H. O. RUGH.

SELECTIVE CALL DEVICE.

APPLICATION FILED AUG. 26, 1912.

1,136,838.

Patented Apr. 20, 1915.

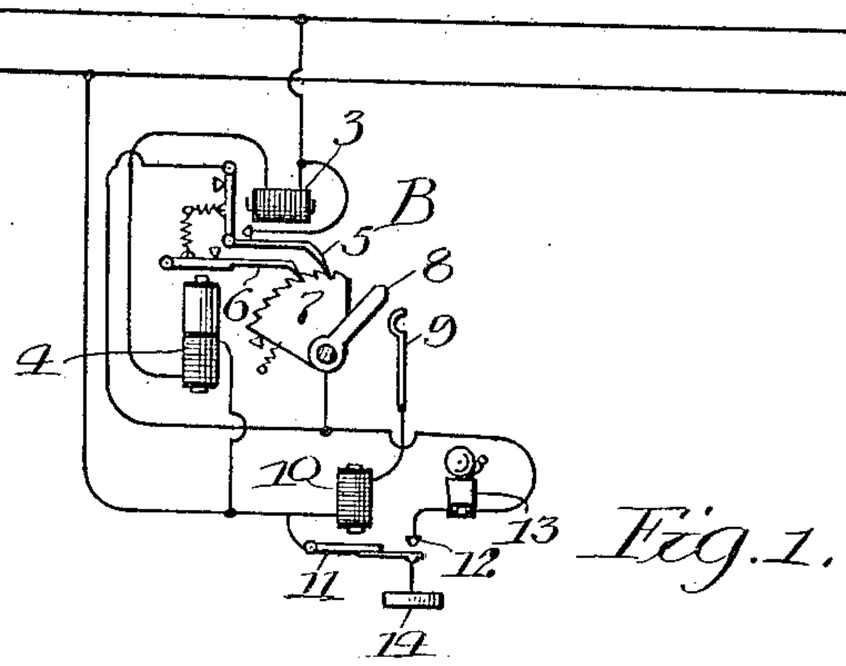


Fig. 1.

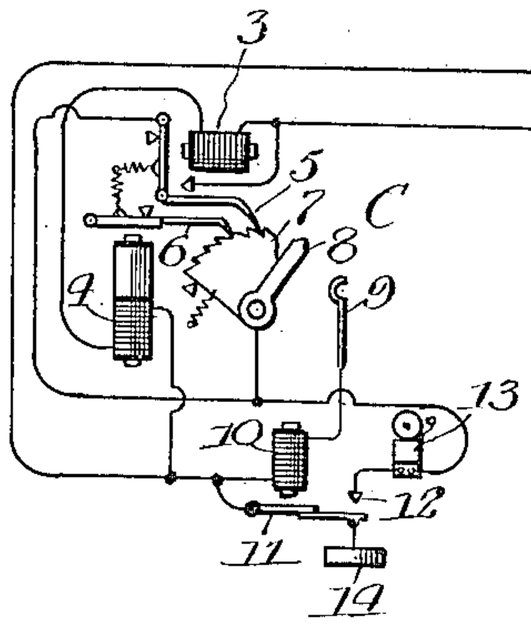
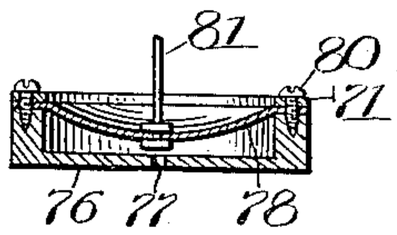


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

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SELECTIVE CALL DEVICE.

1,136,838. Specification of Letters Patent. Patented Apr. 20, 1915.

Application filed August 26, 1912. Serial No. 717,092.

To all whom it may concern:

Be it known that I, HARRY O. RUGH, a citizen of the United States, residing at Sandwich, in the county of Dekalb and State of Illinois, have invented a certain new and useful Improvement in Selective Call Devices, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to a call device and is of more particular utility in connection with a system such as disclosed in my co-pending application Serial No. 717,091, filed August 26, 1912. In my said co-pending application I set forth a signaling system of the step-by-step variety in which any one of a plurality of substations may be selected for operation through the agency of a device at the central station having push buttons or similar actuating devices, one for each station, it being merely necessary to operate the push button corresponding to the desired station, whereupon the call box automatically sets means in operation to call the desired station.

