G. A. LONG.

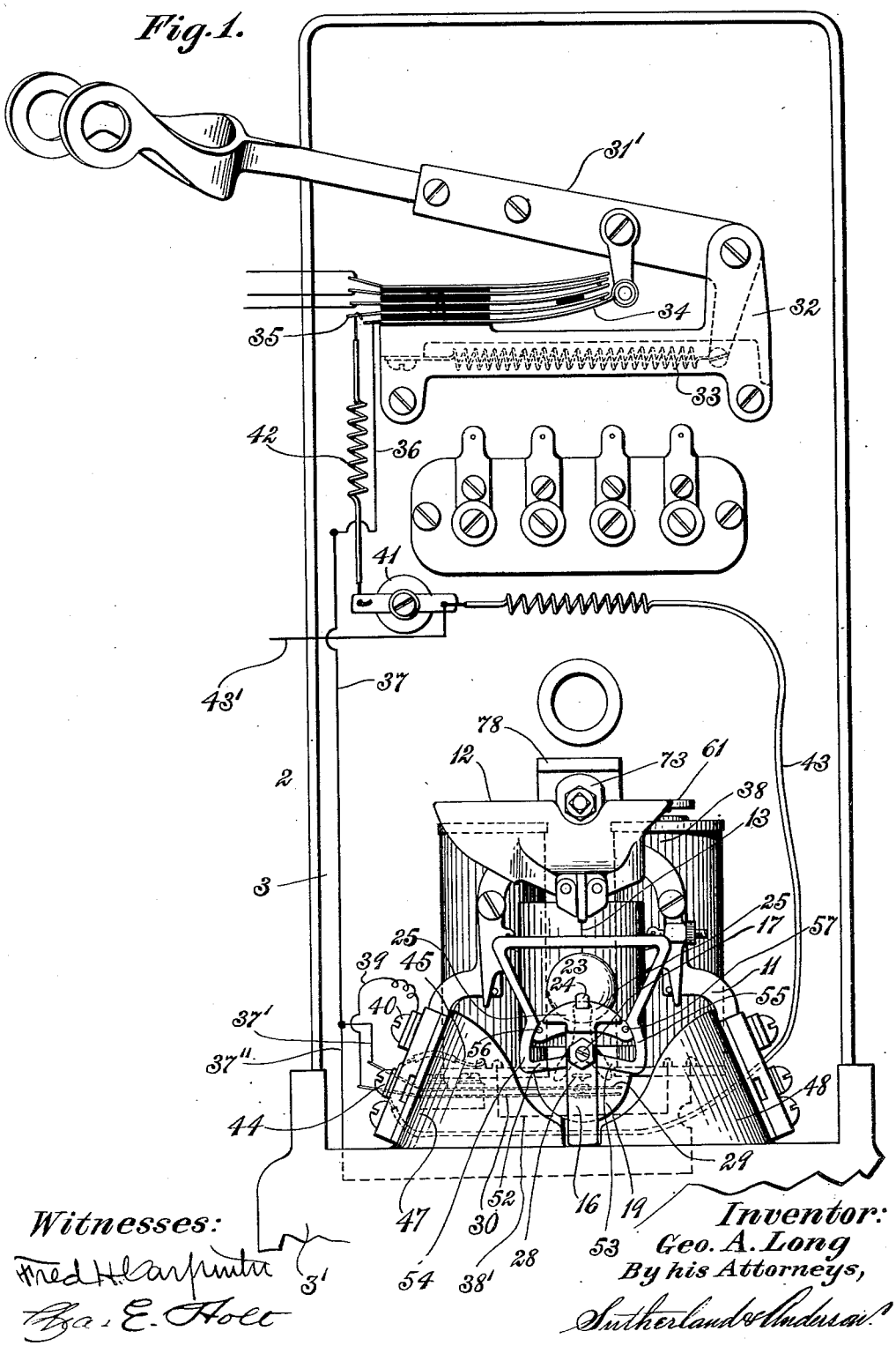
TELEPHONE PAY STATION.

APPLICATION FILED MAY 14, 1908.

917,742. Patented Apr. 6, 1909.

4 SHEETS—SHEET 1.

Fig. 1.



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4 SHEETS—SHEET 2.

Fig. 2

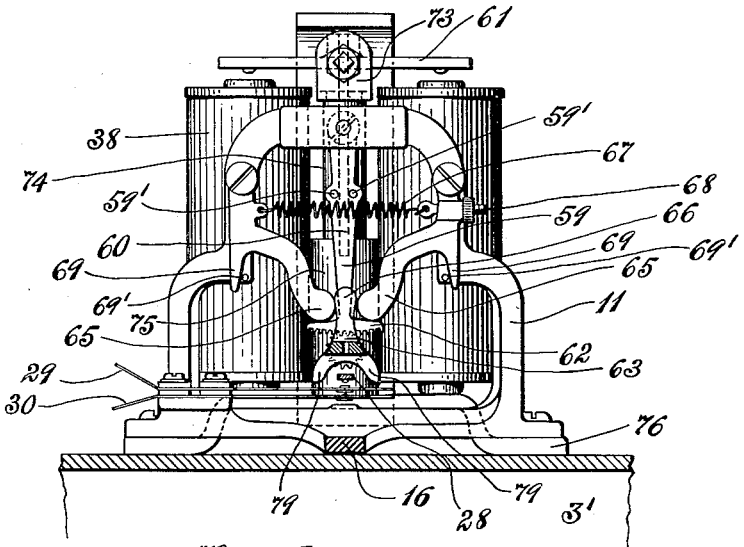
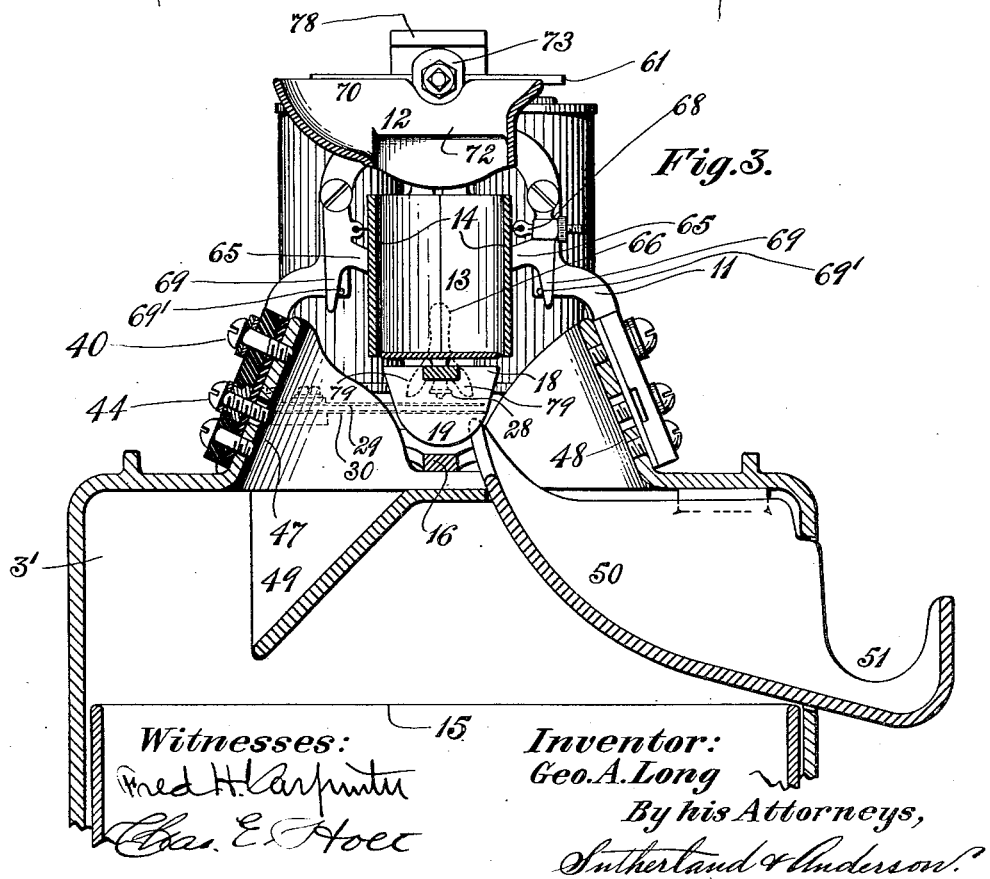


Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 4.

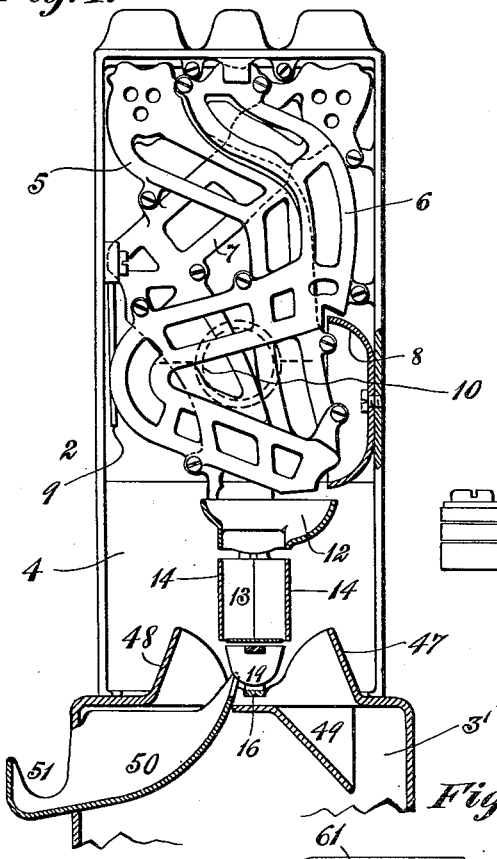


Fig. 6.

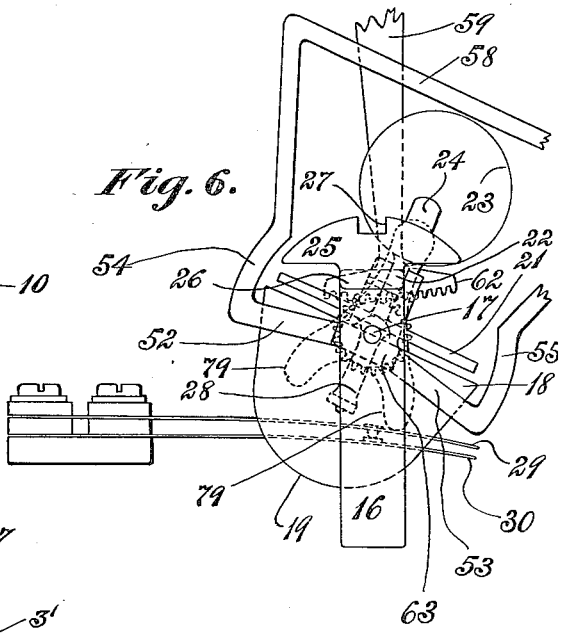
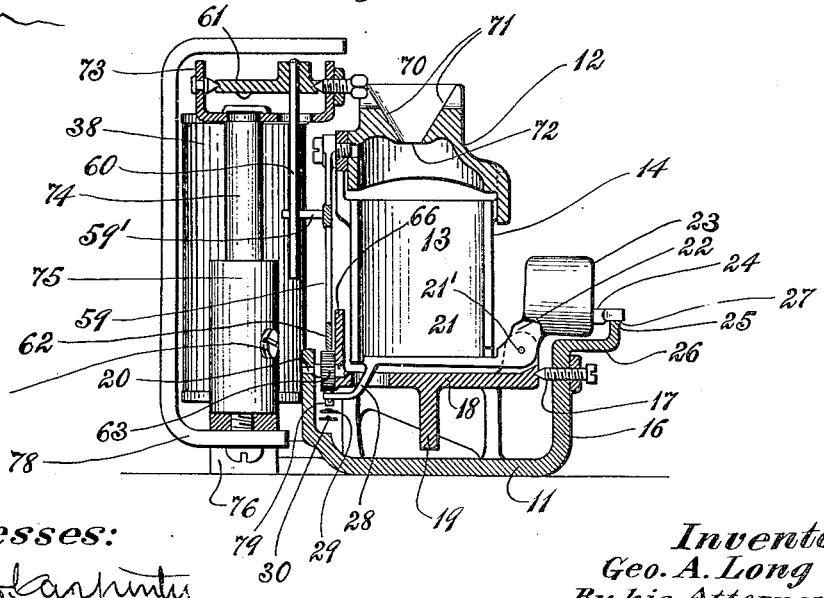


Fig. 5.



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4 SHEETS—SHEET 4.

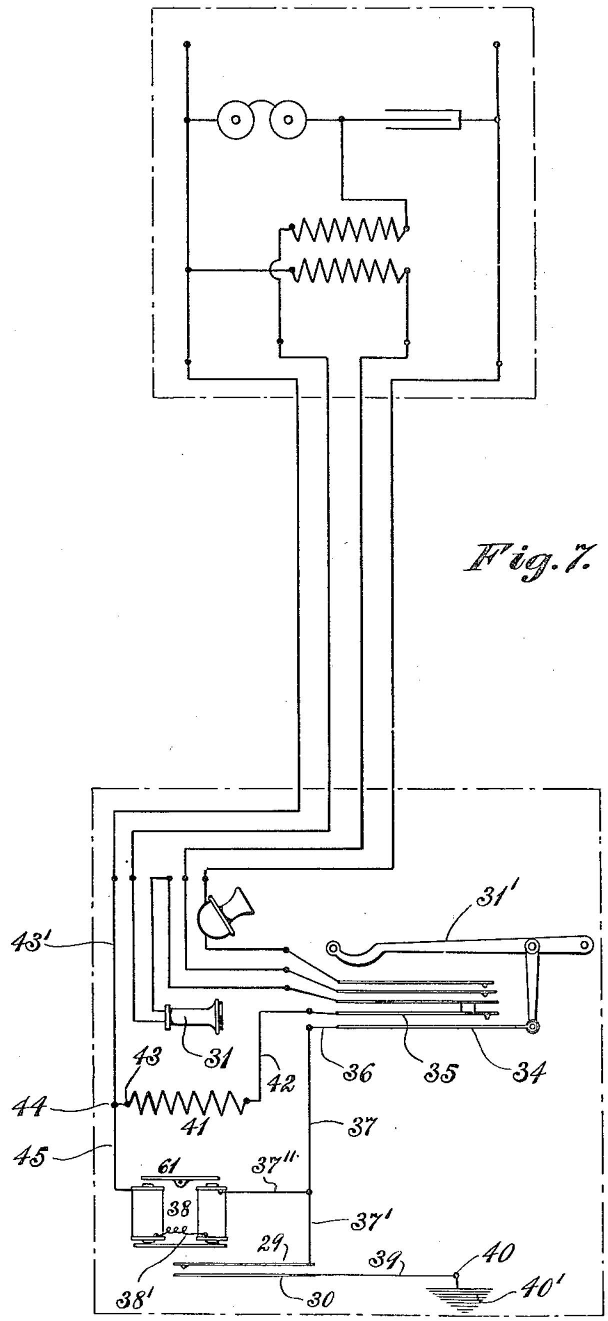

Fig. 7.

