

1,210,917.

Patented Jan. 2, 1917.

2 SHEETS—SHEET 1.

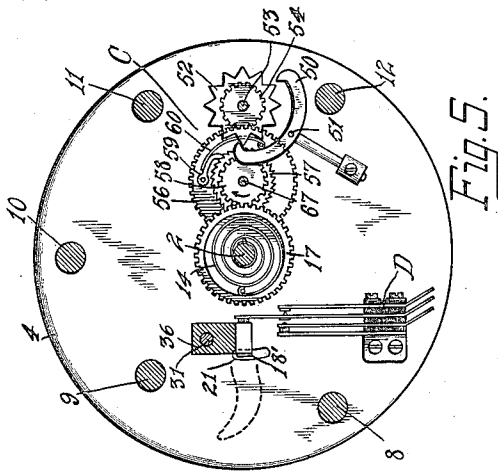


Fig. 5.

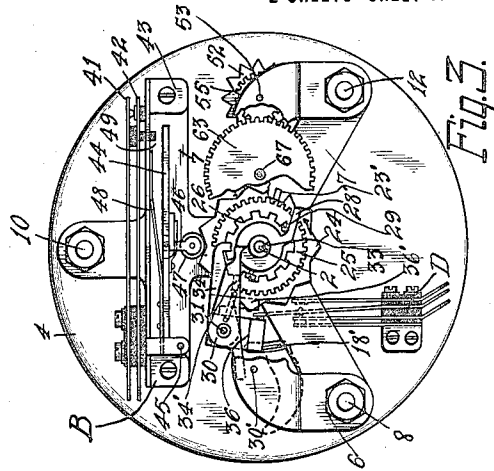


Fig. 3.

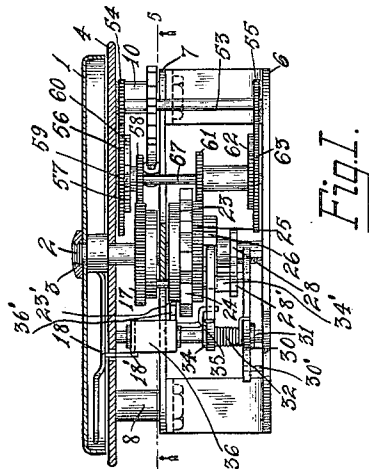


Fig. 1.

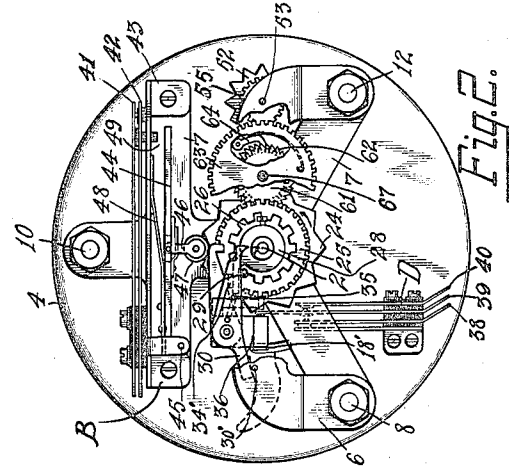


Fig. 2.

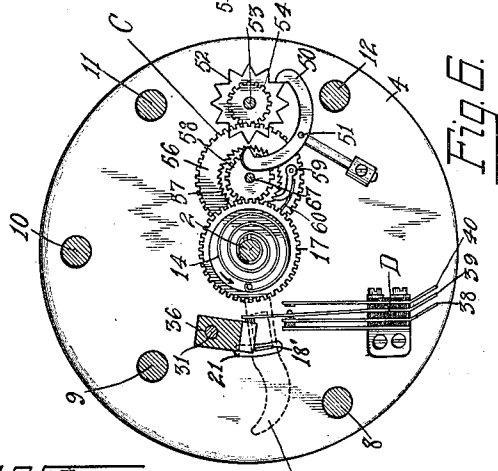


Fig. 6.

