

1,118,655.

Patented Nov. 24, 1914

2 SHEETS-SHEET 1.

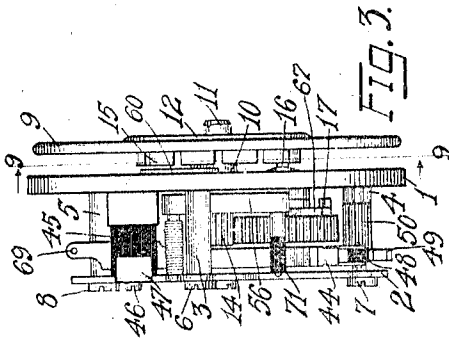


FIG. 3.

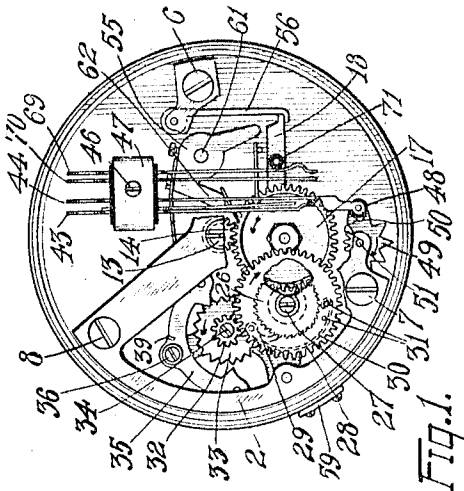


FIG. 1.

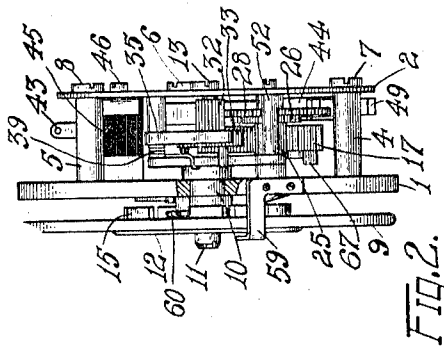


FIG. 2.

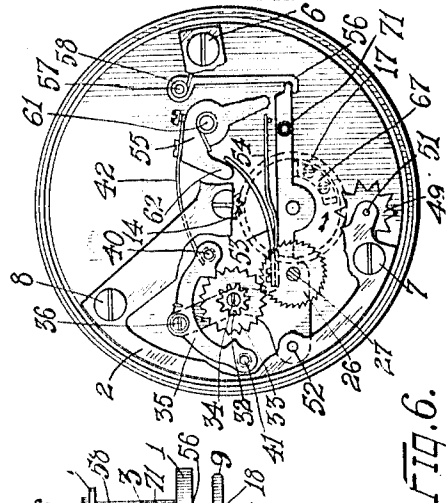


FIG. 6.

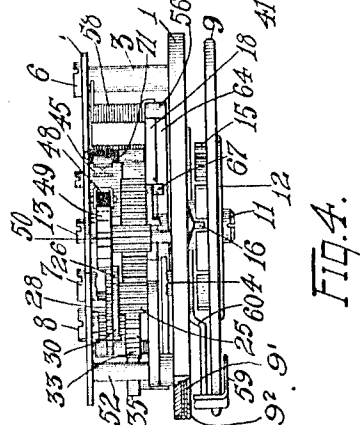


FIG. 4.

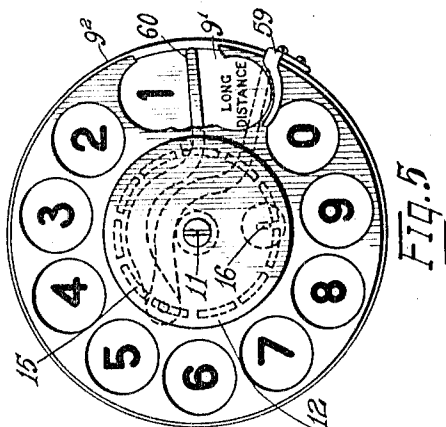


FIG. 5.

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 CALLING DEVICE.
 APPLICATION FILED JULY 25, 1910.

1,118,655.