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UNITED STATES PATENT OFFICE.

GEORGE A. LONG, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE GRAY TELEPHONE PAY STATION COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

TELEPHONE PAY-STATION.

No. 917,742. Specification of Letters Patent. Patented April 6, 1909.

Application filed May 14, 1908. Serial No. 432,787.

To all whom it may concern:

Be it known that I, GEORGE A. LONG, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Telephone Pay-Stations, of which the following is a specification.

This invention relates to telephone pay stations, the object of the invention being to provide a simple apparatus of this character which is effective and accurate in action.

In the drawings accompanying and forming part of this specification I have illustrated in detail one form of embodiment of the invention which to enable those skilled in the art to practice the same, will be set forth fully in the following description while the novelty of the invention will be included in the claims succeeding said description.

Referring to said drawings, Figure 1 is a view of portion of a telephone pay station equipped with circuit connections and controlling devices involving my invention and it also illustrates diagrammatically certain known connections. Fig. 2 is a sectional view of part of the casing, electro-magnet, contact-strips and certain adjunctive devices. Fig. 3 is a transverse-vertical section of the coin-receptacle, closure therefor, hopper, magnet and coöperating elements. Fig. 4 is a sectional elevation of a compound chute, signal means, coin-receptacle and other elements. Fig. 5 is a vertical, sectional view of the coin-receptacle, its hopper, its closure and certain coöperating parts. Fig. 6 is a detail view of contact strips, a cam-device and certain other parts. Fig. 7 is a diagrammatic view of certain known telephone connections and my circuit connections associated therewith.

Like characters refer to like parts throughout the several figures.

I wish to make it clear at the outset that I do not restrict myself to the construction illustrated in the drawings and hereinafter described as my invention resides rather in certain broad relations or combinations as expressed in my claims and by said drawings and description I disclose one simple and convenient mode or manner of carrying my invention into effect. I wish to also state that it is not necessary that I employ all the features of my invention in an organized apparatus; such features may be separately employed should I so desire.

Referring particularly to Figs. 1 and 4 the numeral 2 designates a telephone cabinet which is represented as including in its make-up a back-plate as 3 and a casing as 3'. The back-plate 3 presents the back for a housing as 4 which is illustrated as inclosing three chutes as 5, 6 and 7 which are preferably united together in some suitable manner and which are fixed in the shell or housing 4. The chute 5 is adapted to receive five cent pieces or nickels, while the chute 6 is adapted for the passage of ten cent pieces or dimes, the chute 7 being adapted for the traverse of twenty-five cent pieces or quarters. These chutes may be and preferably are of the character set forth in my copending application for patent for compound chutes filed March 27, 1908, Serial No. 423,593. Within the shell or housing 4 is fixed a bell as 8, one portion of the rim of which is located in proximity to the delivery end of the chute 6 while another portion of said rim extends into said chute 6 by way of a slot between the ends thereof so that a dime traveling along said chute 6 can sound said bell twice. A nickel as it emerges from said chute 5 will strike the bell 8 once. In addition to said bell there is mounted in the shell or housing 4 a gong as 9 adapted to be struck by a quarter traveling along the chute 7 the latter between its ends being slotted whereby a coin of the latter denomination can act upon said gong. I therefore provide for distinctive signals by coins of different denominations, which coins as will be understood are introduced into the upper ends of the said chutes 5, 6 and 7 through appropriate slots in the shell or housing 4.

The shell 4 is preferably metal and it carries the telephone transmitter 10 and as the bell 8 and gong 9 are also carried by said metal shell it follows that there is a resonant connection between the audible signals and transmitter 10 so that when the latter is in electrical connection with a distant receiver or one at a central office, the operation of the signals at the telephone pay station can be detected through said distant receiver by an operator at such central office. It will be assumed that said transmitter 10 forms part of a subscriber's station equipment and that this subscriber is in telephonic communication with an operator at the central office. The central office operator will instruct the subscriber what coin or coins to deposit and

by the sounds forwarded by the signals in the manner set forth the central office operator can readily determine whether or not the proper amount has been paid.

I wish to make it clear that the invention does not reside in any particular chute or signal. As a part of the invention, however, there is preferably employed some signal means which is coin-controlled and the operation of which can be ascertained by a central office operator; preferably the signal means is audible in type and the bell and gong to which allusion has been made, present convenient signal means of the character desired.

I have shown as mounted on top of the casing 3′ a frame member as 11 which is shown best in Fig. 2, and I have illustrated as fastened to the top thereof a hopper as 12 and as shown best in Fig. 4 all three of the chutes 5, 6 and 7 are adapted to deliver their coins or tokens into a receptacle as 13. The receptacle 13 is shown as being of approximately cylindrical form and as composed of two substantially similar or complemental sections as 14 pivoted at their upper ends to the hopper 12, said pivots being so located as to cause the sections of the receptacle 13 to normally abut edge to edge by virtue of their weight, the receptacle during such abutment being closed—its normal or coin-receiving relation. It will be obvious that each of the sections 14 can move or swing relatively to the companion section, the swing in the present instance being laterally; that is when one member is swung relatively to its mate it will move away from the latter. The section of the receptacle 13 which is moved or thus swung will depend on the disposition of the coin or coins therein by the central operator. Should such operator desire to deliver a coin or coins in the receptacle 13 into a coin box as 15 removably located in the casing the section of member 14 on the left in Fig. 3 will be operated while should said operator wish to return the coin or coins to the subscriber or user of the telephone pay station the other section or member 14 will be caused to operate all as will be hereinafter fully described. The coin box 15 is ordinarily inclosed in the casing 3′ under lock and key.

From the frame member 11 there is shown as extending forwardly an arm or bed piece as 16 of substantially L form, the vertical branch of said arm being shown as furnished with a pivot pin as 17 for a rocking or oscillatory member as 18 provided with a balance weight as 19. The rocking member 18 has in turn a pivot as 20 fastened thereto and which has an oscillating bearing in the frame member 11 all as shown in Fig. 5. The bottom of the receptacle 13 is illustrated as consisting of a disk as 21 which when in its normal or neutral position is adapted to fit somewhat closely within said receptacle so as at such time to retain a coin or coins in said receptacle. Said disk constitutes a closure for the receptacle and also in itself acts as a coin-receiving device and as a means for securing the direction of a coin or coins along different paths which in the present case are differently directed. The movement of the coins along said paths is governed by the central office operator and as will hereinafter appear means are provided for preventing the coin or coins following one path when the same is or are directed toward another path by virtue of which perfect control of said coin or coins is assured.

The disk or closure 21 is provided at the front side thereof with a radially-projecting arm as 22 which is represented as extending upwardly and as provided with a weight as 23. On the weight is a forwardly projecting stud or pin as 24 coöperative with a segment as 25 rising from an upward projection as 26 on the vertical branch of the arm 16 as shown in Figs. 1 and 5. When the disk 21 is in its normal or neutral position at which time in the present case it stands horizontally, the pin 24 will be located in a notch as 27 in the segment 25 by reason of which said disk 21 will be positively locked in said neutral or normal position. Therefore before the disk can be swung in either direction from said horizontal position it is unnecessary to unlock or release the same this being preferably accomplished directly by a coin in the receptacle 13. It will be assumed that a coin has been introduced into the receptacle and has lodged upon the disk. When the coin is received upon said disk the weight of the coin causes the downward swing or depression of said disk whereby the pin 24 through the intermediate parts is lifted out of the notch or aperture 27 so that said disk will be freed from the automatic locking means and will be in condition to be swung oppositely from its normal position. When said disk has been returned to its normal position the pin or stud 24 will be caused to drop into the notch 27 by the power of the weight 23. Automatic locking means of which that just described is an example prevents the manipulation of the disk 21 by wire or other articles passed into the casing 3′ from a point outside the same.

The disk 21 is shown as provided with a downwardly bent arm 28 disposed diametrically opposite the arm 22 and extending through a perforation in the rocking disk carrier 18. This arm 28 as will hereinafter appear constitutes a circuit controller it being adapted to bring into engagement or electrical connection an upper contact as 29 and a lower contact as 30 normally insulated from each other and carried by the frame member 11. When a coin depresses the

disk 21 in the manner hereinbefore described the arm 28 is also depressed and becomes effective for pressing the contact piece or member 29 into engagement with the coöperating contact piece 30, thereby bridging or closing one break in electrical connections located at the station and forming a part of the invention. A second break in said circuit connections is bridged by means under the control of the user of the station or subscriber and preferably by means or agents controlled by the customary hook-lever which constitutes a support for the well-known receiver with which the station is equipped.

The receiver is denoted by 31 and although its shiftable support 31′ is shown in full and on a large scale in Fig. 1 said receiver is not the one shown in the diagrammatic view Fig. 7. The hook-lever 31′ is shown as pivoted at its angle to a bracket as 32 fastened to the back plate 2. To the short branch of said hook-lever I have shown connected one end of a pull spring as 33, the opposite end of said spring being connected with said bracket 32. The longer arm of said hook lever is forked to receive the receiver and when the receiver is hung up said long arm is disposed approximately horizontally. When the receiver is removed from its supporting hook lever the spring becomes at once effective for swinging the long arm upward and through suitable means bridging a second break in the said circuit connections. To the long arm of said hook-lever 31′ is linked a contact spring or strip as 34 which is coöperative with a similar contact spring or strip as 35 which strips when the receiver is on the hook-lever are insulated from each other. When the receiver is removed from the hook-lever the lower strip 34 will be caused to engage the upper strip 35 and make an electrical connection therewith or close a second break in the circuit connections at the telephone pay station. There are therefore two points of control of said circuit connections and the control is obtained in the present case by bridging two breaks by suitable means such as those described and the double control is governed primarily by the act of a subscriber or user of the telephone pay station although one control is obtained directly by such act while the other is obtained through the intervention of a coin or equivalent device.

An advantage follows the double control of the circuit connections. Were there a single control a signal would be operated usually by a coin. This signal is generally a lamp which is flashed when a coin is ordinarily introduced into the receiver. By this old method or single control a user will insert a coin into his station which will signify to the central office operator that he desires to make a telephonic connection. The central office operator if the party called for be busy will tell the subscriber to hang up his receiver. When he does the lamp at the central station will remain alight as it is governed only by the coin. In the case of the double control, however, two functions are necessary before the lamp at central office can be flashed or before some other warning signal can be caused to act and by the mechanism described this lamp or analogous signal will cease to operate when the subscriber hangs up his receiver.

From the strip 34 a wire or equivalent connection as 36 extends and is connected with a wire as 37 which extends oppositely from its point of connection with the wire 36, its branch 37′ being connected with the contact strip 29 while the branch 37″ is connected with one pole of the polarized electro-magnet 38. From the lower contact 30 a wire as 39 leads and is connected with a binding-post as 40 which has a ground connection as 40′. (See Figs. 1 and 7.)

On the back-plate 2 I have shown as mounted a resistance coil as 41 connected by a wire as 42 with the upper contact strip 35. The wire 42 leads from one terminal of said resistance coil; from the other terminal thereof a wire as 43 extends to the binding post 44 and from the latter a wire as 45 leads to one pole of the magnet 38, the two poles of said magnet being connected by a bridge wire as 38′. To the wire 43 I have represented as connected one of the two wires common in telephones and it might be stated at this point that my device can be employed in conjunction with any standard equipment without any change whatsoever therein. Said wire to which I have thus referred is a line wire and is sometimes also known as a tip strand to distinguish the same from the usual return wire which is not shown in Fig. 1. The wire 43′ has a ground connection at central station and it is intersected by a battery and a relay controlling a local or lamp circuit. It will be assumed that the contacts 29 and 30 have been caused to engage by the insertion of a coin which is usually a nickel and that the contacts 34 and 35 have been caused to engage by the removal of the telephone receiver 31. When this occurs current will flow from the wire 43′ to the wire 43 and also to the resistance coil 41. In other words the current divides or splits and the reason for this will be made clear hereinafter. That part of the current which enters the wire 43 will follow the same to the post 44, wire 45, left pole (Fig. 1) of magnet 38, bridge wire 38′, right pole of said magnet, branch 37″, branch 37′, upper contact 39, lower contact 30, wire 39, post 40, ground connection 40′. The other part of the current traverses the resistance coil 41, wire 42 contact strip 35, contact strip 34, wire 36, branch 37′, contact 29, contact 30, wire 39,

post 40 and ground connection 40′. I therefore provide a shunt circuit which takes half the current fed by the wire 43′ and this shunt circuit includes the resistance coil 41, the resistance interposed by which is equal to that presented by the magnet 38 although their total resistance is less than that of the relay and ground connection at the central office by virtue of which said relay can be energized when the two points of control are made. It will be obvious therefore that the described circuit connections present a convenient means for effecting the operation of a signal at the central office and from what has been stated it will be evident that this signal may be of any suitable type and the same statement applies to the telephone connections as my invention does not reside in either of these. When the light at the central office is flashed this will signify to the operator thereat that the subscriber wishes to make a telephonic connection. If it be merely local it will be given him. If it be long distance the subscriber will be ordinarily turned over to a long-distance operator who will advise him of the toll and the signal means as the bell and gong to which I have hereinbefore alluded, will when operated instruct the central operator whether or not the correct amount has been paid by the subscriber or user and the audible signal means operates independently of or distinctly from the warning signal operating means.