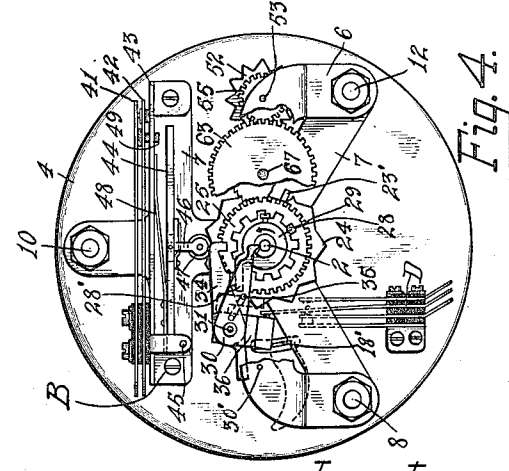


Fig. 4.

Witnesses:

George E. Mueller
Wm. Burghahn.

Inventor:

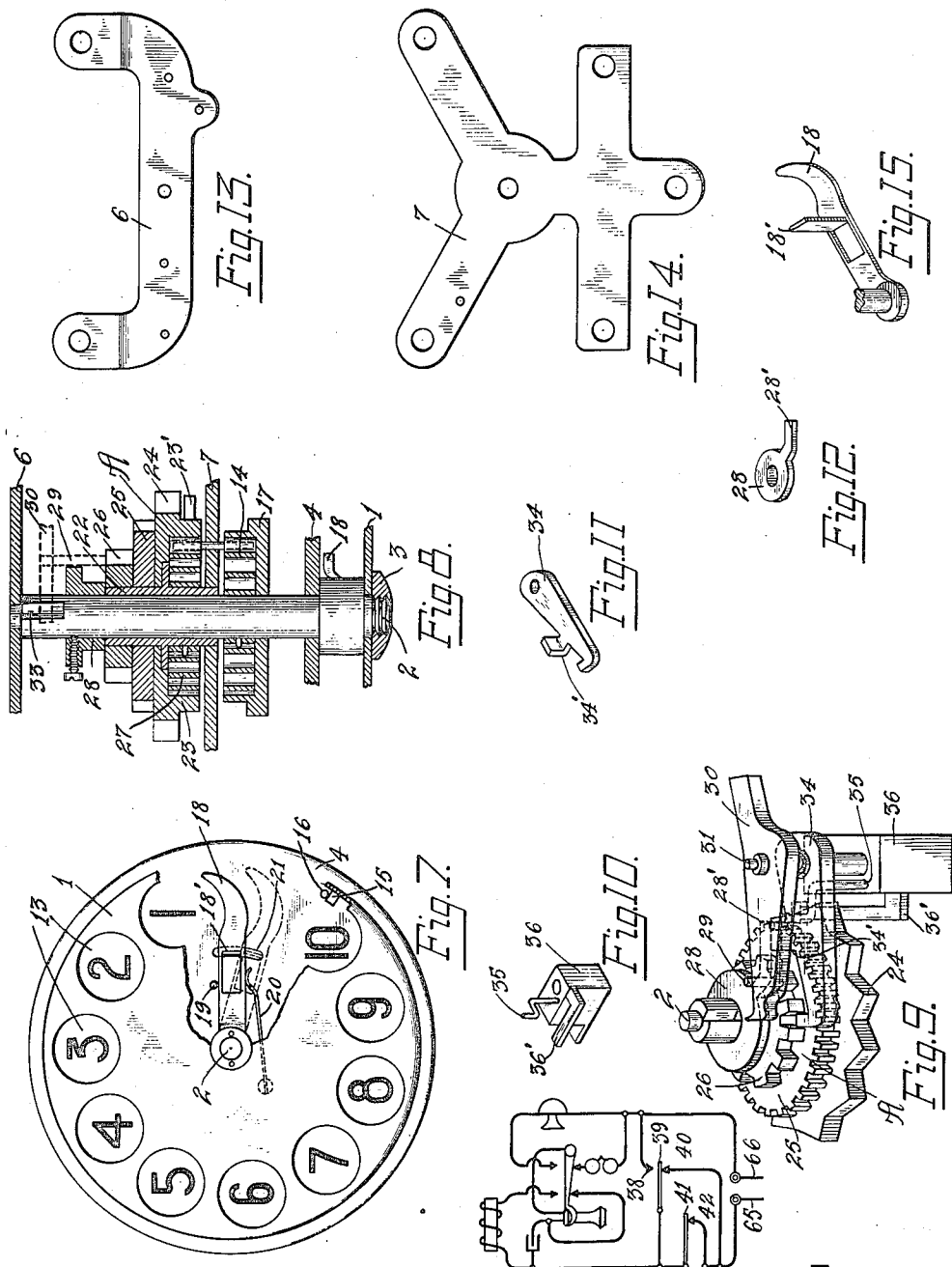
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By Curtis B. Camp
Attorney.