In this present application I set forth an improvement over the system herein disclosed in that I provide means so that after the actuation of one push button, succeeding push buttons may be actuated to call succeeding stations without having the parts restored to normal, thus saving a great amount of time when more than one station is desired to simultaneously respond.

I will explain one form of carrying out my invention more in detail by reference to the accompanying drawing, in which—

Figure 1 is a diagrammatic view of a system arranged in accordance with my invention, and Fig. 2 is a detail of construction.

Referring more particularly to Fig. 1, I set forth a central station A at which my improved call sending device is to be located and a substation B at which is illustrated one form of a substation call receiving device which may work in connection with my improved call sending device, the two stations being united by line wires 1 and 2. The substation device is the same as illustrated in my co-pending application Serial No. 665,738, filed December 14, 1911, and patented August 4, 1914, No. 1,105,842 and comprises the two magnets 3 and 4 which are serially associated with the line wires. Their pawls 5 and 6 respectively are normally disengaged from the step-by-step element 7, but upon an initial prolonged impulse the magnets 3 and 4 are energized and the pawls 5 and 6 engage the teeth of the element 7. The proper number of impulses may then be sent to provide electrical connection between the elements 8 and 9, whereby to close circuit through the magnet 10 and if this circuit is held closed a sufficient length of time the armature 11 of this magnet engages the contact 12 to thereby actuate the local signal 13. A dash pot 14 provides a slow acting element for the magnet 10.

When my improved call sending device is used in connection with a substation device such as indicated at station B, it will be noted that provision must be made so that the initial impulse may be a prolonged impulse to permit the pawls 5 and 6 to engage the teeth of the element 7 and that thereafter additional impulses may be sent with a small enough time interval between them so that the slow acting magnet 4 does not have time to release its armature. After the required number of impulses have been sent so that elements 8 and 9 engage, the last impulse must be a prolonged impulse so as to give the magnet 10 time to operate the local signal circuit as against the delaving action of the dash pot 14. The call sending device must likewise have mechanism so arranged that it will be automatically restored to its normal condition when the call sending operation has been completed.

At the sending station A the call sending device is so arranged as to operate a magnet 15, which through the agency of the battery 16 sends impulses over the line wires 1 and 2 by virtue of the armature 17 and the contact 18. My improved calling device actuates the magnet 15 in the proper manner to send the required impulses. My improved call box may be used to call any one of a plurality of stations, the number of stations depending upon the number of teeth that can be accommodated practically upon an element 7. My improved call box has a key 19 corresponding to each substation on the circuit and each individual key has a spring 20, which springs 20 are individually associated each to each with contacts 21. The call box has a step-by-step element 22 carrying an arm 23, which arm 23 is adapted successively as this step-by-step element moves

forward step by step to engage consecutively the contacts 21, 21. It will thus be seen that each key 19, there being one for each substation, has an individual spring which is associated with one of the contacts 21. Thus for instance, if the first substation had its arm 8 so arranged that but one forward impulse were required to bring this arm into association with the spring 9 then this first substation would correspond to that contact 21 which would be engaged by the arm 23 after the element 22 had moved one step forward. The next contact 21 would correspond to the station requiring two impulses and so on.