The posts or screws 40 and 44 with certain other posts or screws which form no part of the invention and need therefore not be described, may be mounted upon angularly-disposed arcuate flanges as 47 and 48 rising from openings in the top of the casing 3′, the flange 47 being located above a spout or chute as 49 while the flange 48 is located above a spout or chute. The flanges serve as guards to prevent scattering of the coin when discharged from the receptacle 13. When the disk 21 is caused to tip in a direction to cause the coin or coins thereon to enter the coin-box 15 said coin or coins will fall onto the spout 49 and will be directed thereby into the box 15. When said disk is tipped in the opposite direction the coin or coins thereon will slide therefrom onto the spout 50 which is extended out of the casing 3′ and which terminates in a tray or pocket as 51 exterior of said casing and into which a subscriber can reach to obtain the coin or coins in said tray or pocket. Should a wire or other instrument be projected exteriorly of the casing 3′ thereinto by way of the opening in the side of the casing 3′ through which the spout or runway 50 extends with the object of causing the arm 28 to make contact between the contacts 29 and 30 this will not be possible owing to the fact that said disk is locked in the manner set forth and said disk can be freed to tilt by the action of a coin in the receptacle 13 which operates said disk in the manner also hereinbefore set forth.

The disk carrier 18 is provided with two oppositely-projecting rigid arms 52 and 53 provided with inwardly curved extensions 54 and 55 concentric with the axis of motion of carrier 18. Said axis in the present case is located at substantially right angles to that of the disk 21 which it will be observed is pivoted as at 21′ to the carrier 18 at a point outside the receptacle 13. Said curved extensions 54 and 55 coöperate with pins as 56 and 57 extending from the sections 14 of the receptacle 13 as shown best in Fig. 1. In said figure the arms 52 and 53 are shown as being in their normal positions at which time the inner active curved faces of the extensions 54 and 55 are against the coöperating pins 56 and 57 whereby the relatively swinging sections 14 will be locked against outward or lateral swinging movement so as to secure the positive but temporary retention of a coin or coins in the receptacle sustained upon the disk 21. The curved extensions 54 and 55 are connected at their upper ends by a yoke as 58 which prevents abnormal outward swinging movement of the sections when either of them is freed from the locking relation to which I have referred. It will be assumed that the arm 53 is swung down by the tilting of the disk 21 and its carrier 18; it therefore follows that the arm 52 is swung upward, such relations being illustrated in Fig. 6 this operation being for the purpose of returning coins to the subscriber. When this occurs the active face of the locking extension 55 will immediately follow the downward movement of said arm 53 and will pass free of the pin 57 when the tilting motion of the disk 21 has been concluded thereby releasing the section 14 of the receptacle, on the right in Fig. 1 whereby as the coins fall off the laterally tipped disk said right section 14 can be swung open to freely release the coins, the section 14 on the left, however, at this time being held positively closed by the extension 54 whereby the coins cannot possibly be directed into the coin box 15 along the path hereinbefore set forth. During the downward swing of the arm 53 the curved active face of the extension 54 will remain in contact with the pin 56 thereby locking said left section to secure the result stated. When the arm 52 is swung downward the reverse actions will take place, this occurring when the coin or coins on the disk 21 are to be caused to enter the coin-box 15. The locking means therefore is normally active although it is of such nature that it may be operated to release one section 14 and lock the other and vice versa. It will be clear that the disk 21 has a compound motion or that it swings about two axes, its initial mo-

tion controlling circuit connections and effecting the release of locking means which normally restrains it and its other motion serving to deliver a coin along one of two predetermined paths.

I have shown as pivoted to the rear side of the hopper 12 and next the magnet 38, a lever as 59 which is shown as provided with a pair of parallel pins as 59′ which receive between them an arm as 60 depending from the armature 61 of the electro-magnet 38. At the lower end of said lever there is shown a sector 62 rigid with said lever and the teeth of which mesh with those of a pinion as 63 rigid with the pivot or stub-shaft 20. When said lever 59 is swung to the right from its normal and substantially vertical position the sector 62 will operate the pinion 63 in such manner as to tilt the carrier 18 and the disk 21 supported thereby as to direct a coin or coins on said disk into the chute or runway 50 from whence they will pass into the tray 51 to be taken by the subscriber or user of the station, this operation following the failure of the central office operator to make a long distance connection for the subscriber or in fact it may follow the failure to make a local connection, the latter depending upon the rules in vogue in the particular locality in which the station may be installed. When the lever 59 is swung from its said normal position toward the left either in Figs. 2 and 6 the opposite results will take place; that is to say the coin or coins on the disk 21 will follow the path hereinbefore indicated to the coin box 15.

In the present case the oscillation of the lever 58 is secured through the action of an operator at central station. By sending current of one polarity through the magnet 38 one pole of the magnet will be energized to attract one arm of the armature while the other pole of said magnet will repel the other side of the armature, while by sending a current of opposite polarity through said magnet the armature 61 thereof can be oppositely tilted and by virtue of this relation the armature 61 and therefore the arm 60 depending from the center thereof, can be so operated to direct the coins along different paths respectively, this operation being governed by will. The currents of opposite polarity will traverse the connections hereinbefore described at the station and eventually will pass to ground by way of the connection 40′.

I have shown as pivoted to the inner side of the frame member 11 centralizing arms 65 and between the free ends of these arms 65 is disposed an upright arm as 66 rising from the carrier 18 at the inner side of the latter. A pull spring as 67 is shown as connected with one of said arms 65 and as connected with an adjusting screw as 68 tapped through the other of said arms. By the manipulation of said screw the tension of said spring can be regulated. The office of this spring 67 is to return the carrier 18 and disk 21 to their neutral or central positions after they have been released from the pull of the magnet or following the deënergization of said magnet and to maintain said carrier and disk in said normal positions. It will be assumed that the arm 66 has been swung to the right in Fig. 2 following the corresponding motion of the carrier 18 and disk 21. When the disk and carrier are released from the action of the magnet 38, the spring 67 acting through the intermediate parts becomes effective for returning said disk and its carrier to their normal positions. The spring returns the armature 61 also through intermediate parts to its normal or neutral position. When the arms 65 are in their normal positions projections as 69 thereon will bear against stop pins as 69′ on the frame member 11 and thereby limit the movement of said arms 65 toward each other and also the movement of each of them when the other is being shifted by and on the discharge motion of the disk 21.

The hopper 12 is of such construction as to insure the superimposition of coins in the receptacle 13 and presents a simple means for securing this result as thereby a small receptacle can be utilized to receive a large number of coins. Therefore I provide means for insuring the deposit of coins in a definite relation in a receptacle or on a receiving device of whatever nature such parts may be. The hopper 12 is somewhat enlarged at its upper portion as at 70 as shown best in Fig. 3 to receive all the coins from the three chutes 5, 6 and 7 without possibility of scattering. Near the lower portion of the hopper 12 therein are two inclined or sloping converging faces as 71 which lead toward the delivery slot or outlet 72 of said hopper, said slot being sufficiently elongated as to easily receive a coin of the largest size to which the instrument is adapted this being in the present case a quarter. The length of said slot as will be seen on inspection of Fig. 3 is equal or substantially equal to the internal diameter of the receptacle 13. Said slot 72 is located at one side of the transverse central diameter of the receptacle 13 so that coins are not delivered by the hopper 12 centrally into said receptacle but are directed thereinto at one side of said center so that for example in the case of a quarter such coin will strike the upper side of the receptacle 13 at the rear of such center and when the coin is fully free of the hopper 12 the same will be caused to tip or assume a horizontal position in which condition it enters said receptacle.

The armature 61 of the electro-magnet 38 is carried for rocking motion by a support as 73 represented as consisting of a yoke fastened between its ends to the top of a post as 74 adjustably supported by a hollow stud or barrel as 75 mounted on a bearing as 76 on the casing 3′, the adjustment of the post

or rod 74 being maintained by a set screw as 77 tapped through said hollow stud or barrel 75. A permanent magnet as 78 augments the effect of the electro-magnet 38, said permanent magnet being fastened at its lower end to the bearing 76 and its head or top overhanging said permanent magnet.

With the carrier 18 are integral two cams as 79 one of which when the disk is tipped one way serving to press the contact 29 against the contact 30 and the other of which when said disk is tipped oppositely serving to repeat such function so that even should the arm 28 be moved out of contact with the upper of said contacts the circuit connections will be closed at such point during the lateral tipping of the disk whereby the magnet can be energized a time sufficient to secure complete discharge of a coin or coins from said disk. In other words the disk 21 will remain laterally tipped so long as the switch at central office is thrown to a position to energize said magnet. This provides for a third control of the circuit connections and a ground connection involving said magnet whether the coin be off the disk 21 or on the same or whether the telephone receiver be on or off its supporting hook. It will also be evident that the magnet 38 can be energized even if the receiver be hung up or off its supporting hook-lever.

In the diagrammatic view Fig. 7 I have shown certain known telephone connections which I deem it unnecessary to describe; they form no part of the present invention.

What I claim is:

1. A telephone pay station comprising circuit connections, a telephone receiver support mounted for shifting movement and coin operated means conjointly effective to control the circuit of which said connections form a part combined with means for effecting the action by coins of different denominations, of signals of different characters.

2. A telephone pay station comprising circuit connections, a telephone transmitter, a telephone receiver support mounted for shifting movement and coin-operated means the latter and said support being conjointly effective to control the circuit of which said connections form a part combined with means for effecting the action by coins of different denominations of signals of different characters.

3. A telephone pay station comprising circuit connections, a telephone receiver support mounted for shifting movement and coin operated means, said support and coin-operated means having devices operatively associated therewith for conjointly and simultaneously closing the circuit of which said connections form a part.

4. A telephone pay station comprising circuit connections, a telephone receiver support mounted for shifting movement, means operative with said support for controlling the circuit of which said connections form a part, and coin operated means for controlling the same circuit at another point the two controlling means being simultaneously operative before control of said circuit can be obtained.

5. A telephone pay station comprising circuit connections, a mechanical device set in action by a subscriber, means governed by said mechanical device for controlling the circuit, coin-operable means for also controlling said circuit, the two controlling means being conjointly effective, and coin-operable means for producing signals of different characters.

6. A telephone pay station comprising circuit connections having two breaks, a telephone receiver support shiftably mounted, means operative with said support for bridging one of said breaks, and coin-operable means for bridging the other break.

7. A telephone pay station comprising circuit connections, means operative by a coin for controlling the circuit of which said connections form a part, and coin-controlled signal means operable independently of the coin-operated circuit controlling means.

8. A telephone pay station comprising circuit connections, means operable by the act of a subscriber for controlling the circuit at one point, means operated by a coin for controlling the circuit at another point, and signal-means operable by a coin and independent of said circuit controlling means.

9. A telephone pay station comprising circuit connections having two breaks, means operable by the act of a subscriber for closing one of said breaks, coin-operated means for closing the other break, and signal-means operable by coins and active independently of said circuit break closing means.

10. A telephone pay station having coin-controlled means for causing the action of a warning signal, and coin-operated signal means active independently of said first-mentioned means.

11. A telephone pay station having means operable by a coin for causing the action of a signal, audible signal means operable independently of the other means, and a telephone transmitter in resonant connection with said audible signal means.

12. A telephone pay station having distinct means for causing the action of a warning signal, one means being operable by the act of a subscriber and the other by a coin, and coin-operable signal means operable independently of said other means.

13. A telephone pay station having distinct means for operating a signal, and independent coin-operated means for causing the action of signals of different characters.

14. A telephone pay station having distinct means for operating a signal, audible

signal means, coin-operated means for causing the operation of said signal means to produce signals of different characters, and a telephone transmitter in resonant connection with said signal means.

15. A telephone pay station having distinct means for causing the action of a warning signal, one means being operable by the act of a subscriber and the other by a coin, coin-operated signal means for producing signals of different characters, and a telephone transmitter in resonant connection with said signal means.

16. In a telephone pay station, circuit connections, means whereby separate acts are required to control the circuit of which said connections form a part, means for operating signals of different characters by coins of different denominations, a device to temporarily retain the coins after they have operated said signals, and means for releasing the coins thus retained.

17. A telephone pay station comprising circuit connections, distinct devices for controlling the circuit of which said connections form a part, a telephone transmitter, a plurality of audible coin-operable signals in resonant connection with said transmitter, a device to temporarily retain the coins after they have operated said signals, and means for releasing the coins thus retained.

18. A telephone pay station having distinct means for operating a signal, independent coin-operated means for causing the action of signals of different characters by coins of different denominations, a device to temporarily retain the coins after they have operated said signals, and means for releasing the coins thus retained.

19. A telephone pay station comprising means for effecting the action of a warning signal, coin operated means for producing signals of different characters separate from the warning signal, means for supporting a group of the coins, and means operable at will for effecting the positive discharge of the coins from said supporting means.

20. A telephone pay station comprising distinct means for operating a signal, a telephone transmitter, a plurality of audible, coin-operable signals in resonant connection with transmitter and for sounding signals of different characters, a device to temporarily retain the coins after they have operated said signals, and means operable at will for directing the coins in a group along either of two paths.

21. A telephone pay station comprising a casing having a coin box and also having a coin-outlet, circuit connections, means whereby separate acts are required to control the circuit of which said connections form a part, coin-operable means for effecting the action of signals of different characters, means for retaining temporarily the coins after they have operated said signals, and means operable at will for directing the coins in a group either into said coin-box or through said coin-outlet.

22. A telephone pay station comprising circuit connections, a plurality of interdependent circuit controlling devices for controlling the circuit of which said connections form a part, a telephone transmitter, audible coin-operable signal means in resonant connection with said transmitter, and means operable at will for causing the coin which has operated said signal means to take different paths.

23. A telephone pay station comprising circuit connections, a plurality of interdependent circuit controlling devices one of which is coin-operable, for controlling the circuit of which said connections form a part, a telephone transmitter, means operable by coins for sounding signals of different characters and in resonant connection with said telephone transmitter, means for temporarily retaining the coins in a group after they have operated said signal means, and means for causing the coins to take different paths.

24. A telephone pay station comprising circuit connections and mutually dependent devices for controlling said circuit one of said devices being operable by the act of a subscriber and the other by a coin, a telephone transmitter, means in resonant connection with said transmitter and coin operable for sounding signals of different characters, a device to retain the coins after their operation of said signals, and means operable at will for causing all the coins to take one path or all of them to take another path.

25. In a telephone pay station, a coin-receptacle, a plurality of coin-chutes each adapted to deliver a coin to said receptacle, signal means operable by the coins to produce signals of different characters, a device to retain the coins temporarily in said receptacle, a coin-box, and means to operate said device and cause the coins thus retained to pass into said coin box.

26. In a telephone pay station, circuit connections, means operable by the act of a subscriber for controlling the circuit including said connections, a coin-chute, signal means operable by a coin traversing said chute, a receptacle to receive the coin, and a device operable at will for temporarily retaining the coin in said chute and shiftable to direct the coin in different directions.