Patented Nov. 24, 1914
 2 SHEETS-SHEET 2.

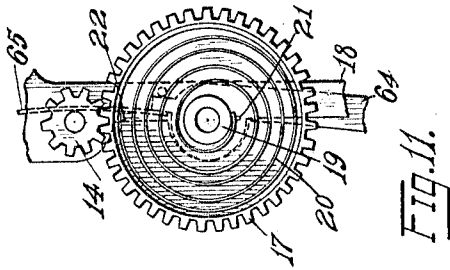


FIG. 11.

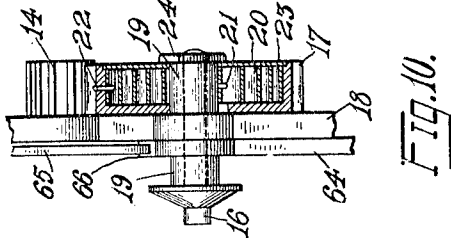


FIG. 10.

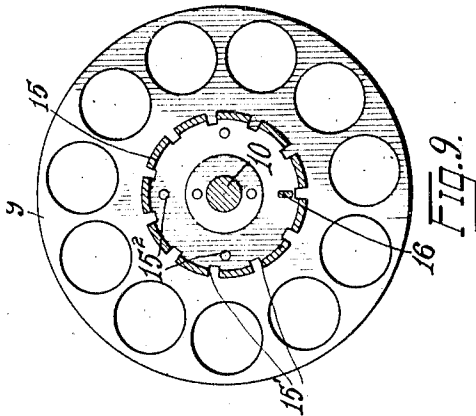


FIG. 9.

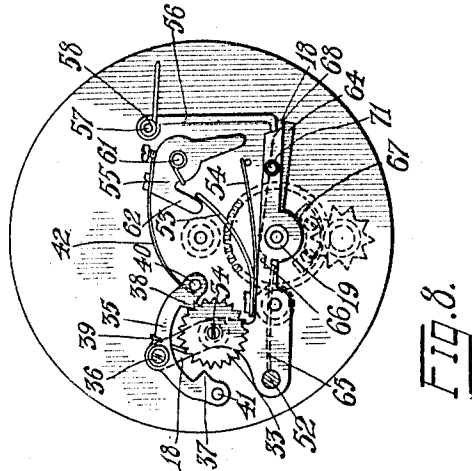


FIG. 8.

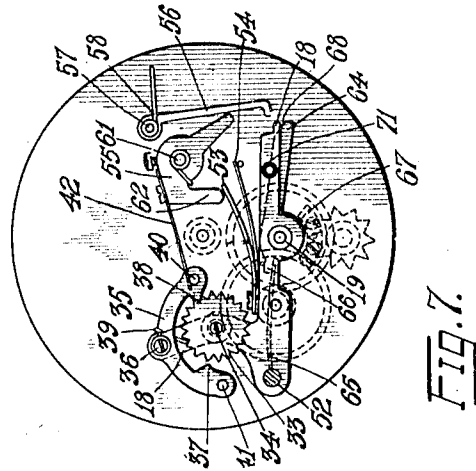


FIG. 7.

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UNITED STATES PATENT OFFICE.

WILLIAM KAISLING, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD AND SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CALLING DEVICE.

1,118,655.

Specification of Letters Patent.

Patented Nov. 24, 1914.

Application filed July 25, 1910. Serial No. 573,593.

To all whom it may concern:

Be it known that I, WILLIAM KAISLING, a citizen of the United States of America, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Calling Devices, of which the following is a specification.

My invention has to do with calling devices of the type commonly employed in automatic and semi-automatic telephone systems for the purpose of operating directly controlled switch mechanism and more particularly to that type known as two wire or metallic systems in which no ground connection is necessary at the calling device for controlling the operation of the directly controlled switches.

The device of my invention is more particularly adapted for use in connection with a so-called two wire system, but with slight modifications of the impulse spring combination it may be used in connection with any system where it is desired to transmit a series of impulses by an operator, the object of my invention being to provide a calling device of this sort which is simple in construction and most positive in its operation.