A. H. DYSON.
 CALLING DEVICE.
 APPLICATION FILED FEB. 14, 1912.

1,210,917.

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2 SHEETS—SHEET 2.



Witnesses:

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Fig. 16.

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UNITED STATES PATENT OFFICE.

ALFRED H. DYSON, OF CHICAGO, ILLINOIS, ASSIGNOR TO KELLOGG SWITCHBOARD AND SUPPLY COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

CALLING DEVICE.

1,210,917.

Specification of Letters Patent.

Patented Jan. 2, 1917.

Application filed February 14, 1912. Serial No. 677,499.

To all whom it may concern:

Be it known that I, ALFRED H. DYSON, a citizen of the United States, resident of Chicago, county of Cook, and State of Illinois, have invented new and useful Improvements in Calling Devices, of which the following is a specification.

My invention has to do with calling devices, or impulse transmitters as they are also called, in general and particularly to devices of that character wherein a setting member is actuated to adjust impulse mechanism, which upon being released will transmit a plurality of impulses, or in other words, causes operations of its impulse springs corresponding to the adjustment of the device, an object being to provide a device of the above character of novel and improved construction, and as will be more particularly pointed out in the following specification and claims.

I am familiar with calling devices of the art in which a manually-operated setting member or dial is actuated to adjust associated impulse mechanism, whereupon the dial is released restoring to normal followed by the operation of the impulse mechanism. In devices of the type referred to, if the dial is not completely actuated but is prematurely released, it restores to normal causing an operation of the impulse mechanism and an effective operation of the impulse contact springs. It is apparent that in such a device that the impulse springs are effectively operated regardless of whether the dial is or is not properly operated.

One of the features of my invention is to provide means whereby, in devices of the character referred to, an effective operation of the impulse springs is not secured unless the dial is fully operated.

For a more complete understanding of my invention reference is to be had to the accompanying drawings in which like reference characters indicate like parts and in which—

Figure 1 is a sectional view of the preferred construction of the calling device of my invention. Fig. 2 is a rear view of the same device showing the parts at normal. Fig. 3 is a view similar to Fig. 2 but showing the parts with the dial in a fully actuated position and with the impulse mechanism adjusted and ready to restore. Fig. 4 is a view similar to Fig. 3 but with the dial

restored and the impulse mechanism released and ready to operate responsive to its adjustment. Fig. 5 is a sectional view along line 5—5 of Fig. 1 looking in the direction of the arrow indicated thereon, and with all the parts illustrated at normal. Fig. 6 is a view similar to Fig. 5 but with the finger lever moved to its actuated position. Fig. 7 is a face view of the device with a portion of the dial or setting member broken away disclosing the finger lever. Fig. 8 is a sectional view of the parts carried by the main shaft, which includes the impulse mechanism A. Fig. 9 is a perspective view of the impulse mechanism and coöperating locking pawls. Figs. 10 to 15 inclusive are views of different details of the mechanism and Fig. 16 illustrates diagrammatically a well-known form of substation telephone with the calling device connected therewith in a preferred manner.

Generally speaking to operate the calling device, the operator inserts a finger in the desired finger hold of the dial illustrated in Fig. 7 which is then rotated in a clockwise direction until the finger engages and moves the finger lever as illustrated in Fig. 7 to its dotted or fully actuated position. This movement of the dial adjusts impulse mechanism A and upon actuation of the finger lever a set of shunt springs are operated and the impulse mechanism is locked in its adjusted position so that upon the operator releasing his hold upon the dial, said dial restores to normal thereupon unlocking the impulse mechanism which now operates the impulse springs a number of times corresponding to the adjustment of the dial and said impulse mechanism. During the restoration or operation of the impulse mechanism, the dial is locked against actuation, but upon the return of the impulse mechanism to normal the dial is unlocked, allowing it to be again operated.