27. In a telephone pay station, means operable by the act of a subscriber for causing the action of a warning signal, coin-operated audible signal means, a telephone transmitter in resonant connection with said signal means, and a device to receive the coin and shiftable to direct the coin in different directions.

28. In a telephone pay station, means op-

erable by the act of a subscriber for causing the action of a warning signal, means for forwarding coins of different denominations, means actuated by the coins for producing signals of different characters, a telephone transmitter in resonant connection with said signals, the latter being audible, and a device to receive the coins in a collection and shiftable to deliver the coins in different directions.

29. In a telephone pay station, circuit connections comprising two breaks, coin operated means for closing one of the breaks, means operated by the act of a subscriber for closing the other break, means for forwarding coins of different denominations, a device to support several coins of such denominations and shiftable to deliver the coins in different directions, and signal means operable by the coins.

30. In a telephone pay station, circuit connections, means operable by the act of a subscriber for controlling the circuit of which said connections form a part, means for forwarding coins of different denominations, means actuated by the coins, for causing the operation of different kinds of signals, a device to receive several coins, and means for shifting said device to cause the movement of the coins in different directions.

31. In a telphone pay station, a device for simultaneously receiving several coins of different denominations, and means for operating said device to cause the discharge of said coins therefrom in different directions.

32. In a telephone pay station, a device adapted to simultaneously receive and support a plurality of coins of different denominations, said device being operable to direct the coins carried thereby in different directions.

33. A telephone pay station comprising a telephone transmitter, means for forwarding coins, audible signal means operable by the coins and in resonant connection with said transmitter, means for temporarily holding said coins in a group after they have operated said signal means, and means operable at will for causing said coins to take either of two paths.

34. In a telephone pay station, means for forwarding coins of different denominations, means to receive simultaneously several of such coins, and means for causing said coins to take different paths.

35. In a telephone pay station, a device to simultaneously receive coins of different denominations, means for forwarding such coins to said device, signal means operable by the coins, and means for operating said device to cause the coins thereon to take different paths.

36. In a telephone pay station, a device adapted to simultaneously receive and support a plurality of coins of different denominations, and means to simultaneously cause the coins thereon to simultaneously all follow one path or to simultaneously all follow a different path.

37. In a telephone pay station, means for forwarding coins of different denominations, a device for receiving and temporarily supporting said coins in superimposed relation, and means operable at will for releasing said coins.

38. In a telephone pay station, means for supporting a plurality of coins of different denominations in superimposed relation, and means for causing all the coins to take one path or all of them to take a different path at will.

39. In a telephone pay station, means for forwarding coins of different denominations, signal means operable by the coins, a device to receive several of the coins simultaneously, and means to cause the coins to travel one path or a different path at will, after the same have been received by said device.

40. In a telephone pay station, means for forwarding coins of different denominations, signal means operable by the coins to produce signals of different characters, a device to simultaneously receive several of the coins after the operation of the signal means, and means to cause all the coins to travel one path or a different path at will.

41. In a telephone pay station, circuit connections, mutually-dependent circuit controlling devices for the circuit of which said connections form a part, one of said devices being coin-operable, a shiftable coin-receiving device, and means for normally locking said shiftable coin-receiving device against movement.

42. In a telephone pay station, circuit connections comprising two breaks, a pair of devices simultaneously effective for closing said breaks one of them being operable by the act of a subscriber and the other by a coin, a shiftable coin-receiving device, and automatically-operative means for normally locking said shiftable coin-receiving device against movement.

43. In a telephone pay station, a shiftable coin-receiving device, a segment, and a coin-operated locking arm normally engaging the segment to prevent movement of said shiftable coin-receiving device.

44. In a telephone pay station, a shiftable coin-receiving device, a weighted arm constituting a locking device, and a relatively fixed part engageable by said arm to normally prevent movement of said device, the arm being coin-operable.

45. In a telephone pay station, circuit-connections, means whereby a plurality of acts are necessary to secure control simultaneously of said circuit connections, coin-

operated signal means for sounding signals of different characters, means for shifting the coins along different paths, and means for preventing the coins from following one path when they are directed toward the other path.

46. In a telephone pay station, coin operated means for sounding signals of different characters, means for receiving the coins after their operation of the signal means, means for causing the direction of the coins along different paths, and means for preventing the coins from following one path when they have been directed toward the other path.

47. In a telephone pay station, coin-operated means for operating signals of different characters, means for receiving the coins, means for causing them to follow different paths, and means for preventing the coins from taking one path when they have been directed toward the other path.

48. In a telephone pay station, circuit connections, coin-operable means for controlling the circuit of which said connections form a part, coin-operable means for sounding signals of different characters, a telephone transmitter in resonant connection with the signal means, a device to receive the coins, means for causing the coins to all follow one path or all follow a different path, and means for preventing the coins from taking one path when they have been caused to take the other path.

49. In a telephone pay station, a device for supporting a plurality of coins in superimposed relation, means for shifting the said device and causing the coins to all take one of two different paths, and means for positively preventing any one of the coins from taking one of said paths when directed toward the other.

50. In a telephone pay station, means for forwarding coins of different denominations, means for supporting said coins in superimposed relation, means for causing the coins to simultaneously take either of two different paths, and means for positively preventing any one coin from following one of said paths when directed toward the other.

51. In a telephone pay station, means operable at will for causing the action of a signal, a telephone transmitter, audible coin-operated signal means in resonant connection with said transmitter and operable by coins of different denominations, means for temporarily retaining the coins in superimposed relation after they have operated said signals, and means operable at will for releasing said coins.

52. In a telephone pay station, a telephone transmitter, a plurality of signals of audible type in resonant connection with said transmitter and operable by coins of different denominations, means for retaining temporarily the coins after they have operated said signal means, and means operable at will for directing the coins along different paths.

53. In a telephone pay station, a plurality of signals each coin operable and adapted for sounding signals of different characters, a telephone transmitter in resonant connection with said signals, a rocking device to support the coins after they have operated said signals, means for operating said rocking device in opposite directions from its coin-receiving position, and means for positively restoring said rocking device to its coin-receiving position after it has been shifted.

54. In a telephone pay station, a shiftable coin-supporting device, means for operating said shiftable coin-supporting device to cause a coin thereon to take different paths, and means at opposite sides of the coin-supporting device for preventing said coin from taking one path when it has been directed toward the other path.

55. In a telephone pay station, a shiftable coin-supporting device mounted for oscillation, means for oscillating said coin-supporting device in opposite directions, and separate devices one active for preventing the coin taking one path when shifted along the other path and the other of which is active for preventing said coin from following a path taken by the other coin.

56. In a telephone pay station, a telephone transmitter, means for producing audible signals by the action of coins of different denominations and in resonant connection with said transmitter said signals being of different character, means for temporarily retaining the said coins of different denominations after the signal means have been operated, means for directing the coins in a group along different paths, and means for preventing any one coin in one group from following a path different from the remainder thereof after said group has been directed along a predetermined path.

57. In a telephone pay station, a receptacle comprising shiftable sections and a shiftable closure for said receptacle the closure when in its normal position being adapted to retain a coin in said receptacle and being movable in opposite directions from said normal position to discharge a coin therefrom in different directions, one section being movable when the coin is caused to follow one path, and the other section being movable when the coin is caused to follow the other path.

58. In a telephone pay station, a coin-receptacle comprising swinging sections, and an oscillatory closure therefor, the closure

being adapted when in its normal position to retain a coin in the receptacle and being shiftable oppositely from said normal position to discharge a coin therefrom in different directions, one section of the coin-receptacle being adapted to swing when the coin is caused to follow one of said directions and the other being adapted to swing when the coin is caused to follow the other of said directions.

59. In a telephone pay station, a coin-receptacle comprising shiftable sections, a shiftable closure for said receptacle adapted when in its normal position to retain a coin in said receptacle and shiftable from said normal position to different positions, one section of the receptacle being adapted to move when the closure is shifted one way and the other section being adapted to move when the closure is shifted the other way, and means for positively holding one of the sections against movement during the movement of the other.

60. In a telephone pay station, a coin-receptacle comprising shiftable sections and a shiftable closure therefor, the closure being adapted when in its normal position to retain a coin in said receptacle and being shiftable in opposite directions to direct the coin along different paths one of the sections of the receptacle being adapted to move when the closure is moved in one direction and the other being adapted to move when the closure is shifted in the other direction, and means for positively preventing each section from movement when the companion section is being shifted.

61. In a telephone pay station, a coin-receptacle comprising a body section mounted for shifting movement and a closure for the receptacle also mounted for shifting movement and adapted when in its normal position to retain a coin in said receptacle, said shiftable body section being adapted to move on the movement of the closure.

62. In a telephone pay station, a coin-receptacle comprising a body section mounted for shifting movement, a closure for the receptacle adapted when in its normal position to retain a coin in said receptacle, the closure and shiftable body section being capable of movement together, means for directing a coin into said receptacle, and signal means operable by the coin.

63. In a telephone pay station, a coin-receptacle comprising shiftable sections, and a closure for retaining a coin in said receptacle when in the normal position thereof and shiftable oppositely from said normal position to discharge the coin in one or the other of different directions, and means operative with the closure for holding both sections against movement when the closure is in its normal position and for holding one section against movement when the closure is shifted to discharge a coin in one of said directions.

64. In a telephone pay station, a coin-receptacle comprising swinging sections, and a swinging closure therefor adapted when in its normal position to retain a coin in said receptacle, and means for locking both sections against movement when the closure is in its normal position and for locking one section against movement and releasing the other section when the closure is swung in one direction and for reversing said relation when the closure is swung in the opposite direction.

65. In a telephone pay station, circuit connections comprising a magnet and a pair of contacts one of which is electrically connected with said magnet, coin-operated means for causing one of the contacts to engage the other, means for moving the coin away from the place at which it causes the engagement between said contacts, and independent and automatically operative means for continuing the engagement between said contacts.

66. A telephone pay station comprising circuit connections, mutually-dependent devices for controlling the circuit of which said connections form a part and one of which is coin operable, a device to temporarily retain the coin, means for effecting the discharge of the coin from said device, and means for maintaining the circuit during the discharge of the coin.

67. A telephone pay station comprising circuit connections, mutually dependent devices for controlling the circuit of which said connections form a part and one of which is coin-operable, signals operable by coins of different denominations, means to temporarily retain the coins after they have operated the signals to thereby maintain the said circuit, means for releasing the coins, and means for maintaining the circuit after the coins have been released.

68. A telephone pay station comprising circuit connections having two breaks, mutually dependent devices for closing the breaks and one of which is coin operable, means to retain the coin temporarily in position where it can close the break governed thereby, means for releasing said coin, and means for closing the break governed by said coin after the latter has been released.

69. In a telephone pay station, a receptacle having a movable closure, circuit connections comprising a magnet and a pair of contacts one of which is connected with said magnet, said movable closure being coin operated and having means for causing one of said contacts to engage the other, means for operating said closure to cause the same to discharge a coin thereon and thereby free the contact member which said closure operates, and means for causing the contact thus con-

trolled to engage the companion contact independently of the closure and during the time the latter is discharging its coin.

70. A telephone pay station, comprising circuit connections, means whereby separate acts are required to control the circuit of which said connections form a part, and means for effecting the action by coins of different denominations, of signals of different characters.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE A. LONG.

Witnesses:

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JOHN C. ANDREWS.

G. A. LONG.

AUTOMATIC TELEPHONE PAY STATION.

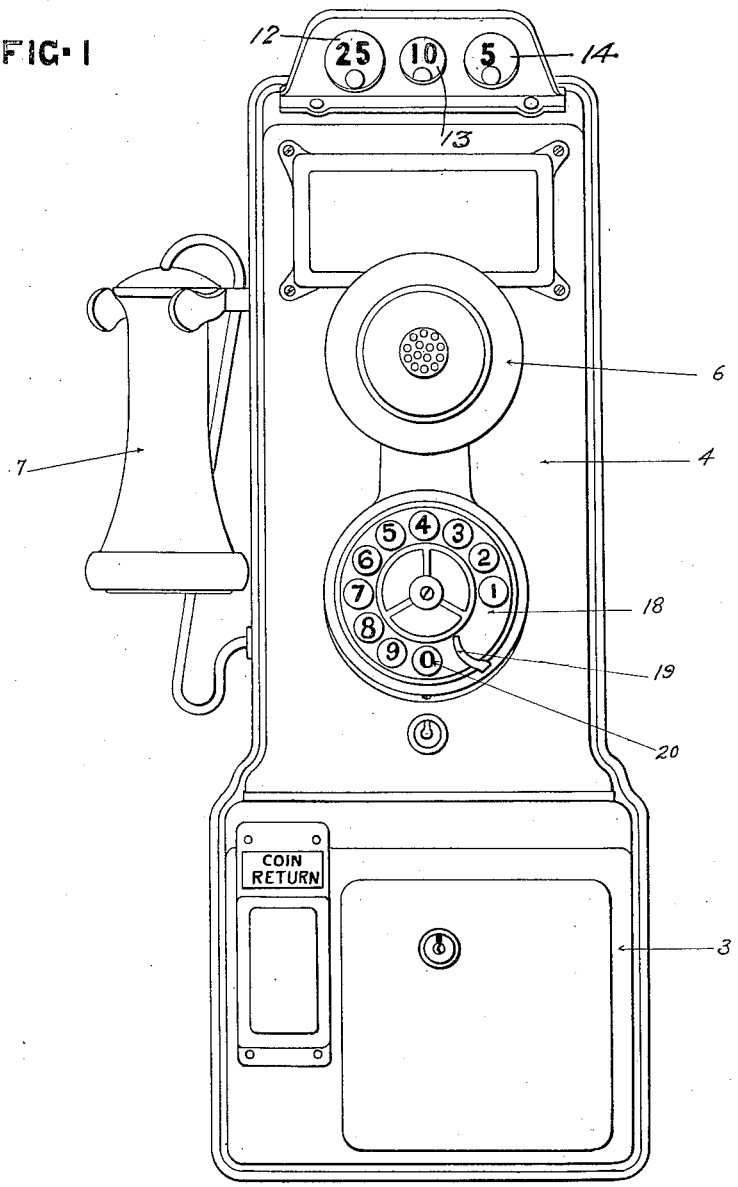
APPLICATION FILED MAY 25, 1920.

1,383,472.

Patented July 5, 1921.