One of the features of my invention is to provide impulse transmitting mechanism which is adapted to be wound up or adjusted upon the movement of the dial. Then by means of a lever, engaged by the finger when in a finger hold of the dial, upon the completion of the dial movement, to unlock the mechanism for transmitting impulses. This lever also controls means to hold the dial locked against further actuation until the impulse transmitting mechanism has operated. Thus the impulse transmitting mechanism is entirely out of control of the operator after the dial has been completely actuated until the said mechanism has operated.

There are many other features and advantages in the device of my invention which will be more fully understood by reference to the following detailed description in connection with the accompanying drawings, and the scope of the invention will be more particularly pointed out in the appended claims.

Referring to the accompanying drawings in which like reference characters indicate like parts, Figure 1 is a rear elevation of the calling device of my invention. Fig. 2 is a left side view of the structure shown in Fig. 1. Fig. 3 is a right side elevation of the same. Fig. 4 is a bottom view of Fig. 1. Fig. 5 is a front elevation showing the dial of the calling device partly broken away at one place to show the finger lever which is adapted to be engaged by the finger of the operator when in a selected finger hold. Fig. 6 is a rear elevation but with several of the gears removed to more clearly show some of the parts underneath. Fig. 7 is a rear elevation with the bridge plate and some of the gears removed and showing some of the parts in their actuated or off normal position. Fig. 8 is a view somewhat similar to that shown in Fig. 7, but with some of the parts in a different position from that shown in Fig. 7. Fig. 9 is a sectional view of the dial along the line 9, 9 of Fig. 3. Figs. 10 and 11 are enlarged views of the main gear with the power spring shown therein.

Referring now more in detail to the drawings, the calling device comprises the main plate 1, the bridge plate 2, and the separating studs 3, 4 and 5 with the screws 6, 7 and 8 for fastening the bridge plate 2 to the said studs 3, 4 and 5.

The dial 9 is fastened to the main shaft 10 by means of the screw 11 with the washer 12 between the said screw 11 and the dial 9. The main shaft 10 is journaled in the front plate 1 and the bridge plate 2, being held in place by the shoulder bearing in the front plate 1, as shown in Fig. 2 and the screw 13. The pinion 14 is preferably cut on the shaft 10. The dial 9 has eleven finger holds and there is a number for each finger hold which corresponds to the number of impulses which the device is adapted to transmit when the finger is inserted in the corresponding hold and the dial is revolved to the stop. When the hold marked Long distance is used, the device is adapted to transmit eleven impulses to connect to a special set of contacts of the switch mechanism with which the calling device may be associated.

The number plate 2' is held in place

against the front plate 1 by means of the clamping ring 9².

The disk 15, which is fastened to the dial 9 by means of the rivets 15², has a number of slots 15¹ cut therein, one slot for each finger hold. The said slots are adapted to receive a small pin 16 which is adapted to lock the dial 9 against further actuation while the said pin 16 is in engagement with one of the slots. The pinion 14 is normally in mesh with the spring drum gear 17, said drum 17 being adapted to be revolved when the dial 9 is actuated. The said gear 17 is mounted on the gear lever 18 by means of the stud 19, as shown in Figs. 10 and 11. Inside of the gear 17 is the clock spring 20 having one end secured to the stud 19 by means of the pin 21 and the other end secured to the drum 17 by means of the pin 22. The plate 23 is preferably set into the gear 17 and held in place by means of the nut 24, which also serves to hold the gear 17 on its stud 19. In Fig. 11 the plate 23 has been removed to show the spring 20 inside of the hollow of the said gear 17. The spring 23 is the main spring of the device being adapted when the mechanism is adjusted by the dial to operate the adjusted mechanism for transmitting impulses, or to restore the dial mechanism if the dial is not moved until the finger moves the finger lever 60.

