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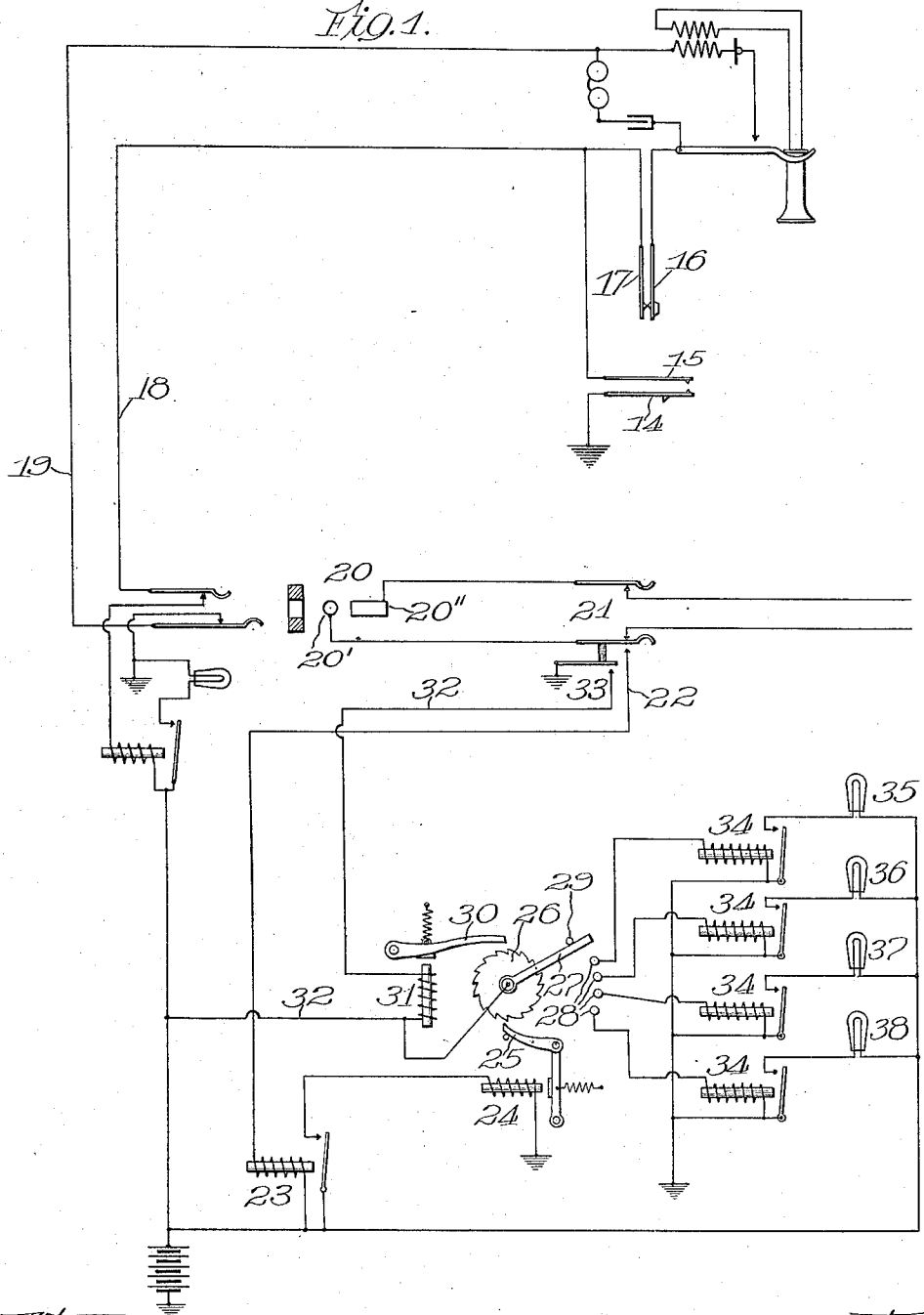
INDICATING SYSTEM FOR TELEPHONE PAY STATIONS.

APPLICATION FILED NOV. 1, 1910. RENEWED OCT. 21, 1915.

1,166,090. Patented Dec. 28, 1915.

2 SHEETS—SHEET 1.

Fig. 1.



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2 SHEETS—SHEET 2.

Fig. 2.