Referring now more in detail to the preferred construction of my invention, it comprises a rotatable dial or setting member 1 rigidly fastened to main shaft 2 by means of a nut 3. The said shaft 2 is journaled near its front end in a plate 4 and at its rear end in a bridge plate 6. A third plate 7 is also provided, these plates 4 and 7 being secured together by means of the studs 8, 9, 10, 11 and 12, the plate 6 being then clamped against plate 7 by means of studs 8 and 12,

the said plates and studs thus forming a rigid frame or support for the mechanism.

In several of the views I have shown arrows on the rotatable members such as gears, etc., these arrows indicate the direction of rotation of the parts so marked, during the setting or adjusting movement of the device.

I have preferably arranged my device so that a maximum number of ten impulses or ten operations of the impulse springs may be effected, although it will be apparent that my invention is not limited to any certain number of impulses. To this end I have provided ten openings or finger holds 13 in the dial 1 and have numbered the plate 4 with indicating numerals from 1 to 10, these numerals being placed preferably directly beneath the openings 13, and indicating the number of operations of the associated impulse springs which will be effected when the finger is inserted in the corresponding hold and the dial fully actuated.

To restore the dial after it has been operated, I provide restoring means, preferably a spring 14 having one end secured to shaft 2 and the other end to plate 7, in such a manner that when the dial is rotated in a clockwise direction and the operator's finger removed therefrom, or the pressure of the finger removed, said spring 14 acts upon the dial and shaft to restore it in a counterclockwise direction until the stop pin 15 carried by dial 1 (Fig. 7) again engages a stop pin 16 which is rigidly secured to front plate 4. Said spring 14 is incased in a spring barrel 17 secured to shaft 2 and having gear teeth cut in its periphery and adapted to cooperate with the governor mechanism C to retard the restoration of the dial.

A control or finger lever 18 is loosely carried by shaft 2, being normally held against a stop pin 19, and having a tension spring 20 pressing against its lower edge. Thus when the finger is inserted in one of the finger holds 13 and the dial rotated in a clockwise direction the finger engages finger lever 18 carrying it along until it reaches the position indicated by the dotted lines in Fig. 7. A rearwardly projecting portion 18' passes through an opening 21 in plate 4 and is adapted to cooperate with certain parts of the device as will be more clearly set forth.

Impulse spring operating mechanism A is preferably supported on main shaft 2 and comprises a secondary shaft or sleeve 22 rotatably carried on shaft 2, said sleeve 22 having rigidly secured thereto other parts of mechanism A including spring barrel 23 which also has the impulse teeth 24 cut on the periphery thereof; a gear wheel 25 and a toothed locking disk 26. To operate the mechanism A, or in other words restore it from its adjustment, I preferably provide a

spring 27 which is mounted in spring barrel 23 having one end pinned to sleeve 22 and the other end pinned to frame plate 7. This spring is so arranged that when mechanism A is adjusted responsive to the movement of dial 1, upon being freed the said spring 27 will restore it from such adjustment. A collar or hub 28 is rigidly secured to main shaft 2 preventing lateral movement of mechanism A. This hub 28 carries a finger 28' which normally engages a stud or pin 29, securely driven into stop disk 26. Thus when the dial is rotated in a clockwise direction, due to finger 28' engaging said pin 29, the mechanism A is rotated or adjusted according to the extent of actuation of dial 1.

A dial locking pawl 30 is provided, being rotatably supported by a shaft 31, and normally resting against said pin 29 under tension of a spring 32. A cooperating stop or notch 33 is provided in shaft 2 being adapted to be engaged by pawl 30 to lock the dial (after it has been operated) against further movement during the operation of the impulse springs, as will be described. A locking pawl 34 for impulse mechanism A is provided, being rotatably supported by shaft 31 and held under tension of said spring 32 against finger 35, said finger being rigidly supported in block 36 which in turn is rotatably supported by shaft 31. Thus it will be seen that the three members 30, 34 and 36 are all supported by shaft 31, but are all independently movable.