The pinion 25 which is in mesh with the gear 17 is fastened to the ratchet wheel 26, the said pinion and ratchet wheel being loose upon the screw stud 27. The gear 28 is also loose upon the screw stud 27, being adapted to be freely revolved upon the said stud 27. Fastened to the gear 28 is the pawl 29 which is pivotally secured to the said gear 28 by means of a small pin. The said pawl 29 is held against the teeth of the ratchet wheel 26 by means of the spring 30, which is preferably secured to the said gear 28 by means of the small pins 31. Thus, it will be noted that when the gear 17 is revolved in a direction opposite to the arrow shown thereon in Fig. 1, the pinion 25, being revolved thereby, carries the ratchet wheel 26 in a direction whereby its teeth slide past the engaging pawl 29. But when the gear 17 is revolved in a direction indicated by the arrow thereon after it has been adjusted by the dial 9, the small pinion 25 carries the ratchet wheel 26 in a direction whereby a tooth engages the pawl 29 and carries the gear 28 around in a direction indicated by the arrow thereon, as shown in Fig. 1. The arrows shown upon the several parts, indicate their direction of rotation when the mechanism is restoring after having been adjusted. The gear 28 is in mesh with the small pinion 32, the said pinion and escapement wheel 33 being fastened together and loose upon the screw stud 34. The stud 34 and stud 27 of the gear 28 are threaded

into the gear lever 18. The anchor 35 is loosely pivoted to the gear lever 18 by means of the screw stud 36 and has the pallets 37 and 38, which are adapted to alternately engage the teeth of the escapement wheel 33. The spring 39 has one end secured to the gear lever 18 and the other end hooked over the anchor 35, the said spring 39 being adapted to assist anchor 35 and the pallets 37 and 38 in retarding the movement of the gear train when the mechanism is restoring. The stud 40 is preferably driven into one end of the anchor 35 and is adapted to be engaged by the spring 42 for reasons which will be more fully explained. The stud 41 is driven into the other end of the anchor 35 to balance the said anchor.

The impulse springs 43 and 44 are mounted upon the insulating block 45 and are clamped in position by means of screw 46 and the clamp plate 47. The spring 44 has the small insulating roller 48 mounted in one end thereof and resting in a tooth of the impulse wheel 49. The said impulse wheel 49 and the pinion 50 are secured together and fastened upon the shaft 51, the said shaft 51 being journaled in the bridge plate 2 and the main plate 1. When the pinion 50 and impulse wheel 49 are revolved the teeth of the said impulse wheel 49 pass the roller 48 breaking and again making the connection between the contact springs 43 and 44 each time a tooth of the said impulse wheel 49 passes the roller 48. The pinion 50 is adapted to be engaged by the teeth of the gear 17, the said gear 17 due to the action of its spring 20 serving to rotate the said pinion 50, thereby rotating the impulse wheel 49 and operating the impulse springs 43 and 44.

As shown in Fig. 1, the pinion 50 is normally out of engagement with the teeth of the gear 17, the said gear 17 being adapted to be adjusted by the dial and then moved out of engagement with the pinion 50 and into engagement with the pinion 50 and thereafter operating the impulse springs 43 and 44 by means of the impulse wheel 49. The gear lever 18, which is adapted to move the gear 17 from its engagement with the pinion 14 into engagement with the pinion 50, is pivotally mounted between the main plate 1 and the bridge plate 2 by means of the shaft 52, the gear 17, gear 28, ratchet 26, pinion 32 and escapement wheel 33 and the anchor 35 being all mounted upon the said gear lever 18 and carried thereby. The said gear lever 18 has the springs 53 and 54 fastened thereto, the spring 53 being actuated by the trip arm 55, while the spring 54 is adapted to restore the gear lever 18 from the position shown in Fig. 8 to that shown in Fig. 6.

The latch 56 is pivotally mounted between the main plate and the bridge plate 2 by

means of the shaft 57. The spring 58 which is wound around the shaft 57 has one end engaging the stud 3 and the other end engaging the latch 56, thereby holding the said latch under tension against the gear lever 18. The finger lever 60 is fastened to one end of the shaft 61 which projects beyond the front plate 1.