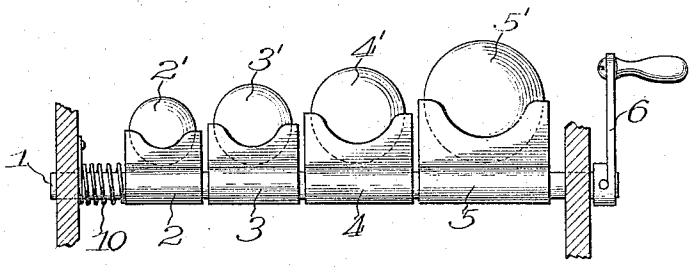


Fig. 3.

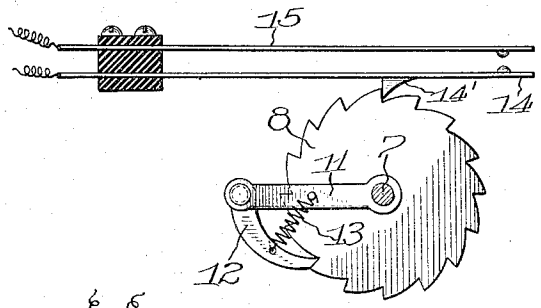
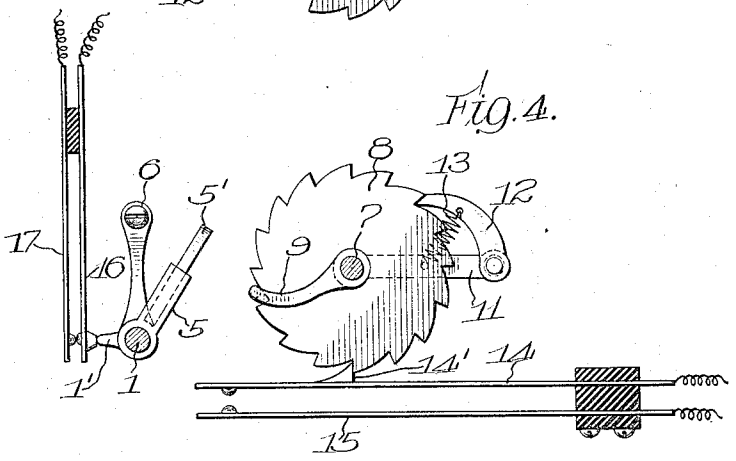


Fig. 4.



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UNITED STATES PATENT OFFICE.

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INDICATING SYSTEM FOR TELEPHONE PAY-STATIONS.

1,166,090. Specification of Letters Patent. Patented Dec. 28, 1915.

Application filed November 1, 1910, Serial No. 590,166. Renewed October 21, 1915. Serial No. 57,188.

To all whom it may concern:

Be it known that I, ARTHUR JOSEPH SEYMOUR, a citizen of the United States of America, and resident of Minneapolis, county of Hennepin and State of Minnesota, have invented a new and useful Improvement in Indicating Systems for Telephone Pay-Stations, of which the following is a specification.

My invention relates to telephone systems, and particularly to those employing coin collecting devices at the subscribers' stations.

It has for its object the conveying of a definite and unmistakable signal to the operator at the central office that will indicate to her, not only the fact that a coin has been deposited by the person desiring to make a call, but also definite information as to the denomination of the coin so deposited.

In those telephone paystation equipments which are adapted to receive coins of different denominations according to the character of the connection which the telephone user is to pay for, the ordinary practice is to so arrange the substation equipment that the coins, when deposited at the request of the operator, will make certain characteristic sounds which are conveyed telephonically over the line to the listening operator. These sounds are produced at the substation by gongs, which are struck either directly by the fall of the coin into the till or as a result of the operation of some mechanism manipulated by the telephone user in the act of depositing the coin. The sounds so produced may be made intelligible to the operator either by one or more strokes on a single gong, or by single strikes on different toned gongs. In any event, this sound transmission method is found to be subject to serious objection, due to the fact that the operator is not always able to properly interpret the signals and may, therefore, make mistakes which will result in loss of revenue to the operating company, or in dissatisfaction of the patron, or both. Another objection to the audible signal method of operation is that unscrupulous persons sometimes devise means of sounding the gongs without depositing the coins.

It is the primary object of my invention to avoid these objectionable features, and for that reason I convey to the operator the necessary information by means of visible rather than audible signals.

I arrange in front of the operator a plurality of visible signals, preferably lamps, and I provide means for selectively displaying these signals; the selection being automatically accomplished and determined in all cases by the denomination of the coin that is deposited at the paystation. In this selective function the operator plays no part, the selective apparatus at the central office standing ready, when connected with a telephone line, to be operated by the act of depositing a coin in the paystation till. I also provide means for guarding against the operation of the indicating signals at the central office in any but a legitimate way by the patron.