As previously stated locking pawl 34 is normally resting against the finger 35, and finger 35 being rigidly secured to block 36 is held in its normal position, (as indicated in Fig. 2) due to the projecting pin 23' carried by spring barrel 23, engaging the arm 36' carried by block 36. Thus when the dial is operated carrying mechanism A around with it, pin 23' moves away from arm 36', but due to the extension 18' of finger lever 18 engaging block 36, (Figs. 1, 2 and 5) block 36 is not free to rotate until the finger lever has been moved to its actuated position, thus causing extension 18' to free itself of block 36 as indicated in Figs. 3, 4 and 6 whereby block 36 is adapted to be rotated, preferably by the tension of spring 39. Pawl 34 is also normally engaged by the finger 28', the said finger 28' engaging the lateral extension 34' as indicated more clearly in Figs. 1, 2 and 4, so that normally pawl 34 is held by members 28' and 36'; or depending upon their relative adjustment by either of the members 28', 36'. Of course when the dial is operated, finger 28' moves away from pawl 34, but due to pawl 34 being engaged by the wire finger 35 it is still held out of engagement with locking disk 26 until the finger lever is actuated, whereupon pawl 34 is moved into locking engage-

ment with a tooth of disk 26, thus locking mechanism A until the dial is restored which is upon removal of the finger therefrom. Upon the dial reaching normal finger 28' again engages extension 34' of pawl 34 lifting it free of locking disk 26 to allow the operation of mechanism A.

A set of contact springs D are provided comprising three contact springs 38, 39, 40 which are insulatingly mounted upon plate 4. Middle spring 39 normally rests under tension against the lower end of block 36 in such a manner that when the dial has been operated and finger lever 18 actuated, said spring 39 is free to act upon block 36 moving it into its actuated position as indicated in Figs. 3, 4 and 6.

It will be apparent that contact springs D are not operated unless the dial is fully actuated allowing actuation of finger lever 18 whereby block 36 is unlocked to allow its actuation and the actuation of contact springs D.

The impulse contact arrangement I preferably employ is shown at B comprising a pair of normally closed contacts 41, 42 which are insulatingly mounted upon a bracket 43 which in turn is secured to frame plate 7. To operate springs 41, 42 I preferably employ an arm 44 pivoted at 45 and carrying a pivoted triangular member 46 supporting a roller 47 which rests against impulse wheel 24 under tension of spring 48. A rubber buffer 49 is carried by spring 41 and passes through holes in spring 42 and bracket 43, and is adapted to be engaged by arm 44 when said arm is reciprocated by cooperation of the impulse wheel 24 and the roller 47. The pivoted member 46 is so arranged that when the dial is actuated, that is moved in a clockwise direction thus carrying impulse wheel 24 around in the direction of the arrow indicated thereon, the teeth of wheel 24 tend to swing roller 47 toward the left (Figs. 2, 3, 4) without reciprocating the arm 44. But when mechanism A is released and impulse wheel 24 restored from its adjustment, the teeth of wheel 24 act upon roller 47 and member 46 in such a manner that arm 44 is reciprocated thereby operating contact springs 41—42.

To control the rate of operation of the impulse springs, governor mechanism C is provided, this governor mechanism also being adapted to retard the restoration of the dial when released after being actuated. For this purpose I provide the well known escapement mechanism comprising a weighted pallet 50 supported by a shaft 51 and adapted to cooperate with the escapement wheel 52. Said wheel 52 is rigidly secured to a shaft 53 having pinions 54, 55 rigidly secured thereto. Intermediate or connecting gearing is provided for operatively associating the dial with the governor, this gear-

ing comprising a gear 56 loosely supported upon shaft 67 and in mesh with pinion 54. A ratchet wheel 57 and pinion 58 are rigidly fastened together and free to rotate upon said shaft 67. A pawl 59 is carried by gear 56 and pressed into engagement with the teeth of ratchet wheel 58 by means of a spring 60. Pinion 58 being in engagement with the gear 17 (which it will be remembered is rigidly secured to the main shaft 2) when the dial 1 is rotated in a clockwise direction, pinion 58 moves in the direction of the arrow indicated thereon (Fig. 5) causing the teeth of ratchet wheel 57 to pass pawl 59 without rotating the large gear 56. With this arrangement it will be seen that when the dial is actuated it is free of the retarding effect governor mechanism C, but when it is restored, which is in a counterclockwise direction, its movement is retarded by the governor mechanism C.