4 SHEETS—SHEET 1.

FIG. 1



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AUTOMATIC TELEPHONE PAY STATION.

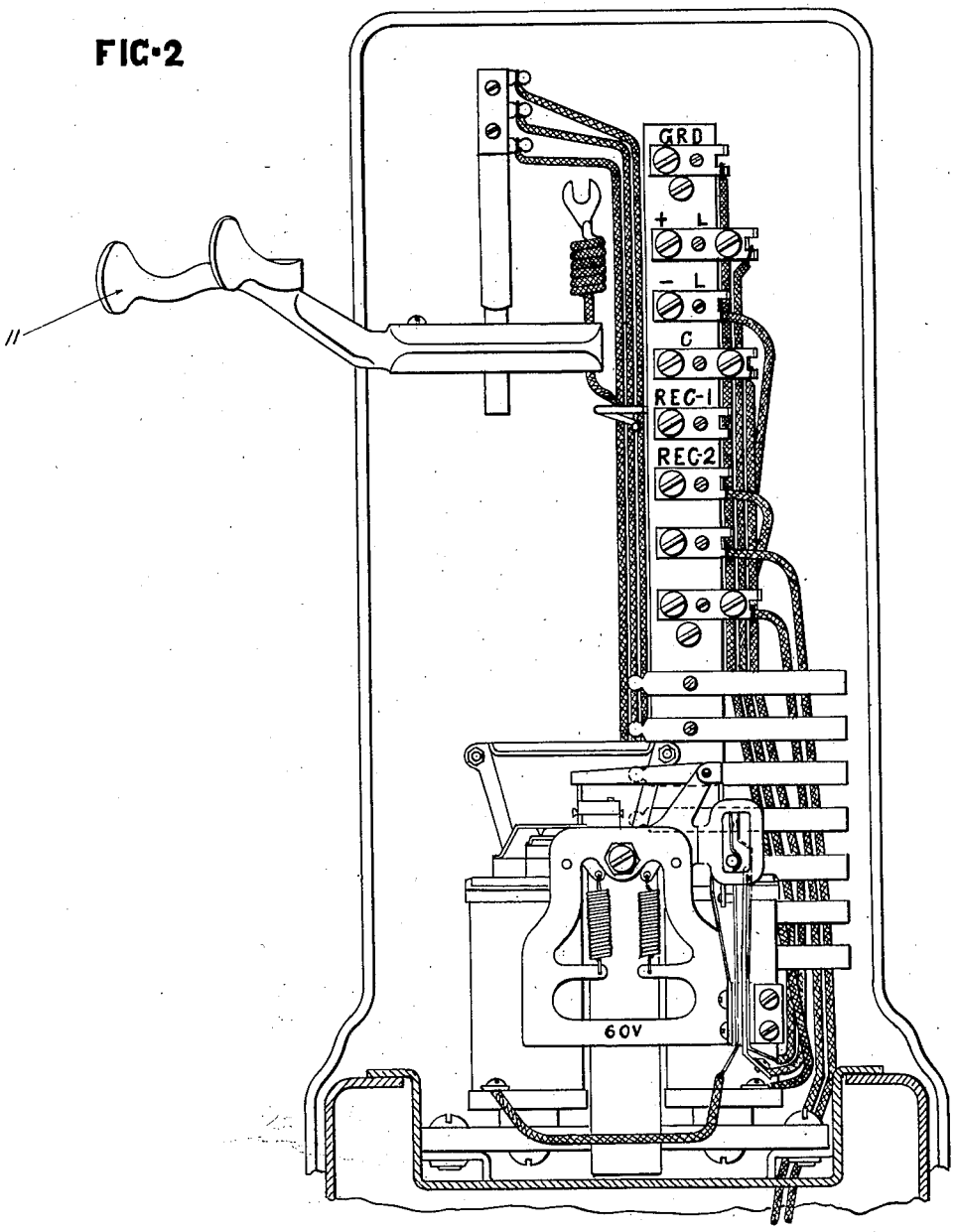
APPLICATION FILED MAY 25, 1920.

1,383,472.

Patented July 5, 1921.

4 SHEETS—SHEET 2.

FIG·2



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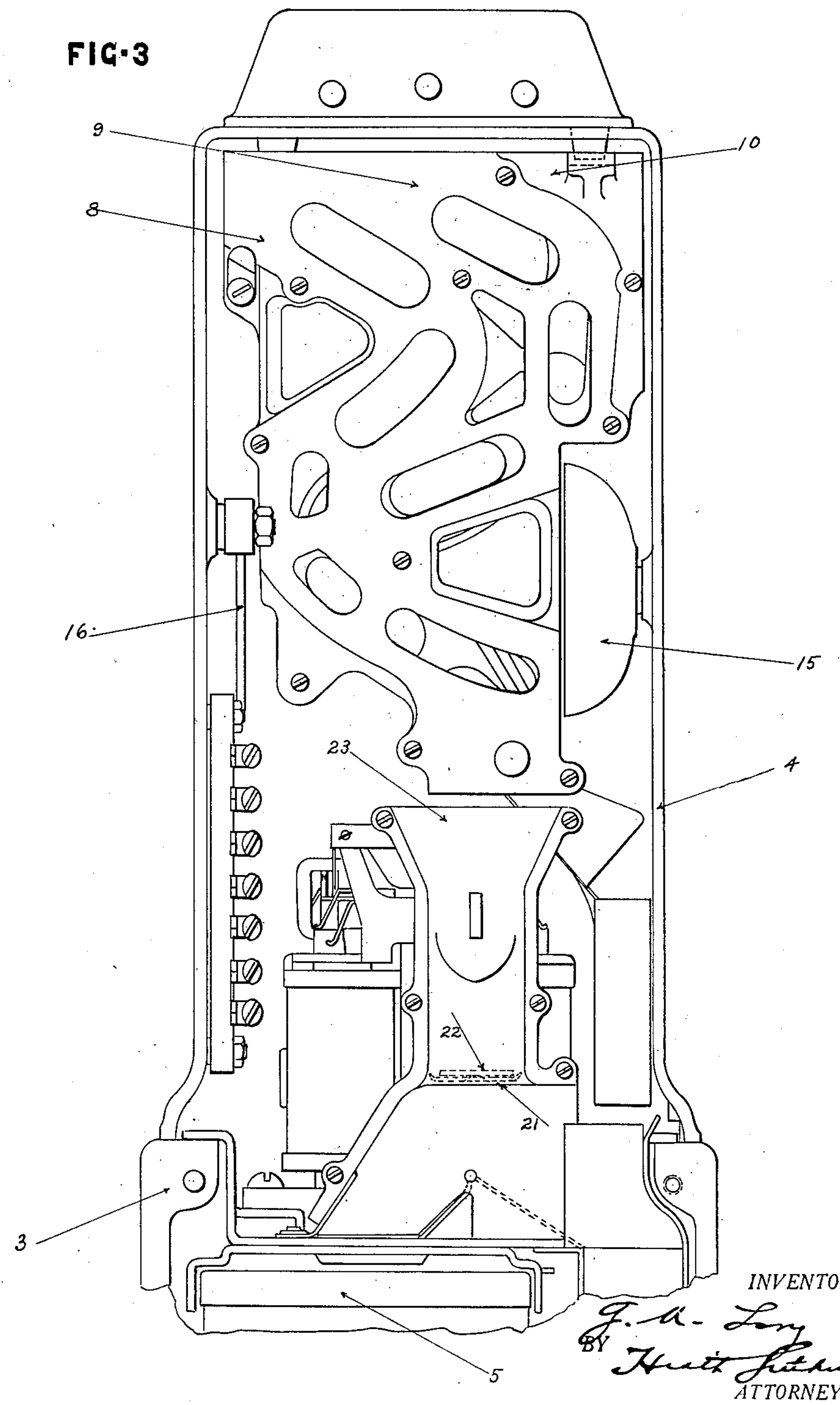
AUTOMATIC TELEPHONE PAY STATION.
APPLICATION FILED MAY 25, 1920.

1,383,472. Patented July 5, 1921.

4 SHEETS—SHEET 3.

FIG-3



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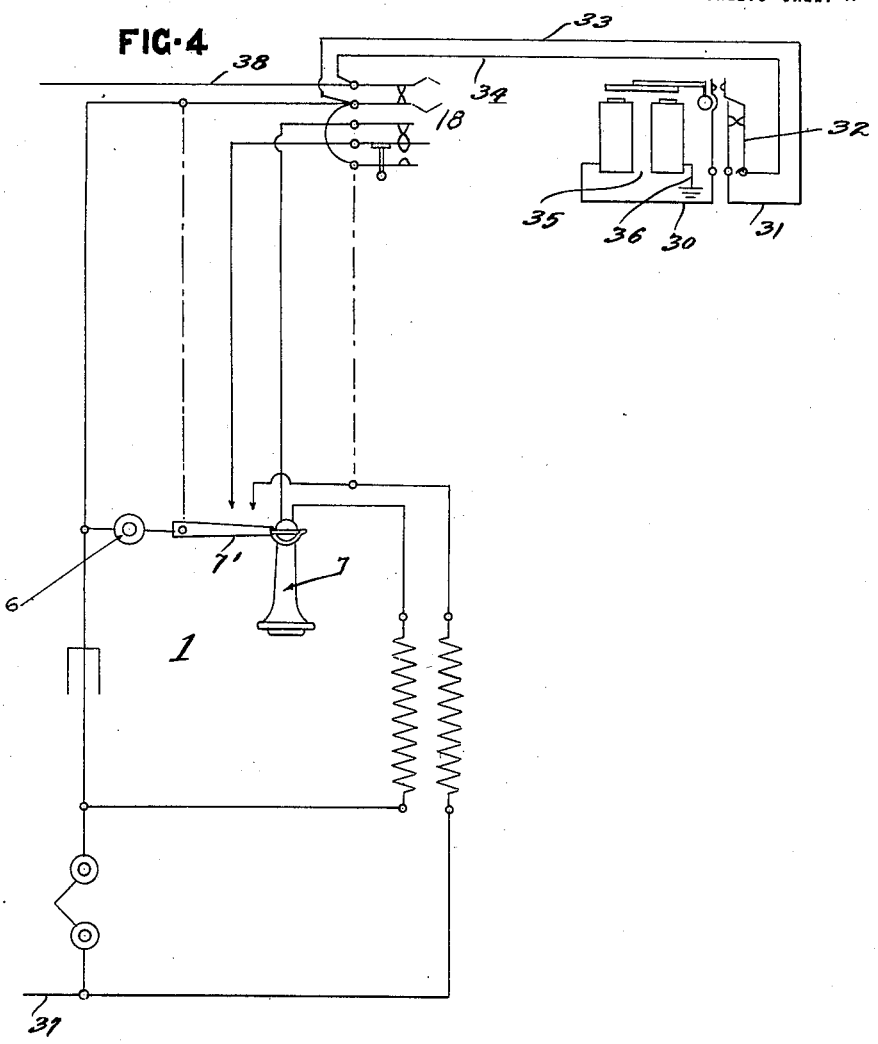
AUTOMATIC TELEPHONE PAY STATION.

APPLICATION FILED MAY 25, 1920.

1,383,472. **Patented July 5, 1921.**

4 SHEETS—SHEET 4.

FIG. 4



INVENTOR.

J. A. Long

BY Watt Sutherland

ATTORNEY

UNITED STATES PATENT OFFICE.

GEORGE A. LONG, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE GRAY TELEPHONE PAY STATION COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

AUTOMATIC TELEPHONE PAY-STATION.

1,383,472. Specification of Letters Patent. Patented July 5, 1921.

Application filed May 25, 1920. Serial No. 384,047.

To all whom it may concern:

Be it known that I, GEORGE A. LONG, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Automatic Telephone Pay-Stations, of which the following is a specification.

This invention relates to an automatic telephone pay-station. In Letters Patent 917,742 issued to me April 6, 1909, is shown described and claimed a telephone pay-station. The pay-station of said patent is controlled in part by an operator at a central station. The pay-station involved in the present case, is automatic in character; that is to say there is no operator at central to connect one local subscriber with another. It is the primary purpose of my present invention, to provide means which are effective and certain in action and simple in construction, by which an automatic telephone can be permitted to operate, so that one subscriber through the intervention of proper means may communicate with another local subscriber without the aid of a central operator, yet which will provide for the accurate collection of long distance toll charges when such collection is necessary, this being accomplished by an operator at a central station. In other words, I provide means by which a telephone can exercise all its automatic functions so as to enable one local subscriber to converse with another local subscriber without the intervention of a central office operator, yet, which however, has provision for the collection of toll for the transmission of a message between distant points. It might, therefore be proper to consider that I have adopted the title given somewhat as a matter of convenience and possibly more so, because the improvement was primarily and especially intended for incorporation in or association with an automatic telephone pay-station. In an automatic telephone pay-station there is a dial or equivalent member through the agency of which a local subscriber can effect automatically connection, with another local subscriber in the making of a local call. It should be noted that this designation "dial" is used in a general sense to include equivalent means for the same purpose. The dial also has means by which a subscriber can converse with a long distance operator to signify to her that such a call is to be made. To carry this proceeding into effect, it is not necessary to deposit a coin. It requires the depositing of a coin or coins or some token or tokens possessing money value, when a subscriber desires to make a toll call. When the proper amount has been deposited into the machine for the transmission of this long distance call, the subscriber will be given his toll connection by central.

In the drawings accompanying and forming a part of the present specification I have shown in detail one of the several forms of embodiment of the invention, which to enable those skilled in the art to practise the same will be set forth fully in the following description. I am obviously not restricted to this showing. I may depart therefrom in several respects within the scope of the invention defined by the claims following said description.

Referring to said drawings:

Figure 1 is a front elevation of an automatic pay-station telephone involving the invention.

Fig. 2 is a front elevation of the upper part of the station with the face plate removed and showing portions in section, the chutes being removed.

Fig. 3 is a rear view with parts in section of the station, the lower portion being removed.

Fig. 4 is a diagram of certain circuit connections.

Like characters refer to like parts throughout the several views which are on different scales.

