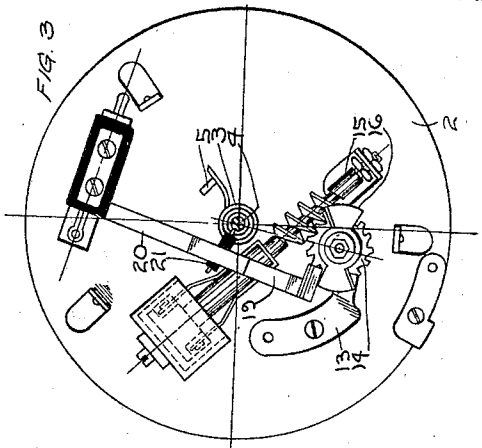
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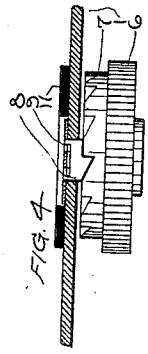
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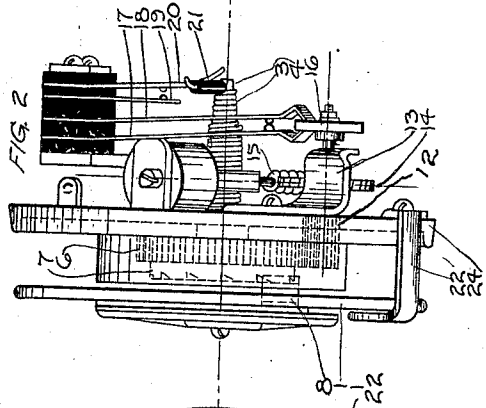
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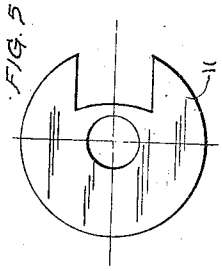
IMPULSE SENDER

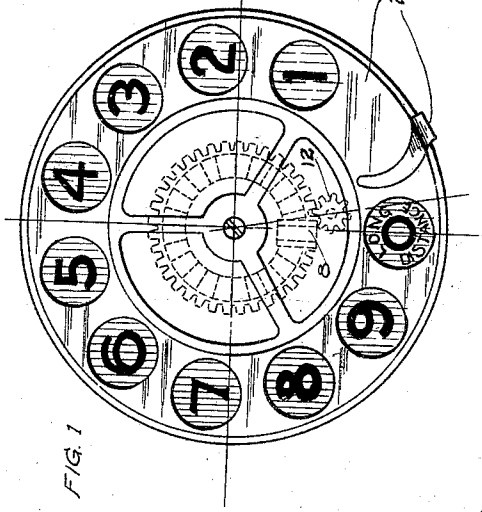
Filed April 8, 1918

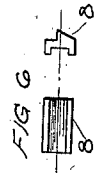


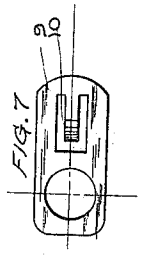












INVENTOR
MICHEAL SETTER
By E. D. Fales
ATTORNEY

Patented July 17, 1923. 1,461,944

UNITED STATES PATENT OFFICE.

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IMPULSE SENDER.

Application filed April 8, 1918. Serial No. 227,402.

To all whom it may concern:

Be it known that I, MICHEAL SETTER, a citizen of the United States, and a resident of Chicago, Cook County, and State of Illinois, have invented certain new and useful Improvements in Impulse Senders, of which the following is a specification.

My invention relates in general to impulse senders and more specifically to an impulse sender for use in an automatic telephone system.

My invention adapts itself especially to that type of impulse sender or calling device which is used in the standard two wire type of automatic telephone system in which a dial is used to open and close a line circuit in accordance with the digits of a called number.

I have chosen to illustrate my invention in connection with a dial of the character shown and described in Automatic Telephony by Smith and Campbell published in 1914, although it may be understood that my invention may also be applied to any calling device of standard construction.

The main object of my invention is to provide improved mechanism for operating a calling device of this character, which mechanism when applied to a calling device provides for a greater efficiency of operation and a longer life for the device. It is well known that a device of this character when located at a subscriber's station or at an operator's position is subjected to a very great amount of wear and tear so that it is very necessary that all parts be as free from friction as possible. One of the elements of this type calling device has been the use of a spring as a ratchet which spring rides over the top of a set of ratchet teeth as the dial is rotated in one direction and then catches in the tooth of the ratchet to which it has advanced to bring the said ratchet wheel back with the finger lever or dial to deliver impulses. A great deal of trouble has been occasioned in the past from the use of this spring dog or ratchet as it was not well adapted to stand the strain which it must undergo and also was liable to snap in cold weather. An object of my invention, therefore, is to provide an improved ratchet to replace this spring or any other device and one which will stand a great deal of wear and tear and in which the amount of friction is reduced to a minimum.