The finger lever 60 is shown in its normal position by the full lines indicated in Fig. 5, while the dotted lines indicate its actuated position when moved by engagement with the finger when in the finger hold. This finger lever 60 serves several different purposes. In the operation of the device the finger is inserted in one of the finger holds and the dial revolved until the finger comes into contact with the finger lever in the position shown by the full lines of Fig. 5, and continuing the movement of the dial, the finger moves the lever 60 into position shown by the dotted lines of Fig. 5. This movement of the lever 60 first trips the catch 56, then moves the gear lever 18 and gear 17 from the pinion 14 to the pinion 50, also at the same time actuating a stop to engage a slot corresponding to the selected finger hold to prevent a further actuation of the dial. When the finger is disengaged from the lever 60 it moves back to normal as shown by the full lines of Fig. 5, thereby releasing the impulse mechanism by the removal of the tension of spring 42 from the anchor pallet and allowing the mechanism to operate for transmitting impulses.

The indicator 59 is fastened to the front plate 1 by screws as shown. This member 59 is not engaged by the finger unless the operator in moving the dial fails to engage the finger lever 60. If this be the case the finger lever 60 not being actuated the dial is not stopped and the finger then engages the indicator 59 and the operator knows the device has not been properly operated.

The trip arm 55 which is fastened to the shaft 61 is adapted to engage the latch 56 and move the said latch 56 out of engagement with the gear lever 18 when the finger lever 60 is actuated. The said trip arm 55, by means of the extension 62 then presses the spring 53 into the position shown in Fig. 7 and the said spring 53 being heavy enough to overcome the tension of the spring 54 forces the gear lever 18 over into the position shown in Fig. 7 when the latch 56 is moved out of engagement with the said gear lever 18, as previously described.

When the finger lever 60 is moved to its alternate position, as shown by the dotted lines in Fig. 5, the trip arm 55 assumes the position shown in Fig. 7 and the spring 42, which is fastened to the trip arm 55, engages the stud 40 of the pallet 38 holding the said pallet in engagement with the escapement wheel 33. This prevents any op-

eration of the gear 17 until the finger lever 60 has been disengaged by the finger and restored to normal when the spring 42 again assumes the position shown in Fig. 6 and removing its tension from the pallet 38, allowing the gear 17 to be rotated in a direction indicated by the arrow thereon in Fig. 1 by the spring 20. The gear 17 at this time is in mesh with the pinion 50 and when the said gear 17 operates, it rotates the said pinion 50, actuating the impulse springs. Due to the train of gears connecting the gear 17 with the escapement, the said gear 17 is retarded in its movement by the said connection to the escapement wheel 33.

The unlatching arm 64 is pivotally mounted on the stud 19 and has the spring 65 resting under tension against the projection 66 of the unlatching arm 64. When the latch 56 is moved out of engagement with the gear lever 18, due to the movement of the finger lever 60, the unlatching lever 64 assumes the position shown in Figs. 7 and 8. This unlatching lever 64 is adapted to move the latch 56 out of engagement with the lever 18 when the said lever 18 is in the position shown in Fig. 8 so that the said lever 18 may be restored to normal after the gear 17 has operated.

Fastened to the bottom of the gear 17 is the stop 67, this stop 67 being carried by the gear 17 in its movement. This stop 67 is normally in a position indicated by the dotted lines in Fig. 6 and when the dial 9 is rotated thereby adjusting the gear 17, the said stop 67 assumes a position out of engagement with the unlatching arm 64, depending upon the adjustment of the gear 17. When the dial has been rotated the finger lever 60 moved to its dotted position as shown in Fig. 5 and then released, the gear lever 18 and latch 56 assume the position shown in Fig. 8. When the gear 17 then restores to normal operating the impulse springs, the stop 67 moves along with the gear 17 until it engages the unlatching arm 64 and continuing in its movement carries the unlatching arm 64 with it, the inclined end 68 of the said arm 64 engages the latch 56 and moves it out of engagement with the gear lever 18 and the said gear lever 18 is then moved to the position shown in Fig. 1 by the spring 54.

When the calling device of my invention is used in connection with a subscriber's telephone for controlling directly operable switches over a metallic circuit, it is desirable to shunt the apparatus of the subscriber's telephone while the impulses are being transmitted, so as to secure a more efficient operation of the controlled switches over long telephone lines. To shunt the subscriber's telephone apparatus while the impulse springs 43 and 44 are operating,

the contact springs 69 and 70 are held closed. This closing of the said springs 69 and 70 is performed by the movement of the gear lever 18 which carries the insulating bushing 71 to engage the curved portion of the spring 69 and thereby moving the said spring 69 into engagement with its fellow spring 70. The gear lever 18 is held in its alternate position as shown in the Figs. 7 and 8, while the impulse springs 43 and 44 are operating, thereafter being restored to position shown in Fig. 1 by the return of the gear 17 and due to the tension of the spring 54. Thus it will be seen that the shunt springs 69 and 70 are held closed while impulse springs 43 and 44 are operating.

