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MULTICOIN COLLECTOR AND RATE INDICATOR FOR AUTOMATIC TELEPHONE SYSTEMS.

APPLICATION FILED DEC. 5, 1914.

1,137,399. Patented Apr. 27, 1915.

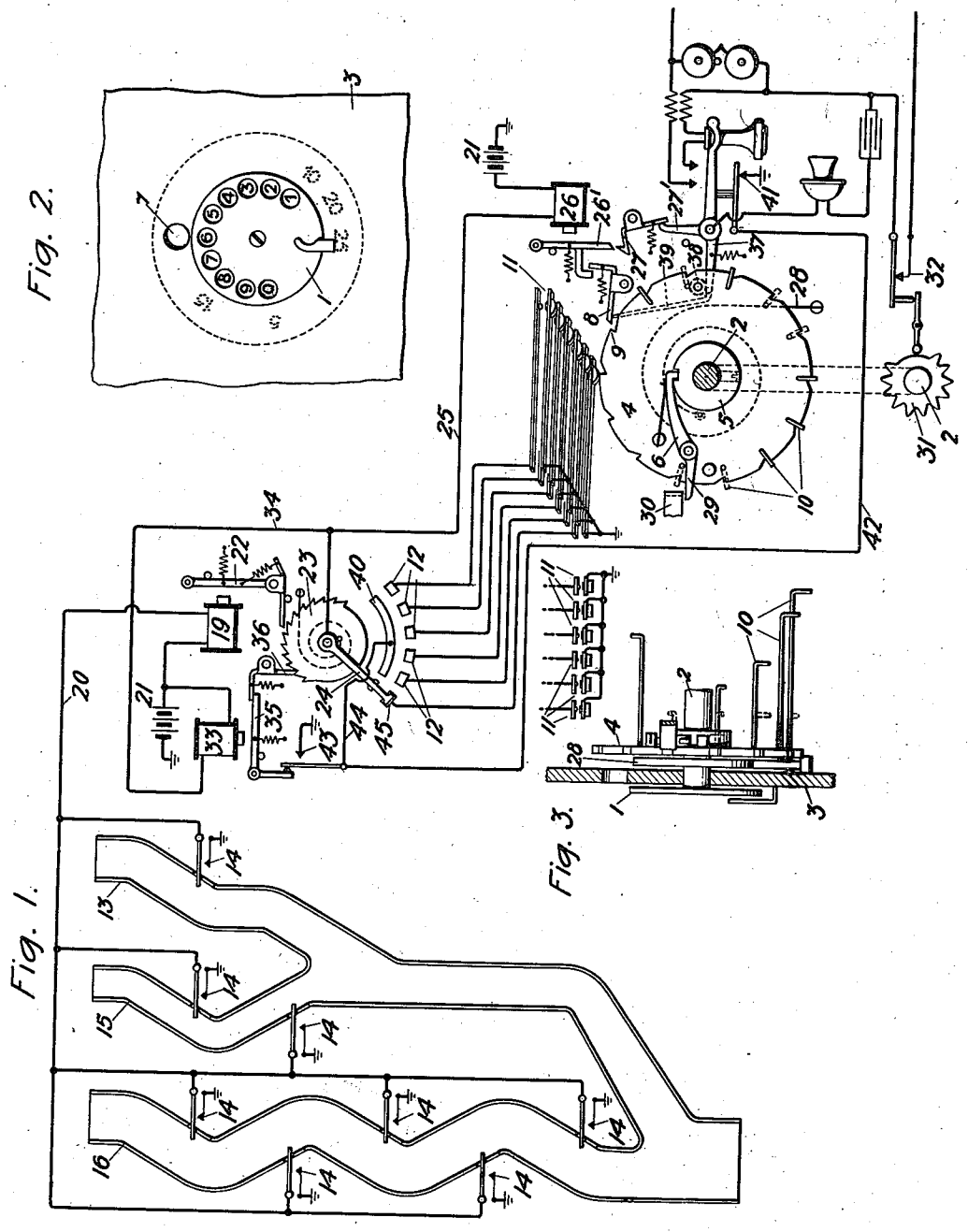


Fig. 2.