As previously stated mechanism A upon being released after adjustment is also retarded by governor C, mechanism A being connected to governor C through the medium of gears 24, connected gear and ratchet 61—62, gear 63 and pinion 55. Gear 63 carries a pawl 64 adapted to cooperate with ratchet wheel 62 in such a manner that when the impulse mechanism is adjusted by the dial, its advancement is not retarded by the governor mechanism C, but upon restoration of mechanism A its movement is retarded by said governor C.

At Fig. 16 I have illustrated a well known form of substation telephone having the calling device of my invention connected in circuit therewith in a preferred arrangement. The impulse springs 41—42 are connected in series with the line conductors 65, 66, but said springs 41—42 have shunt springs 39—40 so connected that a closed circuit is normally connected across said springs 41—42, so that to secure an effective operation of impulse springs 41—42 it is necessary to first interrupt shunt contacts 39—40. I also provide a contact 38 so connected that when contacts 38—39 are closed the substation apparatus is shunted thereby, thus reducing the line resistance and also preventing interference with the transmission of the impulses by the operation of the switchhook contacts.

Operation: Having described the detailed construction of a preferred arrangement of my invention, its operation will now be described. We will assume that the device is connected in circuit to a substation as illustrated in Fig. 16 and that the operator desires to effect five operations of impulse springs 41—42. Therefore the operator inserts a finger in the hole opposite the indicating numeral 5 and the dial 1 rotated in a clockwise direction. As the dial leaves normal, due to the engagement between fin-

ger 28' and pin 29, mechanism A is of course carried around and adjusted according to the movement of the dial. It will be remembered that the said pin 29 while at normal is holding pawl 30 clear of shaft 2 as shown in Figs. 2 and 9, but as pin 29 leaves normal it moves away from pawl 30 allowing spring 32 to act upon pawl 30 whereby it engages shaft 2 as illustrated in Fig. 3. During the adjusting movement of mechanism A, the impulse teeth of wheel 24 coöperate with roller 47 and pivoted member 46 in such a manner that member 46 is simply vibrated on its pivot without reciprocating arm 44. Now as the dial is continued in its advancement, the finger engages finger lever 18 and the continued movement thereof brings lever 18 into its actuated position which is indicated by dotted lines in Figs. 4, 6 and 7. It will be seen that this travel of the dial has advanced mechanism A five operating positions, or in other words advanced five teeth of impulse wheel 24 and five teeth of locking disk 26. The said operation of finger lever 18 causes its extension 18' to move downward tripping block 36 whereupon the tension of spring 39 rotates the block 36 about its pivot and into its operated position as illustrated in Figs. 3, 4 and 6. This releasing operation of block 36 of course allows shunt springs 39, 40 to open and interrupt the shunt circuit about contact springs 41-42, and due to the closing of contact springs 38, 39 a shunt is closed around the substation apparatus. Although when the dial moved off normal, finger 28' moved away from the lateral extension 34' of locking pawl 34, said pawl 34 was prevented from moving off normal due to its engagement with the wire finger 35 carried by block 36, so that as block 36 is tripped by the actuation of finger lever 18 this finger 35 tends to move away from pawl 34 whereby 34 moves into locking engagement with a tooth of wheel 26 as illustrated in Fig. 3. When dial 1 is operated gears 17 and 25 are rotated thereby, but due to the ratchet and pawl arrangements in the gearing connecting these gears with the governor mechanism C, dial 1 advances without being retarded by mechanism C. The locking pawl 34 having dropped into locking engagement with locking disk 26 as stated, it is apparent that further advancement of the dial is prevented, therefore upon the operator relieving the pressure of the finger upon dial 1 it is free to be restored by spring 14 which acts upon shaft 2, restoring it until stop pin 15 carried by dial 1 engages stop pin 16. During this restoring movement of dial 1, due to the connections extending from gear 17 to the governor mechanism C, this intermediate connection comprising the gears 58, 56 and ratchet 57, the restoration of dial 1

