station, means controlled from the central station for governing the course of coins in said race, and an audible signaling device associated with the coin race and adapted to be sounded by a coin in

its passage through the race before said coin reaches a position where it may be affected by said governing means, the audible signal from said device being transmitted over the telephone line to the central station.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

JAMES HARRISON.

Witnesses:

H. LINEORD ROBESY,
JOHN M. STUART.