Fig. 3.

Fig. 1.

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MULTICOIN-COLLECTOR AND RATE-INDICATOR FOR AUTOMATIC TELEPHONE SYSTEMS.

1,137,399. Specification of Letters Patent. Patented Apr. 27, 1915.

Application filed December 5, 1914. Serial No. 875,580.

To all whom it may concern:

Be it known that I, CHARLES L. GOODRUM, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Multicoin-Collectors and Rate-Indicators for Automatic Telephone Systems, of which the following is a full, clear, concise, and exact description.

This invention relates to a multi-coin collector and rate indicator for automatic telephone systems.

Its object is to provide the subscriber's calling apparatus with means for indicating the rate charged for a call, and to provide means by which coin of a value corresponding to the rate indicated must be deposited in order that the desired connection may be obtained.

In accordance with the preferred embodiment of the invention, a rate indicator is associated with the subscriber's calling device and is adjusted by the first movement of the calling device. This first movement represents a zone for which a certain toll is charged, as for example, five, ten, fifteen, twenty, or twenty-five cents. The rate indicator when thus adjusted displays to the telephone user the rate charged for the call he desires to make. The dial of the calling device is locked against further manipulation in completing the call until coin of a value corresponding to the rate indicated is deposited, whereupon a step-by-step device responds in accordance with the value of the coin deposited, and by an arrangement of circuits connected with the rate indicator, the latter and the calling dial are released. Subsequent movement of the calling dial may then be made for the purpose of securing the desired connection.

The invention may be more readily understood by reference to the accompanying drawings in which—

Figure 1 illustrates an arrangement of circuits and apparatus embodying the invention, said figure including a rear view of rate indicator and a perspective view of the contacts controlled by said rate indicator; Fig. 2 is a front view of the dial of the calling device; and Fig. 3 is an edge view of the dial and the rate indicator which is coupled thereto, said figure also showing the relative arrangement of the contacts and the operating fingers carried by the rate indicator.

Like parts are indicated by like reference characters throughout the several views of the drawings.

The dial of the calling device may consist of the usual finger wheel 1 secured to the shaft 2 which is journaled in the wall 3 of the box. Upon the interior of the box is a disk 4 which is loosely mounted upon the shaft 2. The disk 4 is, however, normally coupled to the wheel 1, for which purpose the shaft 2 is provided with a collar 5 and the disk 4 is provided with a dog 6, which normally engages a recess in the collar 5, thereby coupling the disk to the shaft 2.

The subscriber in instituting a call removes his telephone from the hook and operates the finger wheel to set up the first digit of the called subscriber's number. The disk 4 being coupled to the dial moves therewith, and one of a series of numbers, carried upon the face of the disk 4 appears through an opening 7 of the box, thus indicating to the subscriber the amount that must be deposited in order to obtain the desired connection. When the first digit is set up on the finger wheel, the finger wheel and disk do not return to normal but are locked in their operated position by a holding pawl 8 which engages with one of the ratchet teeth 9 of the disk 4. Upon its rear face the disk 4 is provided with a plurality of fingers 10 corresponding to a series of pairs of contact springs 11. The disk, when operated, moves one or the other of the fingers 10 into position to close one of the pair of contact springs 11. The contact springs 11 are connected to corresponding terminals 12 of a step-by-step switch.

The calling subscriber noting through the opening 7 the amount which he must deposit in order to obtain the desired connection, drops the coin in the chutes of the coin box. The chute 13, representing a five-cent piece, is provided with a single contact 14 arranged to be closed by the coin in its passage through the coin chute. The chute 15, representing a ten-cent piece, is provided with two contacts 14 arranged to be closed by the passage of the coin through the coin chute. Likewise the chute 16, representing a twenty-five-cent piece, is provided with five contacts 14 adapted to be closed by a

twenty-five-cent piece inserted in the coin chute.