is retarded. It is apparent that this connection extending between the dial and governor mechanism prevents the dial from snapping back with the usual attendant jar to the associated mechanism. Upon the dial reaching normal, dial locking pawl 30 snaps into the tooth 33 of shaft 2 as illustrated in Fig. 4, locking the dial and preventing its actuation until pawl 30 is released. This release of pawl 30 is not effected until the impulse mechanism has operated as will be again referred to. Upon the dial reaching normal as just referred to, finger 28' engages the lateral projection 34' of locking pawl 34, lifting said pawl out of locking engagement with the impulse mechanism which is now free to operate according to its adjustment. Locking pawl 34 having freed mechanism A, the power spring 27 acts upon said mechanism to restore it, thereby causing the five impulse teeth of wheel 24 which were previously advanced, to act upon roller 47 and reciprocating arm 44 five times, causing five operations of impulse springs 41-42. As mechanism A moves toward normal, the pin 23' carried thereby engages the extension 36' of block 36 rotating said block on its pivot thereby restoring shunt spring 39 to normal and also allowing finger lever 18 to be restored by the action of its spring 20. Also due to this restoring movement of block 36 its wire finger 35 again moves up into engagement with locking pawl 34. Also upon restoration of impulse mechanism A, the pin 29 carried by the locking disk 26, engages and lifts dial locking pawl 30 out of engagement with the notch 33 in shaft 2, said pin 29 also engaging finger 28' and mechanism A is brought to a stop.

As previously stated, the restoring movement of mechanism A is retarded by the governor mechanism C due to the connection extending from its gear 25, and gears 61-63 to the gear 55 of mechanism C, thus the operations of the impulse contacts are effected at a predetermined period.

Should an operator fail to fully actuate dial 1, that is fail to advance it far enough to allow the finger to actuate lever 18, and then release the hold upon the dial, it will be restored to normal. But as the operator failed to actuate the finger lever it will be seen that the mechanism A was not locked in an adjusted position so that when the dial restores the mechanism A restores with it and although such a restoration of mechanism A will actuate impulse springs 41-42, due to the failure to operate shunt spring 39, such an operation of the impulse springs is not an effective operation as the shunt around the impulse contacts is maintained closed through contacts 39-40.

It will be apparent from the above that in order to secure an effective operation of the calling device it is essential that the dial be

fully operated and the finger lever 18 actuated to trip the locking pawl, thereby also causing the operation of the shunt springs.

Although I have shown a preferred arrangement of the contact springs and worked out my invention in a specific manner to meet the commercial requirements of such a device, it is apparent that many changes and modifications thereof may be made and I do not desire to be limited to the exact structure as disclosed, but aim to cover all such devices as come within the spirit and scope of the appended claims.

What I desire to secure as new by United States Letters Patent is:

1. A calling device comprising impulse mechanism and means for the adjustment thereof, impulse contacts operated responsive to said impulse mechanism, shunt contacts normally connected in shunt of said impulse contacts, and means for interrupting said shunt contacts responsive to a setting operation of said impulse mechanism.

2. A calling device comprising a setting member having a fully operated position, impulse mechanism adjusted for operation responsive to actuation of said member to such position, means for restoring said member, means actuated upon restoration of said member whereby said mechanism is subsequently operated, shunt contacts, and mechanism responsive only to a full setting operation for operating said contacts and maintaining them operated while said impulse mechanism is operating.

3. A calling device comprising an adjustable setting member, impulse mechanism adjusted for operation responsive to adjustment of said setting member, shunt contacts normally rendering said mechanism ineffective but operated responsive to said setting operation to render said mechanism effective, means for restoring said setting member, means actuated upon restoration of said member whereby said mechanism is subsequently operated, and restoring means for said shunt contacts effective upon operation of said impulse mechanism.

4. A calling device comprising an adjustable setting member, a finger hold for actuating said member, impulse mechanism adjusted for operation responsive to adjustment of said setting member, shunt contacts, means actuated by engagement with the finger while in the finger hold but independent of the finger-hold to operate said shunt contacts, means for restoring said setting member, means actuated upon restoration of said setting member whereby said mechanism is subsequently operated, and restoring means for said shunt contacts effective upon operation of said impulse mechanism.