A telephone pay-station as will be apparent involves a telephone 1 having a receiver and a transmitter. In addition to this, there is a casing in which the operative parts of the station or at least the majority of them are generally housed. This casing or housing may vary in character. That shown comprises a base portion as 3 and an upper portion as 4. The coin box or drawer 5 is generally situated in the base portion, the upper portion 4 carrying the telephone transmitter 6 and the telephone receiver 7, the latter being normally sustained by a hook 11 supported within the upper portion 4 and the forked end of which normally receives between its branches the receiver 7. The chute structure intended for the delivery of coins or their equivalents, is mounted

in the upper portion 4 of the casing or housing, as I will later explain. This chute structure is intended for the delivery of coins of different denominations. The chute is of "compound type" and may for instance be of the same general character as that shown in Letters Patent No. 912,389, granted to me February 16, 1909 and to which reference may be had. The chute structure involves a chute or run-way as 8 for the reception and transmission of nickles, a chute 9 for dimes, and a chute or run-way as 10 for the transmission of twenty-five cent pieces. The coins are introduced into the upper or receiving ends of the chutes 8, 9 and 10 through proper openings 13, 14 and 12 as shown for instance in Letters Patent No. 1,188,666 granted to me June 27, 1916 and to which reference may also be had.

It will be clear that in making a long distance call, a central office operator needs to be apprised of the introduction of a coin or coins into the station and this is shown by means of signals. The signals may be of any convenient character. Desirably they are audible consisting of the sounds from a bell or gong in resonant connection with the transmitter 6. This resonant connection between an audible signal such as a bell and a transmitter is fully shown for instance in the first mentioned Letters Patent granted to me. The signal 15 is in the form of a bell while that 16 is in the nature of a gong. This is fully disclosed in the first of the patents which I have already identified. It is common, as will be clear, that a nickel in traversing its chute or run-way 8 will strike the bell 15 once, while a dime 9 will strike the same bell twice, the quarter in traversing its chute or run-way 10 hitting the gong 16 once. It is of course not always necessary to employ coins because other means such as checks, may be utilized to obtain the same effects. It is conceivable in fact that audible signals may not always be employed yet they are desirable as I have found after long practice.

The telephone station is provided on its front with what is known as a dial as 18. This dial has holes or perforations from 1 to 9 inclusive and 0, read anti-clock-wise. The connections between the dial and the subscriber's telephone set requires no detailed description as the same do not necessarily constitute a part of the invention.

Normally the telephone 1 as a unit is inoperative and inactive and obviously the same observation applies to the dial 18. Before the telephone and the dial associated therewith can be made operative it is imperative that a coin or token of proper nature be inserted into the pay-station. It will be assumed that one of these stations is set up and that a subscriber wishes to make a local call. As I have observed the mere taking off the receiver from its hook will not do this. Before the telephone can be made to function, it is imperative that a coin or its equivalent be introduced. As a necessity also the receiver must be taken from its hook. After the coin has passed through its run-way it is directed into the coin hopper 23 which is usually furnished with a tilting bottom plate 21. As the coin comes to rest on this bottom plate contact is made through the weight of the coin which cuts the telephone instrument into circuit. After the coin has performed its function to make the telephone instrument operative, the subscriber will step up his connections through the manipulation of the dial 18. If the party called responds in the usual manner by taking his receiver from its hook, the coin 22 will be automatically released from the bottom plate 21 of the hopper 23 where it had been at rest and discharged directly into the cash drawer 5 of the calling subscriber's station. This procedure represents a completed local call. If on the contrary the desired local connection cannot be had due to the fact that the called party did not remove his receiver from its hook, the calling subscriber upon hanging up his receiver will bring about the release of the coin from its position of rest on the bottom plate 21 of the coin hopper which thereby causes the return of the coin to the outside of the pay-station where it can be recovered by the subscriber.

It will be assumed that the subscriber after having inserted a coin into the instrument desires to make a local call for instance that bearing the number 123. After the coin has been deposited in the manner set forth, he puts his finger into the hole bearing the number 1 and turns the dial until his finger strikes the stop 19, when the dial is freed and is automatically returned to its initial position. This same action is repeated with numbers 2 and 3, as may be known.

When a call is desired for a distant point, the subscriber will insert his finger into the long-distance opening 20 (Fig. 1) and will turn the dial 18 around until further movement is arrested by the stop 19. This will automatically connect the subscriber with the central office operator, no coin being necessary to initiate a long distance call. This is made possible by the reversal of the central office connections terminating at such points as are intended to be without charge. It applies to police, fire, hospital and similar calls. It will be understood of course that on all local calls, other than free calls, the subscriber must deposit a coin before the desired connection can be made. Local free calls can be had without the deposit of a coin as I have already indicated.

When a party desires a long distance call he will turn his dial 18 around in the manner in which I have indicated. This will indicate to the central office operator that the subscriber desires a toll call. The central operator will then instruct the subscriber as to the amount to be inserted into the machine. The coins will then be introduced in the manner shown in the Letters Patent first mentioned herein. The central office operator then instructs the subscriber to hang up his receiver 7 and tells him that she will advise him when his long distance party is in readiness for conversation. If she finds this distant party can be had she throws a key marked collect and the money will travel to the cash drawer 5. If she cannot get the called distant party she will throw a key marked refund and the coins will be returned to the subscriber in the manner first shown in my first Letters Patent. It will be thus evident that an operator can collect toll charges in advance to the service being rendered.

The present application is generally speaking along the lines of that filed by me August 5, 1919 under Serial No. 315,406. The present apparatus however differs strikingly from that disclosed in said other application in a number of particulars to which I have hereinbefore referred fully. The most striking difference is in the fact that the telephone as a unit and the calling dial associated therewith are inoperative by a local subscriber to make a call to another local subscriber. Before this call can be made it is necessary that a coin or its equivalent be introduced into the station and such coin or like thing will cut the subscriber's set into full function so that the calling party can dial up the number he wishes and when the called party responds, conversation will proceed in the usual manner. If for any reason the called party does not respond, the line being in use or for other reasons, the coin will be automatically returned to the calling subscriber.

In Fig. 4 I have shown the connections at the subscriber's station by which the coin-operated means can render the telephone operative and which will also render operative the calling dial so that the subscriber can make a local call to another subscriber. The coin-operated means in this case is set in action through a token usually a nickel which is the general toll for a local call. This coin therefore when dropped into the station renders the telephone operative and also renders the calling dial 18 operative. Normally therefore both the telephone and the calling dial are inoperative this relation in fact being shown in said Fig. 2 as well in Fig. 1. To render the telephone operative and the calling dial also operative for the purpose of making a local call to another subscriber, it is necessary to drop as I have observed a nickel into the machine. As I have stated in said Fig. 4, 6 denotes the transmitter, 7 the receiver on its hook 7′ and 18 the dial with sufficient connections therebetween to illustrate the action. When therefore a party desires to make a local call he inserts into the machine a nickel. This coin travels along the chute 10 although it operates the bell 15 (Fig. 3) on such traverse, nothing is accomplished by the ringing of the bell. The nickel will emerge from the chute 10 but as it travels along the chute it renders the telephone operative and the calling dial also operative. In its traverse along the chute it goes into the hopper. As the coin drops into the hopper it operates a trip which in turn operates a spring contact as 30. The operation of the spring contact 30 causes said spring contact to engage against the spring contact 32 and also opens connections between the contacts 31 and 32. These several contacts 31 and 32 are multiplied to the impulse springs of the dial 18 as by the wires 33 and 34. When this action takes place this renders the dial 18 active. The contact or the connection made by operation of spring contacts 30 and 32 also connects the coin collector 35 to the line wire 34. The coin collector 35 has a ground connection 36 which establishes a connection for the operation of a line relay in the central office for calling and also a means for the collecting and refunding of money. After the party has dropped his coin in the chute 10 and the spring contacts 30 and 32 have been brought together, the subscriber raises the switch hook 7′ by taking the receiver 7 thereoff. The transmitter 6 is immediately connected to the line circuit by the wires 37 and 38.

What I claim is:

1. A telephone pay-station comprising a telephone having a transmitter and a receiver, the station also involving a calling dial associated with the telephone, the telephone being normally inoperative by a subscriber for the transmission of intelligence to another subscriber, coin operated means at the station, for rendering the telephone operative and for rendering the calling dial operative to make a local call to said other subscriber, and means for effecting the action, by coins of different denominations, of signals of different characters.

2. A telephone pay-station comprising a telephone having a transmitter and a receiver, the station also involving a calling dial associated with the telephone, the telephone being normally inoperative by a subscriber for the transmission of intelligence to another subscriber, coin operated means at the station, for rendering the telephone operative and for rendering the calling dial

operative to make a local call to said other subscriber, and means for effecting the action by coins of different denominations, of audible signals of different characters.

3. A telephone pay-station comprising a telephone having a transmitter and a receiver, the station also involving a calling dial associated with the telephone, the telephone being normally inoperative by a subscriber, for the transmission of intelligence to another local subscriber, coin operated means at the station, for rendering the telephone operative and for rendering the calling dial operative to make a local call to said other subscriber, and means for effecting the action by coins of different denominations, of audible signals of different characters, said audible signals being in resonant connection with said transmitter.

4. A telephone pay-station comprising a telephone having a transmitter and a receiver, the station also involving a calling member associated with the telephone, the calling member being normally inoperative and the telephone being also normally inoperative, by a subscriber for the transmission of intelligence to another local subscriber, coin operated means at the station, for rendering the telephone operative and for rendering the calling member operative to make a local call to another subscriber, and means for effecting the action by coins of different denominations, of signals of different characters for transmission by the telephone to central.

5. A telephone pay-station comprising a telephone having a transmitter and a receiver, the station also involving a calling member associated with the telephone, the calling member being normally inoperative, and the telephone being also normally inoperative by a subscriber for the transmission of intelligence to another local subscriber, coin operated means at the station, for rendering the telephone operative and for rendering the calling member operative to make a local call to another subscriber, and means for effecting the action by coins of different denominations, of audible signals in resonant connection with the transmitter of said telephone.

In testimony whereof I affix my signature.

GEORGE A. LONG.

In presence of—

HIRST SUTHERLAND,

ELSIE M. RABENSTEIN.

Oct. 7, 1924. 1,510,893

G. A. LONG

TELEPHONE PAY STATION

Filed Nov. 24, 1923

FIG. 1.

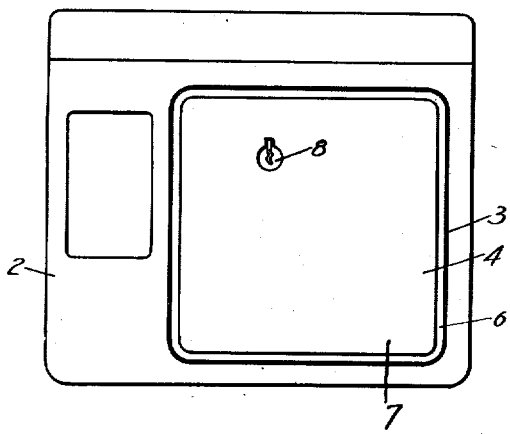


FIG. 2.

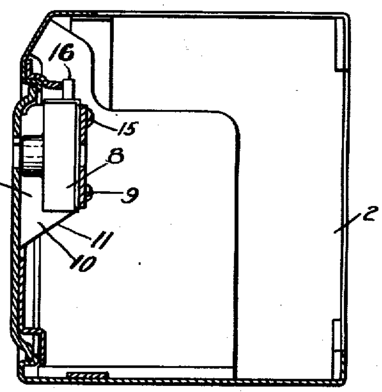


FIG. 3.

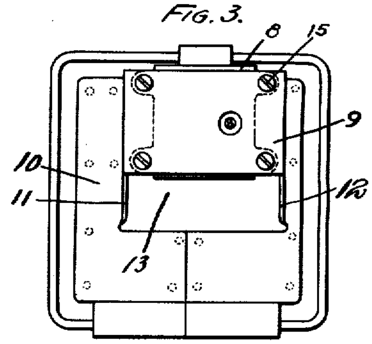


FIG. 4.

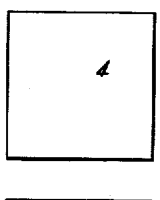


FIG. 5

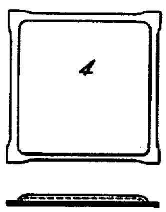


FIG. 6.

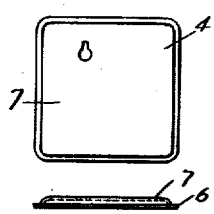


FIG. 7.

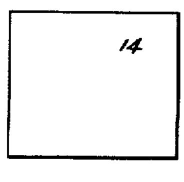


FIG. 8

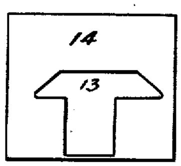


FIG. 9.

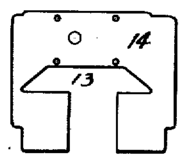


FIG. 10

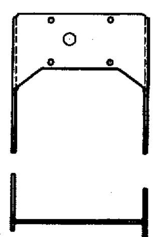


FIG. 11.

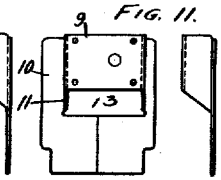


FIG. 12.

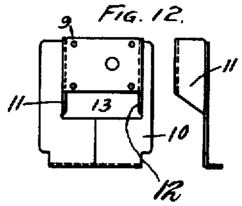
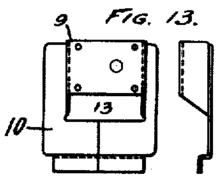


FIG. 13.



INVENTOR

G. A. Long

ATTORNEY

Patented Oct. 7, 1924. 1,510,893

UNITED STATES PATENT OFFICE.

GEORGE A. LONG, OF HARTFORD, CONNECTICUT, ASSIGNOR TO GRAY TELEPHONE PAY STATION COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

TELEPHONE PAY STATION.

Application filed November 24, 1923. Serial No. 676,730.

To all whom it may concern:

Be it known that I, GEORGE A. LONG, citizen of the United States of America, residing at 32 Lorraine Street, Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Telephone Pay Stations, of which the following is a specification.

This invention relates to telephone pay stations. A large number of these stations is found in the United States Patent Office and they are made by the Western Electric Company and the Gray Telephone Pay Station Company. Both concerns are so far as I am aware the only ones engaged in this business. Letters Patent No. 917,742 shows a type of such telephone pay station. In recent years it has been quite a common thing for evilly inclined persons to commit depredations upon these instruments. Among other things they push off the locks and break out the front of the money boxes. Among the many important objects I have in view are the provision of means simple in construction and effective in action and by which the injury to articles of the character set forth is practically reduced if not altogether eliminated.