Broadly speaking, I associate with each operator's equipment at the central office a step-by-step selective device adapted to be actuated by current impulses sent over the line under the control of the coin collecting device at the subscriber's station. Associated with this step-by-step device I provide a plurality of visible signals which may be selectively displayed under control of this mechanism. I preferably provide means under the control of the operator for placing this selecting mechanism and its associated signals under the control of any one of the lines terminating before that operator, and at the substation I provide coin controlled apparatus of such a nature that the deposit of a coin of a certain denomination will result in the sending of a certain predetermined number of impulses over the line for the actuation of the selecting device there.

Referring to the figures which accompany and form a part of this specification, Figure 1 is a diagram of the circuit connections; Figs. 2, 3 and 4 are details of the coin collecting apparatus at the telephone paystation.

Paystation mechanisms having a plurality of slots for receiving coins of the various denominations are well known in the art. In one well known form of these the coin, after being dropped into the appropriate slot, falls through a chute into a carrier mounted on a shaft, which shaft is adapted to be rotated through a portion of a revolution by the telephone user who is making the payment. When so rotated, the coin resting in this carrier impinges in its movement against a lever, and thus accomplishes the desired signaling purpose, after which,

due to the further rotation of the carrier, it falls out of the carrier and into the till. In my improved substation mechanism, I employ this general form of carrier, as is indicated in Figs. 2 and 3. On the shaft 1 there are mounted carriers 2, 3, 4 and 5 adapted to receive coins of various denominations, such as 2′, 3′, 4′ and 5′. 6 is the lever projecting from the side of the mechanism for enabling the telephone user to rotate the shaft. Near it and parallel to the shaft 1 is mounted the shaft 7 carrying a contact actuating ratchet wheel 8 loosely mounted thereon. Fixed on this shaft 7 are four levers, such as 9, of which one only is shown. These levers normally lie in the paths of the respective coins 2′, 3′, 4′ or 5′, which may occupy any one of the carriers, the arrangement being such that when the shaft 1 is rotated by means of the lever 6 none of the levers 9 will be moved unless there is a coin in one of the carriers. If a coin is in one of the carriers, as, for instance, the coin 5′ in the carrier 5 of Fig. 4, the coin will engage the lever and rotate the shaft 7 through a portion of a revolution. The various levers 9 differ slightly in form and in their angular disposition on the shaft 7, so that the shaft 7 will be rotated a different amount by each one of the levers when engaged by the proper coin in the corresponding carrier. When the coin passes beyond the lever 9 that lever and the shaft 7 return to their normal positions under the action of any suitable form of spring, after which the coin drops from the carrier, and the shaft 1 is also returned to its normal position, when the lever 6 is released by the action of a spring, such as that shown at 10.

The ratchet wheel 8, as has been said, is carried loosely on the shaft 7. Rigidly mounted on that shaft adjacent to the ratchet wheel is a lever 11, carrying a pawl 12 having a spring 13 adapted at all times to press the pawl 12 against the periphery of the ratchet wheel. As a result of this, the ratchet wheel 8 partakes of all of the rotary movements of the shaft 7 that are imparted to it by the engagement of a coin against one of the levers 9, but this wheel does not partake of the return movement of the shaft 7 under the influence of the spring, since there is no tendency to drive it, and since, also, its movement in that direction is prevented, as will be pointed out.

Mounted adjacent to the ratchet wheel 8 are two contact springs 14 and 15, which are normally out of engagement. One of these springs 14 carries a cam 14′, which rides on the periphery of the ratchet wheel in such manner as to cause the spring 14 to be raised into engagement with the spring 15 for the passage of every tooth when the wheel is revolved by the deposit of a coin. This cam 14′ also forms a detent which prevents the revolution of the ratchet wheel in the opposite direction.

The respective coin carriers 2, 3, 4 and 5 may be adapted to receive, respectively, United States dimes, nickels, quarters and half dollars, in the order mentioned. The lever 9 on the shaft 7 which lies opposite the carrier 3 is so disposed with respect to the carrier that when a nickel in that carrier is made to engage the lever 9 it will cause the rotation of the shaft 7 through such an arc as will cause one tooth on the wheel 8 to pass under the cam 14′ on the spring 14. Similarly, the lever 9, lying opposite the carrier 2, will, when engaged by a dime, rotate the shaft 7 an amount corresponding to two notches of the ratchet wheel. Quarter dollars or half dollars will likewise, by engaging their respective levers 9, rotate the shaft 7 three notches and four notches, respectively. It is in this way that the deposit of a coin of a particular denomination in the proper slot and the rotation of the carrier shaft will cause the ratchet wheel 8 to move a predetermined number of notches corresponding to the amount deposited and will thus cause the spring 14 to engage the spring 15 a corresponding number of times.