5. A calling device comprising a setting member, a series of finger holds for actuating said member, impulse mechanism ad-

justed for operation corresponding to actuation of said setting member, means for restoring said member, means actuated upon restoration of said member whereby said mechanism is subsequently operated according to its adjustment, shunt contacts normally rendering the impulse mechanism ineffective, and mechanism for operating said contacts and maintaining them operated to render the impulse mechanism effective while operating.

6. A calling device comprising a setting member having a plurality of adjacent finger holds, mechanism adjusted responsive to movement of said member for transmitting impulses, means for restoring said member and thereafter operating said mechanism for transmitting impulses corresponding to the selected finger hold, shunt contacts normally rendering the impulse mechanism ineffective, and mechanism for operating said contacts and maintaining them operated to render said impulse mechanism effective for transmitting the impulses.

7. A calling device comprising a setting member having a plurality of adjacent finger holds, mechanism adjusted responsive to movement of said member for transmitting impulses, shunt contacts normally rendering the mechanism inoperative, means for operating said contacts responsive to the setting movement of said member for rendering the mechanism effective, means for restoring said member and thereafter operating said mechanism for transmitting impulses corresponding to the selected finger hold, and means for restoring said shunt contacts after said impulse mechanism has operated for transmitting impulses.

8. A calling device comprising a setting member, a plurality of adjacent finger holds for actuating said member, impulse mechanism adjusted for operation responsive to actuation of said member, a finger lever adapted to be engaged and operated by the finger when in a selected finger hold, said mechanism being adapted to be locked in its adjusted position, a pair of normally closed shunt contacts controlled by said finger lever, means responsive to said actuation of the finger lever for effecting the locking operation of the impulse mechanism and the interruption of said shunt contacts, means for restoring said setting member, a device responsive to said restoration of the setting member to release said impulse mechanism for operation, and restoring means for said shunt contacts effective upon operation of said impulse mechanism.

9. A calling device comprising a setting member having a fully actuated position, impulse mechanism adjusted responsive to an adjusting movement of said setting member, means for restoring said setting member and thereby operating said impulse

mechanism from its adjustment, and means to prevent an effective operation of said impulse mechanism unless said setting member is moved to its fully actuated position.

- 5 10. A calling device comprising a setting member having a fully actuated position, mechanism adjusted responsive to an adjusting movement of said setting member, impulse contacts responsive to said mechanism, means for restoring the setting member and thereafter operating said impulse mechanism responsive to its adjustment whereby said impulse contacts are operated, and means to prevent an effective operation
15 of said impulse contacts unless said setting member, when actuated, has been moved to its fully actuated position.

11. A calling device comprising a finger hold dial having a fully actuated position, impulse mechanism adjusted responsive to movement of said dial, means for restoring said dial and thereby operating said impulse mechanism from its adjustment, a finger lever adapted to be actuated only upon a full
20 actuation of the dial, and means to prevent an effective operation of said impulse mechanism unless said setting member is moved to its fully actuated position and said finger lever operated.

- 30 12. A subscriber's substation comprising a transmitter and impulse transmitting mechanism, means for adjusting said impulse transmitting mechanism, impulse contacts operated responsive to said impulse mechanism, shunt contacts normally connected in shunt of said impulse contacts, and means for interrupting said shunt contacts and

placing a shunt across said transmitter responsive to a setting operation of said impulse mechanism.

13. A subscriber's substation comprising a microphone and impulse mechanism, means for adjusting said mechanism, impulse springs controlled by said impulse mechanism, shunt springs normally connected in shunt of said impulse springs, means for removing said shunt from about said impulse springs and placing a shunt about said microphone responsive to a setting operation of said impulse mechanism.

14. A calling device comprising a setting member, impulse mechanism adjusted for operation responsive to an actuation of said member, means for locking said impulse mechanism in an adjusted position, restoring means for said member, means actuated upon restoration of said member for unlocking said impulse mechanism and for locking said setting member, means responsive to the restoration of the said impulse mechanism for unlocking said setting member, a finger lever actuated upon a full actuation of the setting member, and means for preventing an effective operation of said impulse member unless said setting member is moved to its fully actuated position and said finger lever operated.

Signed by me at Chicago, county of Cook, and State of Illinois, in the presence of two witnesses.

ALFRED H. DYSON.

Witnesses:

GEORGE E. MUELLER,
CARRIE E. ANDERSON.