In order to step up the element 22 I provide a magnet 24 whose armature 25 carries a step up pawl 26, which step up pawl is slidable over a holding pawl 27 but is separated therefrom by means of a knob 28. The holding pawl 27 is controlled by an armature 29 under the control of a slow acting magnet 30. The armature 29 also carries an arm 31 which carries a flexible spring 32 controlled by a dash pot 33. The flexible element 32 engages a contact 34 and as the armature 29 is attracted it permits the pawls 26, 27 to engage the teeth of the element 22 and after the elapse of a certain time interval controlled by the dash pot 33 the spring 32 is removed from engagement with the contact 34. The magnets 24 and 30 are initially simultaneously actuated and the first impulse of current therethrough will throw the pawls into engagement with the teeth of the element 22 as stated and succeeding impulses will permit the magnet 24 to step up the element 22 in accordance with the impulses, the time interval between succeeding impulses being of such short duration that the slow acting magnet 30 does not release its armature 29 until this circuit is finally broken and remains broken. The first impulse through the magnets 24 and 30 is prolonged by the dash pot 33 and this first impulse continues until the circuit through elements 32 and 34 is broken as will presently appear. To send the impulses I provide a magnet 35 having an armature 36 controlled by a weight 37. The weight 37 is of such proportions that the armature 36 may vibrate with a frequency which is the desired frequency of impulses. The armature 36 has a spring 38 which is associated with a back contact 39. Now when a button 19 is depressed, circuit is closed through the magnets 24 and 30 and a shunt circuit about the contacts 38 and 39 remains closed until the elements 32 and 34 separate. A battery 40 furnishes the necessary current. The closure of the circuit through any key 19 connects the magnet 30 across the battery 40 and connects the magnets 24 and 35 serially through the contacts 38 and 39. A shunt circuit however about the contacts 38 and 39 remains closed after the starting of the initial impulse until the elements 32 and 34 separate. After they have separated the armature 36 vibrates in accordance with the attraction of the magnet 35. The opening of the contact at 39 permits restoration of the armature whereupon it may then be attracted after the elements 38 and 39 contact. Each interruption of the circuit sends an impulse through the magnet 15 and the magnet 24 and also the magnet 35, the three being in series. The initial closure of the key 19 by reason of the closure of the shunt circuit around the elements 38 and 39 immediately causes the actuation of all of the magnets 15, 24, 30 and 35. Thus the first impulse is a long impulse depending upon the dash pot 33 and succeeding impulses are of the period of the armature 36 and these succeeding impulses continue until the arm 23 has reached the particular contact 21 corresponding to the particular key 19 which has been depressed. Immediately this contact is reached a circuit is established through magnet 41, thereby attracting its armature 42. The armature 42 also carries a flexible contact element 43 controlled by a dash pot 44. Thus immediately the magnet 41 is energized contact is established between the armature 42 and the contact element 45 and after the elapse of a certain time interval contact is established between contact element 43 and contact element 46. Immediately the elements 42 and 45 contact a short circuit is established about the elements 38 and 39 and the circuit through the magnets 35, 24, 15 and 41 remains closed so that all their armatures are in an attracted position until elements 43 and 46 engage, at which time a circuit is established through the magnet 47, which thereupon actuates a pivotally mounted plate 48 to thereby release whatever key or keys 19 have been depressed so as to break the circuit between the battery 40 and the various magnets 15, 35, 41, 24 and 30. This permits the magnet 30 to release its armature 29 thereby withdrawing the pawls 26 and 27 from the teeth of the element 22 and permitting the restoration of this element against its stop 49 through the agency of the spring 50.

I provide an auxiliary key 51 which when operated closes circuit through the release magnet 47 thereby to restore all parts to normal. This is of service should it be found after initiating a call that the wrong key had been depressed, or should it for any other purpose be desired to restore the elements to normal. This circuit can be traced from the battery 40 through conductor 52, key 51, contact 53, conductor 54, magnet 47, conductor 55, conductor 56, back to the battery 40. The circuit through the magnet 30 as will be seen extends from the battery 40 through conductor 56, conductor 57, magnet 30, conductor 58, to the