Extending from the shaft 1, as shown in Fig. 4, there is a projection 1′. When the shaft 1 and lever 6 are in their normal positions, this projection rests against a spring 16 mounted adjacent to the shaft in such way as to press it against another spring 17 alongside of it. As soon as the shaft is moved from its normal position, however, the projection 1′ rides out of engagement with the spring 16 and permits it to break contact with spring 17.

Obviously a great many modifications may be made with respect to the mechanism at the telephone paystation which I have illustrated without departing from the spirit of my invention. The broad feature of this substation mechanism which I believe to be new is the arrangement by which any coin which is deposited into the till of the paystation mechanism will, as a result of its passage to the till, make and break an electrical circuit a predetermined number of times, the number always being determined by the denomination of the coin deposited.

Referring to Fig. 1, I have indicated in its upper portion a circuit arrangement of an ordinary common battery telephone substation to which I have added the circuit and contact arrangements which my invention involves. As will be seen, the springs 14 and 15, which are adapted to be operated a predetermined number of times corresponding to the depositing of a given coin in the till, are connected in a circuit extending between one limb of the line and ground, this circuit normally being held open by the fact that these springs normally do not

engage each other. The springs 16 and 17 are included serially in one limb of the line so as to normally hold that limb closed, but to open it whenever the pay station lever 6 is moved out of its normal position. The action of the hook switch at the subscriber's station is the usual one in common battery practice, the hook holding the metallic circuit of the line open to direct current while the receiver is upon it, and closed through the talking apparatus while the receiver is removed for use.

At the central office the two limbs 18 and 19 of the subscriber's line are shown terminating in a common form of spring jack, this jack normally maintaining the connection of the limb 18 through the coil of a line relay to the ungrounded pole of the common battery, and of the limb 19 to ground. This line relay controls in the ordinary manner the local circuit containing a line lamp or other visual signal. The arrangement of the line circuit at the central office forms no part of my invention, and I have shown it in the simplest form to be found in common practice. It is understood, however, that my system is equally well adaptable to multiple switchboards, or, in fact, to any form of switchboard arrangements that are now in common use.

I have shown only a portion of the operator's cord circuit by which the operator may connect lines for conversation. The plug 20, consisting of the tip contact 20′ and the sleeve contact 20″, is to be taken as any one of the plugs used for connecting subscribers' lines. A key 21 is provided for each cord circuit, and this, when operated, breaks the connection between the corresponding plug 20 and the balance of the cord circuit leading to the corresponding plug of the pair. As the means associated with the cord circuit by which talking current is furnished to the subscriber during a connection and by which the operator is enabled to supervise the connection are in no way special to my invention, they have not been illustrated.

When the plug 20 is inserted into the jack of a line and the key 21 is thrown, it is evident that wire 22 will be connected through the tip side of the cord to the limb 18 of the line. The other end of this wire 22 connects with the winding of the relay 23, the other terminal of which is connected with the battery. The relay 23 is therefore responsive to the impulses which may flow through the limb 18 of the line, due to the opening and closing of the contact springs 14 and 15 of the pay station device upon the deposit of a coin. The local circuit of the relay 23 includes the motor magnet 24, and this magnet, through the medium of its armature and a pawl 25, operates to step the ratchet wheel 26 one notch in a clockwise direction for each time that its armature is attracted. By this means the arm 27 is caused to engage the contacts 28 successively, and to stop on any one of the contacts as determined by the number of impulses sent. The ratchet wheel 26 and the arm carried by it is provided with any sort of a restoring spring which will restore the wheel and the arm to their normal positions as determined by the stop 29 when the wheel is not engaged by either the driving pawl 25 or the holding pawl 30. This holding pawl 30 is normally pulled by a spring out of engagement with the teeth of the wheel 26, but the magnet 31 is so disposed, however, with respect to the pawl 30 that when energized it will tend to hold the pawl 30 into engagement with the ratchet wheel teeth. The pawl 30 acts as a holding pawl, therefore, only when the magnet 31 is energized. The magnet 31 is included in a wire 32 leading from the live side of the battery to an auxiliary pair of contacts 33 on the key 21, and when this key is moved by the operator so as to bring the selecting device at the central office into connection with the individual cord circuit and line, the magnet 31 is by the same movement energized so as to enable the pawl 30 to exert its holding function.