Operation: Having now described the details of construction and the cooperation between the different parts, a complete operation of the calling device in transmitting a series of impulses will now be described.

Assuming the operator desires to send three impulses, the finger will be placed in the finger hold, number 3, and the dial 9 rotated in a clockwise direction until the finger engages the finger lever 60 and continuing in its movement until the finger lever 60 is moved to the position indicated by the dotted lines of Fig. 5, the dial 9 of course also being carried along to the same position. The rotation of the dial adjusts the gear 17 to such a position that when released it is adapted to move three points of the impulse wheel 49 past the insulating roller 48. As the finger lever 60 is moved, due to its engagement by the moving finger of the operator, the trip arm 55 is rotated and the spring 42 presses against the stud 40 of the pallet 38, the extension 62 of the said trip arm 55 moves the spring 53 into the position shown in Fig. 7 and the trip arm 55 continuing in its rotation engages and moves the latch 56 out of its engagement with the gear lever 18. The tension of the spring 53 being greater than that of the spring 54 overcomes the said spring 54 and moves the gear lever 18 into the position shown in Fig. 7, thereby disengaging the gear 17 from the pinion 14 and moving the said gear 17 into engagement with the pinion 50.

The gear lever 18 which carries the stop pin 16 moves the said stop pin 16 into a slot 15^a corresponding to the selected finger hold, the said pin 16 by its engagement with said slot stopping the dial 9 from further advance. This stop pin 16 also prevents any further actuation of the dial 9 until the gear lever 18 has moved back to normal after the impulses have been transmitted. The subscriber now removes the finger from the selected finger hold, thereby releasing the finger lever 60 which returns to its normal position as shown by the full lines of Fig. 5.

The return of the said finger lever 60 to normal moves the trip arm 55 back to its normal

position, as shown in Fig. 8, thereby removing the tension from the heavy spring 53 and also allowing the latch 56 to engage the gear lever 18 as shown in Fig. 8. The return of the trip arm 55 to normal also removes the tension of the spring 42 from the stud 40 and the gear 17 being free, now is rotated by the clock spring 20 in a direction indicated by the arrow thereon in Fig. 1. At this time the gear 17 is in engagement with the pinion 50 and the said gear 17 having been adjusted to operate the springs 43 and 44 three times, the said gear 17 in its return under influence of the governor escapement wheel 33 rotates the impulse wheel 49, so that three of its points pass the insulating roller 48, thereby lifting the contact spring 44 out of engagement with the contact spring 43 three times.

As the gear 17 approaches normal, the stop 67 shown in dotted lines in Fig. 8 engages and moves the unlatching arm 64 and the inclined surface 68 of the said arm 64 engages and moves the latch 56 upon its pivot until the said stop 67 butts against the gear lever 18. The latch 56 by means of the stop 67 having been moved out of engagement with the gear lever 18, the said lever 18 is moved back to its normal position, as shown in Fig. 1 by the spring 54, the latch 56 again moving into a position shown in Fig. 1.

The shunt springs 69 and 70 have been held closed while the gear lever 18 is in its alternate position, but are again opened when the said gear lever 18 restores to normal. The restoration of the gear lever 18 also moves the stop pin 16 out of engagement with a slot 15^a and the dial 9 is again unlocked. The mechanism of the device being all at normal and the lock having been removed from the dial 9, the said calling device is now available to be actuated for another series of impulses.

Should the operator in actuating the dial fail to move it far enough to completely actuate the finger lever, the trip arm 55 will fail to release the catch 56 and when the finger is removed from the dial, the gear 17 will restore and the lever 18 not having moved, the said gear 17 will also return the dial. This will indicate to the operator that the device has not properly operated so that the dial may be moved again. Thus it will be noted that to operate the impulse springs it is necessary to completely actuate the dial 9 and finger lever 18.