upper springs 59 of the keys 19, and from there, whenever a key 19 is depressed, through the spring 60, conductor 61, back to the battery 40. This circuit through the magnet 30 thus remains closed so long as a button 19 is depressed. The circuit through the magnet 35 can be traced from battery 40, conductor 56, conductor 62, magnet 24, conductor 63, conductor 64, magnet 15, magnet 35, conductor 65, to the junction 66; from there the circuit may extend initially before the dash pot 33 has released the contacts 34 and 32, through the contact 34, spring 32, conductor 67, spring 59, spring 60, and conductor 61 to the battery 40; after the elements 32 and 34 have separated, consequently upon the elapse of a certain time interval after the attraction of the armature 29, the circuit through magnets 24, 15 and 35 is completed from the junction 66 through the conductor 68, back contact 39, spring 38, armature 36, conductor 69, to the spring 59, spring 60 back to the battery 40. This circuit condition through the magnets 24, 15 and 35 causes the armature 36 to vibrate, whereby the circuit through these magnets is periodically made and broken and this continues until the arm 23 engages a contact 21 associated with the spring 20 of a depressed key 19. Establishment of the circuit conditions between the elements 21 and 23 causes the establishment of a circuit beginning with the battery 40, conductor 56, conductor 70, magnet 41, conductor 71, arm 23, contact 21, conductor 72, spring 20, spring 60 (of a depressed key 19) back to the battery 40. This energizes the magnet 41 and its initial energization immediately results in closure of contact between the elements 42 and 45, which thereupon establishes a circuit condition through the magnets 15, 35 and 24, the same up to the junction point 66 as heretofore, and then continuing by way of conductor 73, armature 42, contact 45, conductor 74, conductor 69, spring 59, spring 60, back to the battery 40. Under these circuit conditions the magnets 24, 35 and 15 again remain in their attracted position during which time the substation signal 13 operates and this operation continues until elements 43 and 46 contact, after the elapse of a certain time interval due to the dash pot 44, at which time a circuit is established beginning with the battery 40, conductor 56, conductor 55, magnet 47, conductor 75, contact 46, spring 43, conductor 74, conductor 69, spring 59, spring 60, back to the battery 40. The release magnet 47 thus attracts the arm 48 thereby restoring the depressed key 19 to normal. It will be understood that the impulses through the magnets 15, 24, and 35 are made whenever the elements 38 and 39 contact and the forward movement of the step-by-step element 22 in answer to one of these circuit closures whereby the arm 23 engages a live contact 21, actuates the magnet 41 simultaneously with the actuation of the magnet 35 and thereby no further forward steps of the element 22 are occasioned as the magnets 15, 41, 24 and 35 will remain in their energized condition until the operation of the magnet 47, at which time all parts are restored to normal. From this it will be seen that immediately a key 19 is depressed the magnet 15 is attracted and remains attracted during a time interval controlled by the dash pot 33. Thus the first impulse is a prolonged impulse. Immediately following the opening of the circuit between the elements 32 and 34 the magnet 15 is periodically energized with a certain frequency depending upon the frequency of the element 36 and these impulses continue until the desired substation has been reached as controlled by the particular key 19, which is depressed, whereupon the energization of the magnet 41 again maintains a prolonged energization of the magnet 15 depending upon the dash pot 44 and this last prolonged impulse which is the signal operating impulse continues until the actuation of the magnet 47.

The particular form of dash pot which I prefer to employ is shown in Fig. 2 where I have a cup shaped casing 76 provided with a bleeder port 77, which casing is closed by means of a flexible diaphragm 78 held in place by means of the ring 79 and screws 80, and which diaphragm controls the movements of the plunger 81. The improvement herein consists in the provision of means to render the release operation of the calling device temporarily inoperative, and the manner in which I perform this consists in opening the circuit through the conductor 75 through the agency of the switching device 82. Under these circumstances, assume that a push button 19 for a station requiring three impulses is depressed with the switch 82 open. Then the call box will operate suitably to select this desired substation responding to three impulses. All of the instrumentalities will operate and the functions will be properly performed with the exception of the release function, as the magnet 47 will not operate even though contacts 43 and 46 are closed, by reason of the fact that the conductor 75 is open at the switch 82. Now assume that a station ordinarily requiring five impulses is also to be called, then key No. 5 is depressed which releases the key 3, thereby removing the battery connection from the contact 21 corresponding to key 3, and the step-by-step magnet 35 will continue to operate, that is, send two additional impulses and call the signal at station No. 5. It will of course be understood that when key No. 5 is depressed that key No. 3 is released, thereby removing

the battery connection from the contact 21 corresponding to station 3 so that the magnet 41 releases its armature 42 until the arm 23 engages the contact 21 of substation No. 5. This operation can be carried on indefinitely to call succeeding stations, whereafter the switch 82 is restored and all parts are restored to normal as before.