Assume that the rate indicator shows that twenty-five cents is the rate charged for the desired connection. In such case the last pair of contacts 11 are closed by the finger 10 of the disk 4. Coin that, in its passage through the coin box, will close five of the contacts 14 is required to be deposited in the coin box. This coin may be a single twenty-five cent piece, or two dimes and a five cent piece or a dime and three five cent pieces, or five five-cent pieces. When coin of proper value is deposited in the coin chutes, five impulses are given to a stepping magnet 19 of the step-by-step switch, the circuit closed by the coin in its passage through the coin chute being as follows: from ground, through coin contacts 14 wire 20 in which is included the windings of the stepping magnet 19, battery 21, to ground. A series of stepping impulses are thus given to the magnet 19 which attracts its armature 22 and steps around a ratchet wheel 23 and with it a switch arm 24. When the switch arm 24 rests upon the terminal 12 corresponding to the pair of contact springs 11 which are closed, a releasing circuit for the disk 4 is established as follows: from ground, through contact springs 11, contact terminal 12, switch arm 24, wire 25 which includes the winding of a release magnet 26, battery 21 to ground. The resulting energization of the release magnet 26 operates its armature 26′ and draws up the holding pawl 8 out of engagement with the teeth of the disk 4. A latch 27 may be provided for holding the armature 26′ in its attracted position, the release of the armature from the latch being under the control of an arm 27′ which projects from the telephone hook. The pawl 8 being held out of engagement with the disk 4, said disk and the dial 1, under the tension of the spring 28, return to a sub-normal position. Thereupon, an extension 29 of the dog 6 engages a fixed stop 30 and lifts the dog 6 free from the collar 5, thereby uncoupling the disk 4 from the finger wheel 1. The finger wheel can then be operated in the usual manner to set up the other digits necesssary for completing the call. It will be understood that the shaft 2 has mounted thereon an impulse-sender or interrupter 31, which serves to open and close the contact 32 for sending impulses of current over the line in the usual manner.

At the same time that a circuit is closed for the release magnet 26 of the dial and disk, a circuit is also closed for a release magnet 33 of the step-by-step switch. This latter circuit is as follows: from ground, through the closed pair of contact springs 11, contact terminal 12, switch arm 24, wire 34 which includes the winding of the release magnet 33, battery 21 to ground. The release magnet 33 is thus energized and attracts its armature 35. In its attracted position the armature closes the contact 43, thereby establishing a locking circuit for the magnet 33 as follows: from ground, through contact 43, wire 44, arc-shaped terminal 40, switch arm 24, wire 34, magnet 33 and battery 21 to ground. The release magnet 33 thus remains energized until the step-by-step mechanism returns to normal position, such return being permitted by reason of the fact that the attracted armature 35 holds a holding pawl 36 out of engagement with the ratchet wheel 23, thus permitting the ratchet wheel to return to normal position.

When the subscriber hangs up his receiver at the end of a call, the disk 4 and the dial 1 are again locked together. This is accomplished by providing the telephone hook with an extension 37 which engages a pin 38 on the disk 4, thereby turning the disk slightly and bringing the dog 6 into position to drop into the recess in the collar 5, thereby locking the disk to the shaft 2. The parts have thus all been returned to their normal position and are ready for use in instituting another call.

Means are provided whereby the dial and disk are returned to normal, if, after a digit is set up on the finger wheel the subscriber hangs up his telephone without depositing a coin. Any suitable release mechanism may be provided for this purpose, the drawings showing the switchhook as provided with an extension 39 which engages beneath the pawl 8 and lifts the same out of engagement with the disk 4 when the telephone is on the hook. It will be understood that the extension 39 is so arranged that it does not project into the path of the pin 38 carried by the disk 4. It thus appears that when the telephone is on the hook, the disk 4 is free to be returned to normal position under the influence of the spring 28. Means are also provided whereby, if coin of insufficient value is deposited, the apparatus is returned to its normal position upon the subscriber hanging up the receiver. If any coin whatsoever is deposited in the coin box, the switch arm 24 is stepped into engagement with the arc-shaped terminal 40, and if the subscriber then hangs up his receiver, release circuits are established as follows: from ground, through contact 41, closed by the telephone hook, conductors 42 and 44, terminal 40, switch arm 24, wire 25, release magnet 26, battery 21 to ground. The release magnet 26 is thus operated to release the disk 4 in the manner already described. At the same time a circuit for the release magnet 33 is closed as follows: from ground, through contact 41, wire, 42, terminal 40, switch arm 24, conductor 34, release magnet

33, battery 21 to ground. The resultant energization of the release magnet 33 permits the step-by-step switch mechanism to be restored to normal in the manner already described.