Each of the contacts 28 with which the rotary arm 27 of the selector is adapted to register is connected with the winding of a slow acting relay 34, the other terminal of which winding is grounded. As the arm 27 is connected with the live side of the central office battery, it follows that the stopping of this arm on any one of the contacts 28 brings about the necessary conditions to energize the corresponding relay 34. The fact that relays 34 are slow acting prevents their drawing up their armatures by the mere passage of the arm 27 over the contacts 28, since this passage is so rapid as not to allow sufficient time for the full energization of these relays. When, however, the arm 27 stops on any one of the contacts 28, then the corresponding relay 34 draws up its armature and illuminates the corresponding one of the lamps, 35, 36, 37 or 38, this illumination being caused by the closure of the local circuits including these lamps in an obvious manner.

The operation may now be understood. After the operator has told the patron to drop a coin of a certain denomination into the paystation device, she throws the key 21, thereby bringing the signal selecting apparatus shown at the lower portion of Fig. 1 under the control of the line. The patron deposits the coin and the first movement of the lever 6 opens the springs 16 and 17 and therefore breaks the connection between the two sides of the line at the sub-station. The act of moving the lever 6 in depositing the coin causes the spring 14 to engage the spring 15 a predetermined number of times, such as once for a nickel, twice for a dime,

three times for a quarter and four times for a half dollar. Assuming that a half dollar has been deposited, the limb 18 of the line will have been connected four times with the ground through the springs 14 and 15. This will allow four impulses of current to flow over that limb of the line through the winding of the relay 23, which in turn will cause the motor magnet 24 to be energized four times, and thus step the ratchet wheel 26 around four steps, bringing the arm 27 into engagement with the fourth one of the contacts 28. Meanwhile the relay 31 will have been energized by the operation of the key 21, thus permitting the pawl 30 to act as a holding pawl to prevent the return movement of the ratchet wheel. When the arm 27 comes to rest on the fourth contact 28 the lower one of the relays 34 will be energized, and by the attraction of its armature will cause the lamp 38 to be lighted, thus indicating to the operator that a fifty cent piece has been deposited. In like manner the depositing of a nickel would have caused the lamp 35 to be lighted, of a dime the lamp 36, and of a quarter the lamp 37. The operator seeing the lamp 38 light knows that the proper coin has been deposited, and she then releases the key 21, which breaks the pair of contacts 33 and de-energizes the magnet 31. This permits the holding pawl 30 to be withdrawn and the ratchet wheel 26 and its arm 27 are brought back to normal position by the action of a suitable spring or gravity. The entire selective device is then available for use in connection with any other pair of cords and with any other line to register the deposit of a coin at any other station.

Obviously many modifications may be made in the arrangement of the central office apparatus without departing from the spirit of my invention. Instead of employing lamps for indicating the deposit of the coin, I may employ any of the well known visual signals. The broad feature of my invention in this respect, which I believe to be new, is the placing at the central office of a selecting device adapted to control the display of signals so arranged as to break it under the control of any subscriber's line during the time of collecting pay for a connection, this device being responsive to impulses sent automatically from the paystation apparatus at the subscriber's station as determined by the deposit of the proper coin or token.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In an indicating system for telephone exchanges, an automatic selecting switch at a central office; a plurality of visual signals controlled thereby; a coin-collecting device at the subscriber's station; a ratchet in said coin-collecting device; contact springs controlled by said ratchet, and means controlled by the deposit of a coin for causing said ratchet to move a predetermined number of steps and thereby operate said contact springs to control said automatic selecting switch, substantially as described.

2. In an indicating system for telephone exchanges, a coin-collecting device at the subscriber's station containing a ratchet; contact springs controlled by said ratchet; means controlled by the deposit of a coin for causing said ratchet to move a predetermined number of steps, depending upon the denomination of the coin, and to thereby operate said contact springs to send a predetermined number of impulses over the subscriber's line to the central office; a plurality of signals at the central office, and an automatic selecting switch controlled by said impulses to select and operate a given one of said signals.

3. In an indicating system for telephone exchanges, an automatic selecting switch at the central office operated by impulses of current; a plurality of signals selectively controlled thereby; a coin-collecting device at the subscriber's station containing a ratchet wheel; a pair of contact springs controlled by said ratchet wheel; means controlled by the deposit of a coin for causing said ratchet wheel to rotate a predetermined number of steps according to the denomination of the coin, and thereby operate said contact springs to send a predetermined number of impulses over the subscriber's line for moving said automatic switch to select one of said signals.

Signed by me at Minneapolis, county of Hennepin, and State of Minnesota, in the presence of two witnesses.

ARTHUR JOSEPH SEYMOUR.

Witnesses:

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W. C. Lestico.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."