While I have herein shown and particularly described one form of carrying out my invention, I do not mean to limit myself to such specific description, but

Having thus described one form which my invention may take, what I claim as new and desire to secure by Letters Patent is:

1. A calling device having a line circuit controlling element, individual operating devices corresponding respectively to the different calls, means under the control of each operating device to selectively control the operations of said line circuit controlling device, said means under the control of each operating device operating automatically upon actuation of any device aforesaid to send a predetermined call, means to restore said means to normal and means to at will prevent the restoration to normal of said means, whereby when one operating device has been actuated to send a call, succeeding devices may be successively operated to send their call.

2. A calling device having a line circuit controlling element, individual operating devices corresponding respectively to the different calls, means under the control of each operating device to selectively control the operations of said line circuit controlling device, said means under the control of each operating device operating automatically upon actuation of any device aforesaid to send a predetermined call, and including a common controlling element adapted to occupy different operating positions for the different calls, means to restore said element to normal and means to at will prevent the restoration to normal of said common controlling element, whereby when one operating device has been actuated to send a call, succeeding devices may be successively operated to send their call.

3. A calling device having a line circuit controlling element, individual operating devices corresponding respectively to the different calls, means under the control of each operating device to selectively control the operations of said line circuit controlling device, said means under the control of each operating device operating automatically upon actuation of any device aforesaid to send a predetermined call, and including a common step-by-step circuit controlling element, means to restore said element to normal and means to at will prevent the restoration to normal of said step-by-step element, whereby when one operating device has been actuated to send a call, succeeding devices may be successively operated to send their call.

4. A call box having line circuit controlling means, individual operating devices one for each call, means under the control of each operating device and operable automatically upon actuation of the associated device to selectively control the operations of said line circuit controlling means, means to restore said means to normal and means to at will prevent the restoration to normal of said means, whereby when one operating device has been actuated to send a call, succeeding devices may be successively operated to send their call.

5. A call box having line circuit controlling means, individual operating devices one for each call, means under the control of each operating device and operable automatically upon actuation of the associated device to selectively control the operations of said line circuit controlling means, said last aforesaid means including a common device adapted to occupy different operative resting positions corresponding to the different calls, means to restore said device to normal and means to at will prevent the restoration to normal of said common device, whereby when one operating device has been actuated to send a call, succeeding devices may be successively operated to send their call.

6. A call box having line circuit controlling means, individual operating devices one for each call, means under the control of each operating device and operable automatically upon actuation of the associated device to selectively control the operations of said line circuit controlling means, said last aforesaid means including a common step-by-step circuit controlling element, and contacts one for each individual operating device under the control thereof, means to restore said element to normal and means to at will prevent the restoration to normal of said step-by-step element, whereby when one operating device has been actuated to send a call, succeeding devices may be successively operated to send their call.

7. A call box having line circuit controlling means, individual operating devices one for each call, means under the control of each operating device and operable automatically upon actuation of the associated device to selectively control the operations of said line circuit controlling means, said last aforesaid means including a common step-by-step circuit controlling element, and contacts one for each individual operating device under the control thereof, means whereby said line circuit controlling means control the operations of said step-by-step element, means to restore said element to normal and means to at will prevent the

restoration to normal of said step-by-step element, whereby when one operating device has been actuated to send a call, succeeding devices may be successively operated to send their call.

8. A call box having circuit controlling impulse mechanism, a plurality of individual operating devices one for each call, means interposed between said operating devices and said impulse mechanism to selectively control the operations of said impulse mechanism, said means operating automatically upon actuation of an operating device aforesaid, means for prolonging the first impulse of said impulse mechanism, means to restore said means to normal and means to at will prevent the restoration to normal of said first aforesaid means, whereby when one operating device has been actuated to send a call, succeeding devices may be successively operated to send their call.

9. A call box having circuit controlling impulse mechanism, a plurality of individual operating devices one for each call, means interposed between said operating devices and said impulse mechanism to selectively control the operations of said impulse mechanism, said means operating automatically upon actuation of an operating device aforesaid, means for prolonging the first impulse of said impulse mechanism, means for prolonging the last impulse transmitted by said impulse mechanism, means to restore said means to normal and means to at will prevent the restoration to normal of said first aforesaid means, whereby when one operating device has been actuated to send a call, succeeding devices may be successively operated to send their call.