Means are provided by which free calls can be made. With this object in view the first pair of contact 11 are connected to a terminal 45 on which the switch arm 24 normally rests. When a call is made for which no charge is made the first pair of contact springs 11 are closed and a circuit is closed for the release magnet 26, thereby permitting of the manipulation of the finger wheel in the usual manner.

What is claimed is:

1. In an automatic telephone system, the combination with a subscriber's calling device, of coin-controlled means permitting a partial operation of said calling device for the purpose of ascertaining the amount of coin to be deposited and requiring the deposit of coin of the ascertained value before permitting of the completion of the operation of the calling device.

2. In an automatic telephone system, the combination with a subscriber's calling device, of means for locking said calling device in the position to which it is moved in partly setting up a call, and coin-controlled means for releasing the calling device for the completion of the call.

3. In an automatic telephone system, the combination with a subscriber's calling device, of means for locking said calling device in and for indicating a coin value according to the position to which it is moved in setting up the first digit of a called subscriber's number, and coin-controlled means, responsive to the deposit of coin of a value ascertained by such movement of the calling device, for releasing the calling device for the completion of the call.

4. In an automatic telephone system, the combination with a subscriber's calling device, of a rate indicator adjusted by the operation of the calling device.

5. In an automatic telephone system, the combination with a subscriber's calling device, of a rate indicator adjusted by the operation of the calling device in instituting a call and means under the control of said rate indicator for controlling the completion of the call.

6. In an automatic telephone system, the combination with a substation dial, of a rate indicator, and means for adjusting said indicator in setting up on the dial the first digit of a called subscriber's number.

7. In an automatic telephone system, the combination with substation dial, of a rate indicator adjusted by setting up on the dial the first digit of a called subscriber's number, and coin-actuated means for controlling the further operation of the dial in completing the call.

8. In an automatic telephone system, the combination with a sub-station calling device, of a rate indicator adjusted by the first movement of the calling device in setting up the first digit of a called subscriber's number, means for locking said calling device after it has adjusted the rate indicator, and coin-controlled means for unlocking said calling device for further manipulation.

9. In an automatic telephone system, the combination with a sub-station dial, of a rate indicator normally coupled thereto and adjusted by the movement of the dial, means for locking said indicator in its adjusted position, coin-controlled means for unlocking said indicator, and means, operative when the telephone is off its hook, for uncoupling said dial and indicator upon their return to normal position.

10. In an automatic telephone system, the combination with a substation dial, of a rate indicator adjusted by the movement of the dial in setting up the first digit of a called subscriber's number, means for locking said indicator and dial against return from the first position to which they are moved, contacts closed by said rate indicator in its adjusted position, a step-by-step switch, coin-actuated contacts controlling the operation of said step-by-step switch, and a releasing magnet for said locking means, said releasing magnet having a circuit closed through said switch and said contacts.

11. In an automatic telephone system, the combination with a subscriber's calling device, of a rate indicator normally coupled thereto and adjusted by the first movement of the calling device, means for locking said rate indicator in its adjusted position and thereby locking the calling device, a series of contacts corresponding to different positions of adjustment of the rate indicator and arranged to be controlled by the position of said indicator, a circuit through said contacts, a step-by-step switch controlling completion of said circuit, a release magnet for the rate indicator included in said circuit, an operating circuit for said step-by-step switch, and a coin box having coin controlled contacts for closing the last mentioned circuit.

In witness whereof, I hereunto subscribe my name this 3rd day of December, A. D. 1914.

CHARLES L. GOODRUM.

Witnesses:
E. EDLER,
K. L. STAHL.