What I claim as new and desire to secure by Letters Patent is:

1. The combination with a numbered plate 9^a, the forwardly moving finger hold dial 9, the slotted flange 15 fixed thereto, the locking member 16, the movable finger lever 60 adapted to be engaged by the finger when in a finger hold, the fixed indicator 53, said

lever when engaged by the finger upon actuation of the dial, controlling said locking member to engage said flange to lock the dial, impulse mechanism operated responsive to restoration of the finger lever after actuation of the dial and finger lever, and means for unlocking said dial after said mechanism has operated.

2. The combination with a dial having a series of actuating finger holds, operating positions for said dial corresponding to said holds, a finger lever adapted to be actuated by engagement with the finger in a finger hold, and means released by said finger lever for holding said dial locked after the removal of the finger, when moved to any of its operating positions.

3. In a calling device the combination with a revoluble dial having a plurality of operating positions and a series of adjacent finger holds for actuating said dial, coöperative contacts, operating means for said contacts adapted to be adjusted corresponding to movement of said dial to any one of its positions, a finger lever adapted to be actuated by engagement with the finger in a finger hold, a locking member controlled by said finger lever for locking said dial against further actuation when moved to any of its operating positions, means effective upon restoration of the finger lever for releasing said operating means from an adjusted position to operate said contacts, and means for unlocking said dial after said contacts have operated.

4. In a calling device the combination with a movable member of power storing mechanism connected with said movable member and adapted to be adjusted responsive to movement of said member, coöperative contacts, operating means for said contacts normally disconnected from said mechanism, means for disconnecting said mechanism when adjusted from said movable member and connecting said mechanism with said operating means and means for thereafter releasing said mechanism from said adjustment to operate, whereby said contacts coöperate for transmitting impulses.

5. In a calling device the combination with a movable member having a series of finger holds for actuating said member, of mechanism connected with said member and adapted to be adjusted responsive to movement of said member, coöperative contacts, operating means for said contacts disconnected from said mechanism, a finger lever actuated by engagement with the finger in a selected finger hold for disconnecting said mechanism when adjusted from said member and connecting said mechanism with said operating means, and means also actuated on movement of said finger lever for controlling said mechanism to actuate said

operating means and contacts for transmitting impulses.

6. In a calling device the combination with a manually movable member, of mechanism adapted to be adjusted in any one of a plurality of positions responsive to movement of said member, coöperative contacts, operating means for said contacts disconnected from said mechanism, and means for connecting said mechanism when adjusted in any of its positions, with said operating means, whereby said operating means operate said contacts corresponding to the adjustment of said mechanism.

7. In a calling device the combination with a movable member having a plurality of operating positions, of mechanism adapted to be adjusted responsive to movement of said member, a latch for holding said mechanism in operative relation with said member while being adjusted, coöperative contacts, operating means for said contacts, disconnected from said mechanism, means automatically actuated on movement of said mechanism to any of its operating positions for releasing said latch, whereby said mechanism is disconnected from said member and connected to said operating means, and means actuated thereafter to release said mechanism from its adjusted position for actuating said operating means and contacts.

8. A calling device comprising power storing mechanism, adjusting means for said mechanism operatively connected therewith, a movable frame supporting said mechanism, an impulse contact operating device disconnected from said mechanism, and means for moving said frame upon adjustment of said mechanism whereby said mechanism is operatively connected to said contact operating device.

9. In a calling device the combination with a manually movable member having a plurality of operating positions, of power storing mechanism adapted to be adjusted corresponding to movement of said member, impulse contacts, operating means for said contacts disconnected from said mechanism, means for connecting said mechanism when adjusted, with said operating means, and a manually-operated member adapted to be thereafter actuated to release said mechanism from its adjustment, whereby said operating means operate said contacts corresponding to the operating position of said manually movable member.

10. In a calling device the combination of power storing mechanism, a setting member for adjusting said mechanism operatively connected therewith, a movable frame supporting said mechanism, an impulse contact operating device disconnected from said mechanism, means for moving said frame upon adjustment of said mechanism, where-

by said mechanism is operatively connected to said contact device, and a locking member carried by said frame adapted to lock said setting member, responsive to movement of said frame.