In the drawings I have illustrated a calling device of the character described showing the relation of my ratchet device to such a sender.

Fig. 1 is a front view of the calling device.

Fig. 2 is a side view of the same.

Fig. 3 is a rear view of the same.

Figs. 4, 5, 6 and 7 are detail views showing elevations of the various parts of the device.

I will now explain in detail the construction and operation of the device illustrated. Referring to Fig. 1, I have illustrated the front plate or finger hole dial 1 pivoted at its central point in a base plate 2 (Figs. 2 and 3) by means of a rod 4 having a coiled spring 3, one end of which is firmly secured to the end of rod 4 by means of a slot therein and the other end of which is fastened to a lug 5 on the under side of the base plate 2. This spring 3 acts to return the finger hole dial 1 to its normal position after having been wound up by the rotation of the dial manually in a clockwise direction. Loosely mounted upon the pivot rod 4 and rotatable thereon is a combined gear and ratchet wheel 6 which is provided with gear teeth around its circumference and with a plurality of ratchet teeth 7 on the front surface thereof. These ratchet teeth 7 are equal in number to the number of holes in the finger dial and are arranged to lie just underneath the rear surface of said dial for co-operation therewith. In dials previously made a circular spring having a dog cut therefrom was mounted on the rear face of the dial to co-operate with the teeth 7. I have however provided a new dog and ratchet device. Through an opening in the dial 1 is placed a small metal dog 8, which is shown in detail in Figure 6, this dog is cut out so that one edge will fall into one of the ratchet teeth 7 when the dial is normal. A spring 9 (Fig. 7) is provided having a downwardly bent lip 10 which rides in the upper grooved face of said dog 8 and maintains it at all times with a slight tension tending to press against the teeth 7. A fibre piece 11 is provided (Fig. 5) which fits over the spring 9 but is cut away to allow for vertical movement of the lip 10. The manner in which the dog 8 and its co-operating parts is adapted to fit into the ratchet teeth is very clearly shown in Fig. 4, like parts being numbered

alike in the various figures. Co-operating with the gear teeth in the circumference of gear wheel 6 is a pinion 12 fixed to a shaft which is pivoted in the bracket 13 at one end and in a part of base plate 2 at the other end. Mounted on this same shaft is a worm wheel 14 which drives the usual governor 15 and a cam wheel 16 having two wings adapted when the shaft is rotated to open and close contact of a pair of springs 17 and 18, which are usually used to send impulses over the well known two wires of a telephone system to control automatic switches. A pair of springs 19 and 20 are also provided and are what is known as the shunt springs, that is, these springs are allowed to close by bushing 21 as soon as the calling device leaves its normal position and are used to shunt the talking equipment at a subscriber's station to prevent the subscriber from being annoyed by induction.

Now as the finger of a subscriber is inserted in one of the finger holes of the dial 1, said dial is first rotated in a clockwise direction until the finger reaches the stop 22. During this rotation the gear wheel 6 will remain in its normal position and the ratchet or dog 8 will simply ride up the inclined face of each tooth and drop into the next, against only the tension of the curved lip 10 of spring 9. When the finger of the operator is removed however the spring 3 into which tension was stored by the forward movement, causes the dial 1 to be returned to normal. In this movement the dog 8 will not ride over the teeth 7 as in the forward movement, but will catch in the tooth to which it was rotated and cause the gear 6 to rotate with the dial 1 back to normal position where it is stopped by a suitable stop. As the dog 8 rotates the gear 6, the pinion 12 will also be rotated and the return movement of the entire apparatus will therefore be regulated and timed by the retarding action of the governor 15. The result of this return of the device to normal is the interruption of the contact of the springs 17 and 18 a number of times corresponding to the number of the finger hole dial into which the subscriber's finger was inserted. It will be seen, therefore, that I have provided a novel and useful device for use as a ratchet which works up and down against the tension of spring 9 as the dial rotates in one direction and which clamps itself stationary in the tooth of the ratchet to which it is advanced. Also it will be seen that there is very little friction caused by the operation of this dog and ratchet arrangement and that very little strain is undergone by the retaining spring, and that the entire strain caused by the rotating back to normal of the device is taken up by the metal of the dial 1 rather than by any spring.