10. A call box having circuit controlling impulse mechanism, a plurality of individual operating devices one for each call, means interposed between said operating devices and said impulse mechanism to selectively control the operations of said impulse mechanism, said means operating automatically upon actuation of an operating device aforesaid, means for prolonging the first impulse of said impulse mechanism, means for prolonging the last impulse transmitted by said impulse mechanism, automatic means operable upon completion of a call to restore the various operating parts aforesaid to normal, and means to at will prevent the restoration to normal of said first aforesaid means, whereby when one operating device has been actuated to send a call, succeeding devices may be successively operated to send their call.

11. A call box having circuit controlling impulse mechanism, a plurality of individual operating devices one for each call, means interposed between said operating devices and said impulse mechanism to selectively control the operations of said impulse mechanism, said means operating automatically upon actuation of an operating device aforesaid, means to restore said means to normal, and means to at will prevent the restoration to normal of said first aforesaid means, whereby when one operating device has been actuated to send a call, succeeding devices may be successively operated to send their call.

12. A call box having circuit controlling impulse mechanism, a plurality of individual operating devices one for each call, means interposed between said operating devices and said impulse mechanism to selectively control the operations of said impulse mechanism, said means including a common step-by-step circuit controlling element and electromagnetic means for operating same, said means operating automatically upon actuation of an operating device aforesaid, means for prolonging the first impulse of said impulse mechanism, said last aforesaid means including a circuit controlling element under the control of said electromagnetic means and means to delay the action of said circuit controlling means, means to restore said means to normal, and means to at will prevent the restoration to normal of said first aforesaid means, whereby when one operating device has been actuated to send a call, succeeding devices may be successively operated to send their call.

13. A call box having an impulse controlling device, individual operating devices to selectively control the operations of said impulse controlling device, means under the control of each operating device operable automatically upon actuation of the associated device interposed between said operating devices and said impulse device, means to prolong the first impulse transmitted by said impulse device, and means to restore said means to normal, means to at will prevent the restoration to normal of said first aforesaid means, whereby when one operating device has been actuated to send a call, succeeding devices may be successively operated to send their call.

14. A call box having an impulse controlling device, individual operating devices to selectively control the operations of said impulse controlling device, means under the control of each operating device operable automatically upon actuation of the associated device interposed between said operating devices and said impulse device, means to prolong the first impulse transmitted by said impulse device, means to prolong the last impulse of said impulse device, means to restore said means to normal, and means to at will prevent the restoration to normal of said first aforesaid means, whereby when one operating device has

been actuated to send a call, succeeding devices may be successively operated to send their call.

15. A call box having an impulse controlling device, individual operating devices to selectively control the operations of said impulse controlling device, means under the control of each operating device operable automatically upon actuation of the associated device interposed between said operating devices and said impulse device, said means including a common step-by-step circuit controlling element, means to prolong the first impulse transmitted by said impulse device, means to restore said means to normal, and means to at will prevent the restoration to normal of said first aforesaid means, whereby when one operating device has been actuated to send a call, succeeding devices may be successively operated to send their call.

16. A call box having an impulse controlling device, individual operating devices to selectively control the operations of said impulse controlling device, means under the control of each operating device operable automatically upon actuation of the associated device interposed between said operating devices and said impulse device, said means including a common step-by-step circuit controlling element, means to prolong the first impulse transmitted by said impulse device, electromagnetic means under the control of said step-by-step element operable upon completion of a call to restore all movable parts aforesaid to normal, and means to at will prevent the restoration to normal of said first aforesaid means, whereby when one operating device has been actuated to send a call, succeeding devices may be successively operated to send their call.

17. A call box having an impulse controlling device, a plurality of individual operating devices to selectively operate said device, means associated with each operating device and operable automatically upon actuation of the associated device to control the number of impulses transmitted by said impulse device in accordance with the selected operating device, means to restore said means to normal, and means to at will prevent the restoration to normal of said first aforesaid means, whereby when one operating device has been actuated to send a call, succeeding devices may be successively operated to send their call.

In witness whereof I hereunto subscribe my name this 17th day of August, A. D., 1912.

HARRY O. RUGH.

Witnesses:
OTTO M. WERMICH,
MAX W. ZABEL.

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