In the drawing accompanying and forming part of the present specification, I have illustrated in detail a form of telephone pay station, which involves the invention, and will hereinafter set forth the invention. I am not restricted to such showing. I may depart therefrom in a number of particulars within the scope of the invention. As a matter of fact, the invention involves certain methods or procedures which will also be set forth.

Referring to said drawing:

Fig. 1 is a front elevation of the coin portion of such a structure.

Fig. 2 is a sectional side elevation looking toward the left.

Fig. 3 is a rear elevation of the lock carrier door with the lock thereon.

Figs. 4, 5 and 6 are respectively collective views of the front member of the door in successive stages of the production.

Figs. 7 to 13 inclusive represent respectively collective views of the rear member of the door in successive stages of its production.

Like characters refer to like parts throughout the several views.

In a number of United States Patents issued to me and especially in Patent No. 912,389 of February 16, 1909 and to which reference may be had, I show a structure involving a coin box and above which three chutes are arranged. The three chutes accommodate respectively nickels, dimes and quarters in their descent toward the coin box that give various characters of audible signals, which are distinct from each other and which are transmitted to the central office operator. In the present case I show in Figs. 1 and 2 such a coin box 2 which has an opening 3 to receive the coin drawer and which is usually held under lock and key. In the opening 3 fits a door, as 4, the corners of which, as shown by Figs. 1 and 6, are rounded. In addition to this the door has on its front and near its edge the bead 6 of rectangular and continuous formation, as shown best in Fig. 1. The bead has from its inner side the wall 7. This type of structure, which is represented in Figs. 2 and 6, makes one which is quite difficult to remove by the aid of punches as evil inclined persons have been able to do in the past with ease.

A lock such as answers my purpose in preventing wrongful opening of the door is that denoted in a general way by 8 and mounted between the body 9 of a plate 10, having depending legs 11 and 12 and which is fitted in the opening 13 of the plate 14 attached by welding, as 15, to the front plate or door 4. The lock has a bolt 15, Figs. 2 and 4, which when in active relation is engaged by the keeper 16 on the front of the box or body 3.

The lock, as explained, is carried by the body 9 to which it is united by welding, as indicated in Figs. 9 to 14 inclusive.

Prior to the present structure it was not a difficulty to pry off the lock 8 but by mounting it other than on the plate 4 considerable difficulty is attended.

What I claim is:

1. A telephone pay station comprising a

coin box having an opening, a door to fit the opening, a plate attached to the door and carrying a lock at the top and a toe at the bottom bearing against the inside of the under edge of said opening.

2. A telephone pay station comprising a coin box having an opening, a door to fit the opening, a plate attached to the door and carrying a lock at the top and a toe at the bottom bearing against the inside of the under edge of said opening, the door having exteriorly a bead near the outer edge thereof rounded in cross section and of continuous formation.

In testimony whereof I affix my signature.

GEORGE A. LONG.

April 7, 1925. 1,532,706

G. A. LONG

TELEPHONE PAY STATION

Filed Sept. 27, 1924

Fig. 1.

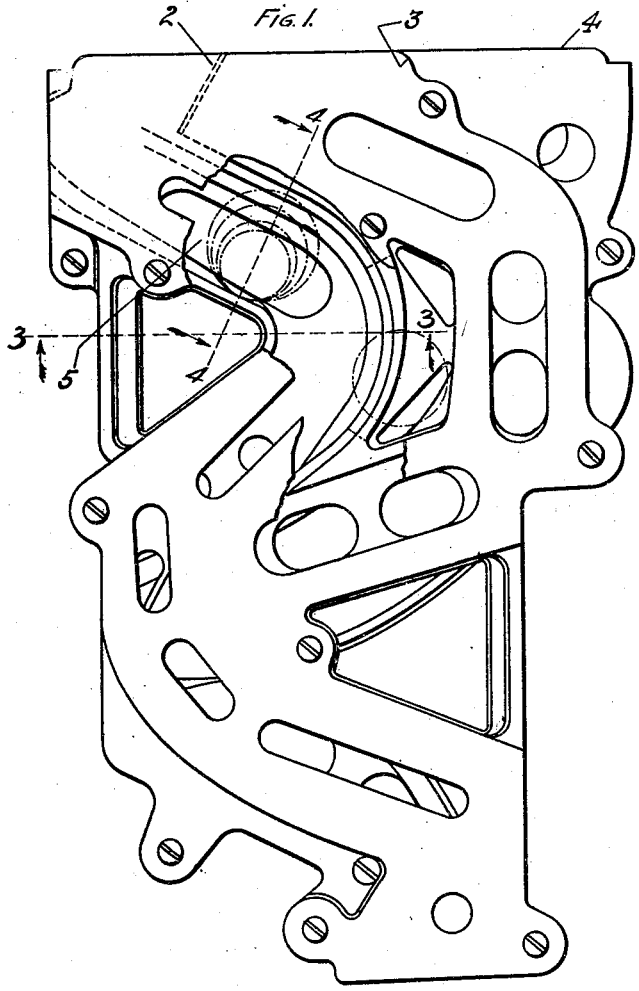


Fig. 4a.

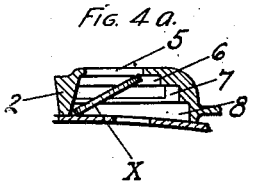


Fig. 4b.

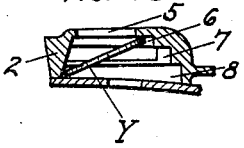


Fig. 4c.

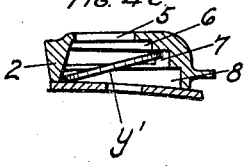


Fig. 4d.

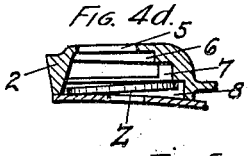


Fig. 5

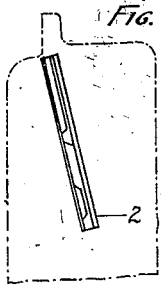


Fig. 2.

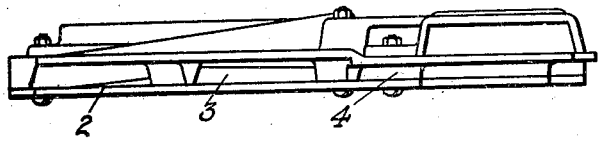
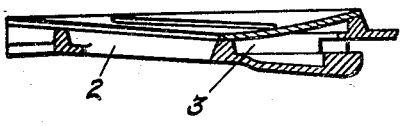


Fig. 3.



INVENTOR

George A. Long

Hugh Fullerton

ATTORNEY

Patented Apr. 7, 1925. 1,532,706

UNITED STATES PATENT OFFICE.

GEORGE A. LONG, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE GRAY TELEPHONE PAY STATION COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT.

TELEPHONE PAY STATION.

Application filed September 27, 1924. Serial No. 740,220.

To all whom it may concern:

Be it known that I, GEORGE A. LONG, citizen of the United States of America, residing at 32 Lorraine Street, Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Telephone Pay Stations, of which the following is a specification.

This invention relates to telephone pay stations and among the principal objects of the invention is the provision of a machine of the character set forth of means of a simple and effective nature for receiving coins of different sizes and in the same chute and which will give a like signal. In a country which I have in mind there is in use two coins of different sizes but of the same denomination. I provide a construction wherein a chute will conduct such coins from the inlet to the discharge end of the chute and will sound a proper signal, the other chutes being of such character as to receive totally different coins.

In the drawing accompanying and forming part of the present specification, I have shown in detail a form of embodiment of the invention which, to enable those skilled in the art to practice the same, will be set forth fully in the following description. I am not restricted to this disclosure. I may depart therefrom in a number of respects within the scope of the invention defined by the claim following said description.

Referring to said drawing:

Fig. 1 is a front elevation of a compound chute involving the invention.

Fig. 2 is a top plan view.

Fig. 3 is a cross section taken in the line 3—3 of Fig. 1 looking upwardly.

Figs. 4^a, 4^b, 4^c and 4^d are cross sections on the diagonal line 4—4 looking in the direction of the arrows in Fig. 1.

Fig. 5 is a top plan view, the dotted outlines illustrating a portion of the casing.

Like characters refer to like parts throughout the several views.

A compound chute is represented in detail in Fig. 1. It comprises, as represented, three auxiliary chutes, as 2, 3 and 4. The invention is primarily directed to one of the member chutes, such as that represented in detail in Figs. 4^a to 4^d inclusive. The chute 2 is intended for the reception and delivery of five-cent pieces and during its transit along the chute 2 the particular coin strikes a bell (not shown) once. A ten-cent piece is introduced into and follows the chute 3 and strikes the same bell twice. A twenty-five cent piece takes the chute 4 and strikes a gong (not shown) once. The idea of a compound chute having chutes for the reception of five-cent, ten-cent and twenty-five cent coins is broadly old, but the invention is, however, inherent in a chute, as 2, which is intended to accommodate different sized coins of the same denomination, usually five-cent pieces. In Canada such coins as of this character are of two sizes and the chute, as 2, is of such nature as to accommodate either sized coin rejecting any other which will enter the chute.

As will be inferred, the chute 2 receives five-cent coins of different sizes and conducts them from the inlet end to the discharge end of the chute, rejecting any other coin which passes through the side slot 5. It will be assumed that a coin of the correct size is inserted in the entering end of the channel 2. It rolls along the channel and is discharged from the delivery end thereof, ringing the bell by contact in its progress along the chute. It will be assumed that a wrong sized coin is inserted in the channel. It rolls along the chute until the slot 5 is reached at which point the wrong coin is discharged through said slot 5. The chute 2 is of serpentine formation, the slot 5 being located in the first portion of the chute 2 so that the wrong coin will be promptly ejected. In the initial part of the chute 2 one side wall as the upper side in Fig. 1 and the right side in Figs. 4^a, 4^b, 4^c and 4^d, has the parallel ridges 6, 7 and 8, the opposite wall being inclined.

It should be noted that the wall of the chute 2 opposite the ridges 6, 7 and 8 is at an inclination or an angle, its surface diverging forwardly so that as a coin is inserted in the chute it is positively tipped by the inclined wall into engagement with the proper ridges 6, 7 and 8.

In Figs. 4^b and 4^c coins Y and Y′ respectively are assumed to be the correct coin. In this event they will engage the ridges 6 and 7 respectively and will follow the chute to its delivery end, ringing the bell in transit. In Fig. 4^d coin Z is assumed to be a wrong coin and will be trapped out of the

escape slot 5. It will be understood that both the wrong and the correct coins engage opposite sides of the chute 2.

What I claim is:

A chute for pay stations having a discharge slot in one side thereof, its top comprising parallel ridges spaced successively at greater distances from the bottom of the chute, said bottom being inclined away from the slotted side of the chute whereby coins of improper sizes are discharged through said slot.

In testimony whereof I affix my signature.

GEORGE A. LONG.

Nov. 8, 1932. G. A. LONG 1,886,409

COIN CONTROLLED ACTUATING DEVICE

Filed April 14, 1932

Fig. 1.

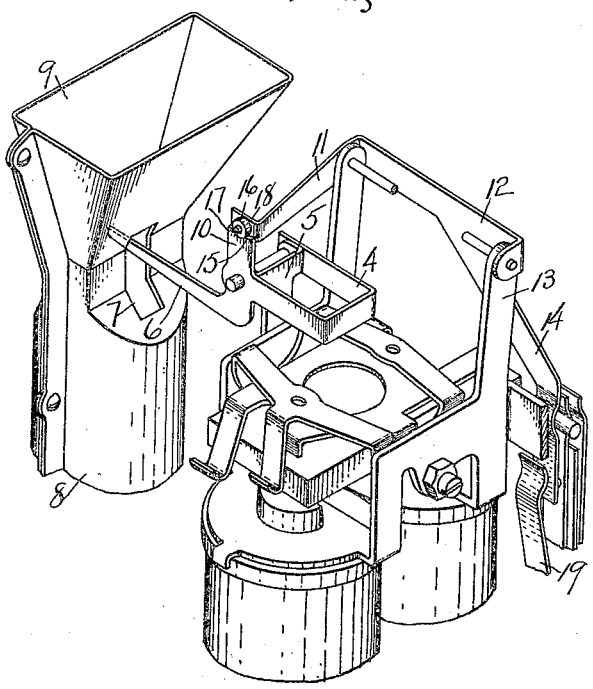
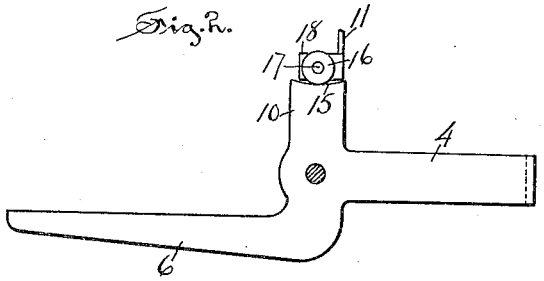


Fig. 2.



INVENTOR

George A. Long,

by

Arthur B. Jenkins,

ATTORNEY

Patented Nov. 8, 1932 1,886,409

UNITED STATES PATENT OFFICE

GEORGE A. LONG, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE GRAY TELEPHONE PAY STATION COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT

COIN CONTROLLED ACTUATING DEVICE

Application filed April 14, 1932. Serial No. 605,177.

My invention relates to devices the operations of which are controlled by means of falling coins and an object of my invention, among others, is the provision in a device of this type of means for preventing fraudulent operation by means other than that of a coin.

One form of a device embodying my invention and in the constructon and use of which the objects herein set out, as well as others, may be attained is illustrated in the accompanying drawing, in which—

Figure 1 is an isometric view on enlarged scale of a portion of a coin controlled telephone apparatus embodying my improvement.

Figure 2 is a view, scale still further enlarged, illustrating the connection between the trip and the switch lever.

While my improved device is not limited in its use to a mechanism of any particular type, yet, as it finds ready adaptation in the operation of coin controlled telephone apparatus I have shown it in the drawing herein as embodied in such a mechanism. In apparatus of this type as heretofore constructed it has been possible to release certain members of the mechanism by jarring blows, or a succession of such blows applied to the case containing the mechanism, and such fraudulent use has frequently been made use of to obtain service without the payment of a toll or fee therefor.