11. A calling device comprising a finger hold setting member, impulse mechanism adjusted for operation responsive to movement of said member, a finger lever moved to an operated position upon movement of said member, means actuated by the finger lever to engage and hold said mechanism in its adjusted position, said lever being adapted when released, to disengage said holding means, whereby said mechanism is operated, and means for locking the setting member while said mechanism is operating.

12. A calling device comprising power storing mechanism, a setting member for adjusting said mechanism, operatively connected therewith, a movable frame supporting said mechanism, an impulse contact operating device disconnected from said mechanism, means for moving said frame upon adjustment of said mechanism, whereby said mechanism is operatively connected to said contact operating device, and a locking device for said setting member actuated responsive to the movement of said frame.

13. A calling device comprising a movable setting member, adjustable power storing mechanism in operative relation with said member, a contact operating device disconnected from said mechanism, means for moving said mechanism after adjustment thereof by said member, out of operative relation with said member and into operative connection with said contact device and means for locking said setting member during connection between the mechanism and contact device.

14. In a calling device, the combination with a finger hold dial, of impulse mechanism adjusted for operation responsive to movement of said dial, a finger lever adapted to be engaged by the finger when in a finger hold upon actuation of the dial, a locking member for said dial controlled by said finger lever and a second locking member also controlled by said finger lever to maintain said mechanism in its adjusted position while said finger lever is engaged by the finger.

15. A calling device comprising a movable setting member, adjustable power storing mechanism in operative relation with said member, a contact operating device disconnected from said mechanism, said mechanism upon adjustment thereof by said member being moved out of operative relation with said member and into operative connection with said contact device, and means for thereafter releasing said mechanism from its adjustment to operate said contact operating device.

16. A calling device comprising a movable setting member, adjustable power storing mechanism in operative relation with said member, a contact operating device disconnected from said mechanism, means for moving said mechanism after adjustment thereof by said member, out of operative relation with said member and into operative connection with said contact device, means for thereafter releasing said mechanism from its adjustment to operate said contact operating device, and means for locking said setting member against actuation while said contact device is operating.

17. A calling device comprising a movable setting member, adjustable power storing mechanism in operative relation with said member, a contact operating device disconnected from said mechanism, means for moving said mechanism after adjustment thereof by said member out of operative relation with said member and into operative connection with said contact device, means for thereafter releasing said mechanism from its adjustment to operate said contact operating device and cooperative contacts adapted to be held in a definite position while said contact device is operating.

18. A calling device including a finger hold setting member, impulse mechanism adjusted responsive to movement of said member, a finger lever, a movable frame controlled by said finger lever and adapted to be moved after complete actuation of said finger lever, cooperative contacts adapted to be moved into operative relation upon movement of said frame, and means for thereafter releasing said impulse mechanism for transmitting impulses.

19. In a telephone system, a finger-hold dial, a gear wheel, a spring for propelling the gear wheel, said spring connected to be wound up by the dial, a finger lever adapted to be actuated by the finger and thereafter restored, means responsive to the restoration of the finger lever for releasing the gear wheel when the dial has been advanced, an impulse wheel, and a gearing through which the gear wheel acts to drive the impulse wheel.

20. A calling device comprising a finger-hold dial, a finger lever, impulse mechanism, means controlled by the finger lever for locking the dial when it is fully rotated and whereby the removal of the finger from the finger lever causes it to restore and allow operation of the impulse mechanism, and devices operative to cause the dial to return to its last position when released before reaching the end of any forward rotation thereof.

21. A calling device comprising a finger-hold dial, a finger lever, means whereby when the dial is fully rotated said finger lever locks said dial, devices operative to

cause the dial to return to its last position if released before reaching the end of any forward rotation thereof, and impulse mechanism operative only when the finger lever is engaged and again released in the forward rotation of the dial.

Signed by me at Chicago, county of Cook,

and State of Illinois, in the presence of two witnesses.

WILLIAM KAISLING.

Witnesses:

GEORGE E. MUELLER.

W.M. BERGHAIN.