Having fully described and ascertained my invention, what I consider to be new and desire to have protected by Letters Patent will be pointed out in the appended claims.

What I claim as my invention is:

1. In a ratchet driven mechanism, an element to be driven having ratchet teeth on one of its surfaces, a hand operated driving element, having an opening therein, a pawl adapted to be inserted into said opening and cooperating with said driving element to drive said element, and a leaf spring mounted adjacent said opening and having a projection which acts as a sole support for said pawl and holds it in engagement with the ratchet teeth of the driven element through said opening.

2. In a ratchet driven mechanism, an element to be driven having ratchet teeth on one of its surfaces, a hand operated driving element, an opening in said driving element, a pawl adapted to be inserted into said opening, a leaf spring mounted adjacent said opening and having a projection which holds said pawl in engagement with the ratchet teeth of the driven element through said opening, said spring so mounted that it may be moved away from said opening to allow said pawl to be removed therefrom.

3. In a ratchet driven mechanism, a gear wheel adapted to drive the mechanism, having crown ratchet teeth on one side thereof, a driving element mounted adjacent said gear wheel, a pawl removably mounted in an opening therein in such a manner that when the element is moved in one direction the pawl rides over the crown teeth and when moved in the other direction the pawl moves said gear wheel and a spring over the opening opposite the ratchet teeth which tends to keep the pawl in engagement with the ratchet teeth said spring being held against lateral movement by a groove in the pawl.

4. In a ratchet driven mechanism, a gear wheel adapted to drive the mechanism having crown ratchet teeth on one side thereof, a driving element mounted adjacent said gear wheel, a pawl removably mounted in an opening therein in such a manner that when the element is moved in one direction the pawl rides over the crown teeth and when moved in the other direction the pawl engages said crown teeth to move said gear wheel, and a spring over the opening opposite the ratchet teeth which tends to keep the pawl in engagement with the ratchet teeth, said spring mounted so that it may be moved to one side of said opening to allow the pawl to be removed.

5. In a ratchet driven mechanism, a gear wheel adapted to drive the mechanism having crown ratchet teeth on one side thereof, a driving element mounted adjacent said gear wheel, a pawl removably mounted in an opening therein in such a manner that when

the element is moved in one direction the pawl rides over the crown teeth and when moved in the other direction the pawl moves said gear wheel and a flat spring mounted over the opening opposite the ratchet teeth which tends to keep the pawl in engagement with the ratchet wheel, said spring mounted so that it may be moved to one side of said opening to allow the pawl to be removed, without changing the relative position of the opening with regard to the ratchet teeth.

6. In a ratchet driven mechanism, a gear wheel adapted to drive the mechanism having crown ratchet teeth on one side thereof, a driving element mounted adjacent said gear wheel, a pawl removably mounted in an opening therein in such a manner that when the element is moved in one direction the pawl rides over the crown teeth, and when moved in the other direction the pawl moves said gear wheel, a spring over the opening opposite the ratchet teeth which tends to keep the pawl in engagement with the ratchet teeth, and a washer having an opening therein mounted over said spring to hold the same on the driving element, for permitting a portion of the spring to be movable with the pawl as it rides over the crown ratchet teeth.

7. A ratchet mechanism having a driving element, a pawl carried thereby, a driven element having ratchet teeth co-operating with the pawl, said pawl loosely mounted in an opening in said driving element, and a spring covering one end of said opening and acting to keep the pawl in engagement with said teeth, said spring so mounted that it may be rotated away from said opening to allow the pawl to be removed therefrom without changing the relative position of the driving element to the driven element.

8. In a ratchet driven mechanism, gear wheels for operating said mechanism, a hand operated driving element, ratchet teeth on one of said gears, a pawl for communicating the motion from the driving element to the gears by engagement with said ratchet teeth, said pawl inserted in an opening of said driving element, a leaf spring for holding said pawl in place, said pawl having a groove therein for holding said spring against lateral movement.

9. In a ratchet mechanism, a gear train, one of said gears having crown ratchet teeth on one side thereof, a hand operated driving member mounted on the same shaft with said gear, a pawl inserted in an opening through said driving member and cooperating with said crown teeth to drive said gear train when the driving member is operated, and a spring for holding said pawl in place, said pawl having a groove therein for holding the spring against lateral movement.

Signed by me at Chicago, Cook County, Illinois, this 3d day of April, 1918.

MICHEAL SETTER.