My improved device illustrated and described in the drawing herein is provided with means whereby such fraudulent operation cannot take place, in such drawing the numeral 4 denoting a switch controlled frame, preferably of U-shape, pivotally mounted on the upper end of a supporting post 5 rising from an electromagnet arrangement as commonly employed in apparatus of this sort, and for which reason a detailed description of such mechanism is omitted herein. The frame 4 has a coin actuating finger 6 projecting from one side thereof into a slot 7 in a coin chute 8 having a hopper 9 into which a coin is directed in the operation of the device. A trip 10 in the form of a projection from an upper side part of the frame 4 forms a rest for a lever 11 comprising a portion of a switch actuating frame 12 pivotally mounted at the upper end of posts 13 projecting upwardly from the electromagnet arrangement heretofore referred to. A switch actuating arm 14 projects downwardly from the frame 12 for the purpose of actuating the switch common to devices of this type.

All of the parts thus far described are of old and well known construction and further and detailed description is therefore omitted herein. In applying my improvement to this device I form an inwardly curved edge 15 on the upper end of the trip, this curve being preferably on the arc of a circle, the center of the arc being preferably on a line passing centrally through the trip 10, and as shown in Figure 2 of the drawing. I also provide a roller 16 pivotally mounted on a stud 17 projecting from a laterally bent end 18 of the lever 11, and as shown in Figure 1 of the drawing.

The mechanism is somewhat delicate in its construction, the weight of the coin on the finger 6 being sufficient to overcome the weight of the frame 4 thereby tipping the latter upwardly to release the trip 10 from the lever 11. The weight of the frame 4 is, however, sufficient to return the frame to its normal position when the coin is released from the finger 6. Similarly while the resistance of the spring 19 is sufficient to retain the roller 16 in contact with the indented end 15 of the trip, this resistance is not sufficient to prevent the trip from being readily disengaged from the lever 11 by the weight of a coin.

From this it will be seen that if the frame 4 be moved, as by a jar, to displace the roller 16 from the center of the indentation in either direction, the roller will at once return to its mid-position and it will therefore be impossible, by a succession of jars, to dislodge the roller from the indented edge of the trip and thereby release the lever 11.

In accordance with the provisions of the patent statutes I have described the principles of operation of my invention, together with the device which I now consider to represent the best embodiment thereof, but I de-

sire to have it understood that the device shown is only illustrative, and that the invention may be carried out by other means and applied to uses other than those above set out.

I claim:

1. A coin actuated device including a movably mounted switch actuating member, a movably mounted frame including a coin actuated finger, and a trip having an indented edge comprising a rest at the end thereof for said switch actuating member.

2. A coin actuated device including a movably mounted switch actuating member pressed into contact with a trip, a movably mounted frame including a coin actuated finger, and a trip on said frame having an indented edge comprising a rest for said switch actuating member at the end thereof.

3. A coin actuated device including a movably mounted frame, a coin actuated finger projecting from said frame, a trip borne by said frame and having an indented edge, and a movably mounted switch actuating frame comprising a lever having its end supported in said indented edge of said trip.

4. A coin actuated device including a movably mounted switch actuating member having a laterally bent end, a movably mounted frame including a coin actuated finger and a trip having an indented edge, and a projection from said bent end resting in the indented edge of said trip.

5. A coin actuated device including a movably mounted switch actuating member having a laterally bent end, a roller rotatably mounted on said bent end, a movably mounted frame including a coin actuated finger, and a trip having an indented edge within which said roller is adapted to rest.

GEORGE A. LONG.

Nov. 22, 1932. G. A. LONG 1,888,956

METHOD OF FORMING TELEPHONE PAY STATION BOXES

Filed June 10, 1931

Fig. 1.

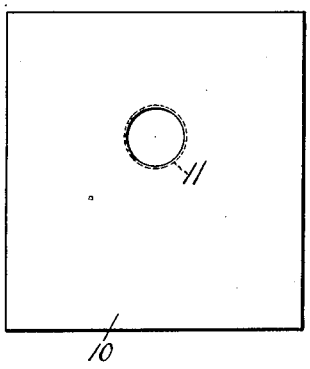


Fig. 2.

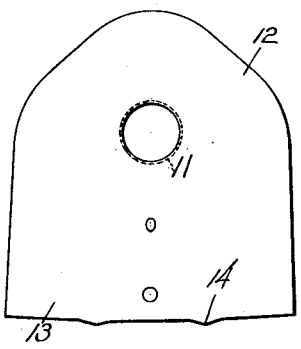


Fig. 4.

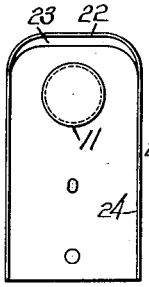


Fig. 6.

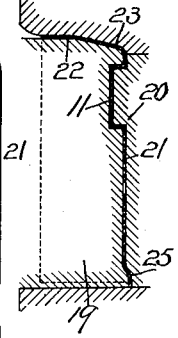


Fig. 3.

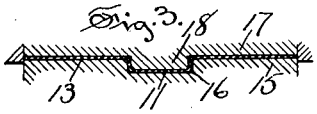


Fig. 5.

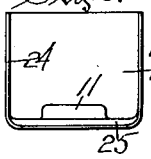


Fig. 7.

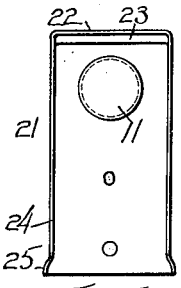


Fig. 10.

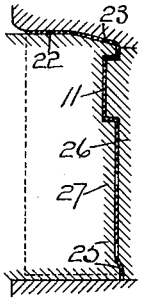


Fig. 11.

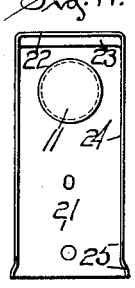


Fig. 13.

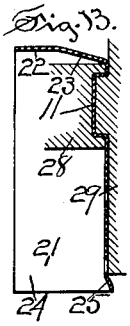


Fig. 14.

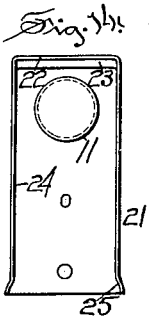


Fig. 16.

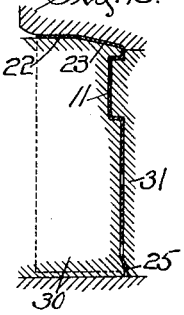


Fig. 8.

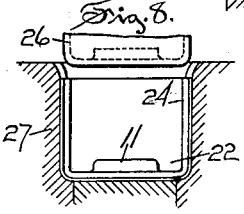


Fig. 12.

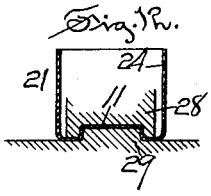


Fig. 15.

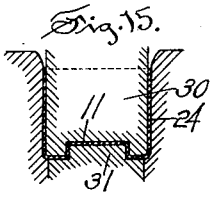


Fig. 9.

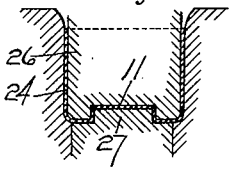
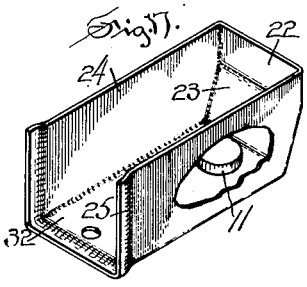


Fig. 17.



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UNITED STATES PATENT OFFICE

GEORGE A. LONG, OF HARTFORD, CONNECTICUT, ASSIGNOR TO THE GRAY TELEPHONE PAY STATION COMPANY, OF HARTFORD, CONNECTICUT, A CORPORATION OF CONNECTICUT

METHOD OF FORMING TELEPHONE PAY STATION BOXES

Application filed June 10, 1931. Serial No. 543,275.

My invention relates to the class of devices employed for collecting tolls for the use of telephone instruments, and an object of my invention, among others, is to provide a box employed for this purpose which shall be composed of a single piece of sheet metal.

My improved process in the practice of which the objects herein set out, as well as others, may be attained is illustrated in the accompanying drawing, in which—

Figure 1 is a view of a sheet metal blank from which my improved pay station box is formed.

Figure 2 is a view of said blank after a preliminary step in the process.

Figure 3 is a view illustrating the formation of the blank shown in Figure 2.

Figure 4 is a view illustrating the shape of the box after an advanced step in the process.

Figure 5 is an end view of the box shown in Figure 4.

Figure 6 illustrates the step of forming the box to the shape shown in Figure 4.

Figure 7 illustrates the shape of the box at a still further advanced step in the process.

Figures 8, 9, and 10 illustrate steps in the method of producing the box shown in Figure 7.

Figure 11 shows the shape of the box after a still further advanced step in the process.

Figures 12 and 13 illustrate the method of shaping the box to the form shown in Figure 11.

Figure 14 is a view showing the shape of the box in a still further advanced step in the process.

Figures 15 and 16 illustrate the method of producing the box of the shape shown in Figure 14.

Figure 17 is a perspective view of the completed box.

Telephone pay station boxes of the type shown herein have heretofore been made of two pieces of metal, one comprising the upper part of the box and the other the lower part thereof, the lower member constituting about two-thirds of the box. Applicant has for a long time desired to make these boxes of a single piece of metal, and to this end many well-known concerns of high repute in the making of dies and the formation of structures of all sorts from sheet metal have been requested to make the boxes in this manner. Many attempts have been made by such concerns to produce such boxes, but all such attempts have invariably proved unsuccessful. After the failure of these various attempts, and after applicant had been informed by all of such manufacturers that such a box could not be produced, he set out in an attempt to produce the structure. It was not, however, until after repeated trials resulting time and time again in failure, and after much perseverance, that applicant's attempts were successful.

The process which applicant finally developed for the production of these one-piece boxes consists in forming at a preliminary step in the process a cup 11 on a flat sheet 10 of metal and before any attempt to impart a box shape to the sheet. The formation of this cup may consume a number of steps, but I have shown only one and as illustrated in Figure 1 of the drawing wherein the cup is substantially of its final form, the final operation as to this cup being performed simply to correct distortion that may occur during subsequent steps in the formation of the box from the blank.

This initial formation of the cup 11 constitutes an important step in the process, and this is followed by an equally important step, the latter consisting in shaping the blank 10 with a tapered end 12 as shown in Figure 2, this tapered end being rounded at its outer extremity and also rounded to meet the side edges of the blank. This shape is obtained preferably by means of dies thereby producing the blank 13 shown in Figure 2. In this step in the process not only are the corners reduced and rounded, but the opposite side edges of the blank are tapered from a wider dimension to a narrower dimension at the end 12. The blank at this step in the process is also provided with toothed projections 14 on that edge opposite the tapered end, and as shown in Figure 2, these toothed projections being an aid in the proper formation of the corners of the box at the bottom and open end thereof. At this step in the formation of the

blank the lower die 15 has a recess 16 to receive the cup 11, the upper die 17 having a hub 18 fitting into the cup 11, and as shown in Figure 3 of the drawing.

In a succeeding step in the process the lower die 19 has a recess to receive the cup 11 in the same manner as hereinbefore described, the upper die 20 being shaped to fit into said recess as shown in Figure 6. In this step in the process the blank is given a box formation but open on one side and the bottom, and the cup 11 now has an important function in that it retains the blank accurately positioned between the dies and prevents any crawling or creeping of the blank which crawling or creeping, if not restrained, would prevent an accurate formation of the blank. The blank 21 now appears with the top 22 closed and having a sloping front portion 23 and with sides 24 and an open bottom. A rib 25 begins to appear around the bottom edge.

In another and subsequent step in the process, and as illustrated in Figures 7, 8, 9, and 10 the dies 26 and 27 are formed to more clearly define the general shape of the box to more closely approach its final form, the cup 11 in these operations performing its function of securely retaining the blank in position to resist distortion of said blank.

In the operation illustrated by Figures 11, 12 and 13 the dies 28 and 29 operate upon the cup to correct its form and in the step illustrated in Figures 14, 15 and 16 the dies 30 and 31 operate upon the whole box structure to bring it more nearly to its final and correct shape, and as shown in Figure 17 wherein the completed structure is shown having the sides 24, the top 22 with its sloping forward portion 23 and the rib 25 extending around the two opposite sides and front, the bottom being open. The front 32 of the box has the cup 11 as hereinbefore described projecting inwardly within the box near the top thereof.

In accordance with the provisions of the patent statutes I have described the principles of operation of my invention, together with the device which I now consider to represent the best embodiment thereof; but I desire to have it understood that the device shown is only illustrative, and that the invention may be carried out by other means and applied to uses other than those above set out.

I claim:

1. The process for forming an open back and bottomless box that consists in shaping a flat blank with a tapered and rounded end to compose the top of the box, then stamping the blank to box form with an open back and bottom and before such forming creating a cup shaped projection in the blank to closely engage said cup shaped portion with a die member to be held from lateral movement thereby during said stamping operation, and subsequently, by a succession of operations, gradually perfecting the shape of the box and different portions thereon.

2. The process for forming an open back and bottomless box that consists in shaping a flat blank with a tapered and rounded end to compose the top of the box, then stamping the blank to box form with an open back and bottom, and before such forming creating a cup shaped projection in that part of the blank to compose the front of the box to closely engage said cup shaped portion with a die member to be held from lateral movement thereby during said stamping operation, shaping the top with a sloping front, and subsequently by a succession of operations, gradually perfecting the shape of the box.

3. The process for forming an open back and bottomless box that consists in shaping a flat blank with a tapered and rounded end to compose the top of the box and the bottom edge with tooth shaped projections for formation of the corners between the sides and front of the box at the bottom thereof, then stamping the blank to box form with an open back and bottom, and before such forming creating a cup shaped projection in the blank to closely engage said cup shaped portion with a die member to be held from lateral movement thereby during said stamping operation, and subsequently, by a succession of operations, gradually perfecting the shape of the box and different portions thereon.

4. The process for forming an open back and bottomless box that consists in shaping a flat blank with a cup shaped projection thereon, then placing the blank with the cup shaped portion closely engaged with and held by a die member, then stamping the blank to box form with an open back and bottom and creating a rib around the bottom edge, and then by a succession of operations, gradually perfecting the shape of the blank to form the box and different portions thereof.

5. The process for forming an open back and bottomless box that consists in shaping a flat blank with a tapered and rounded end to compose the top of the box, then stamping the blank to box form with an open back and bottom, and before such forming creating a cup shaped projection in the blank which is closely engaged with a die member to hold it from lateral movement during said stamping, then forming a rib around the bottom edge of the structure, and then, by a succession of operations, gradually finally perfecting the shape of the box and the different portions thereon.

GEORGE A. LONG.