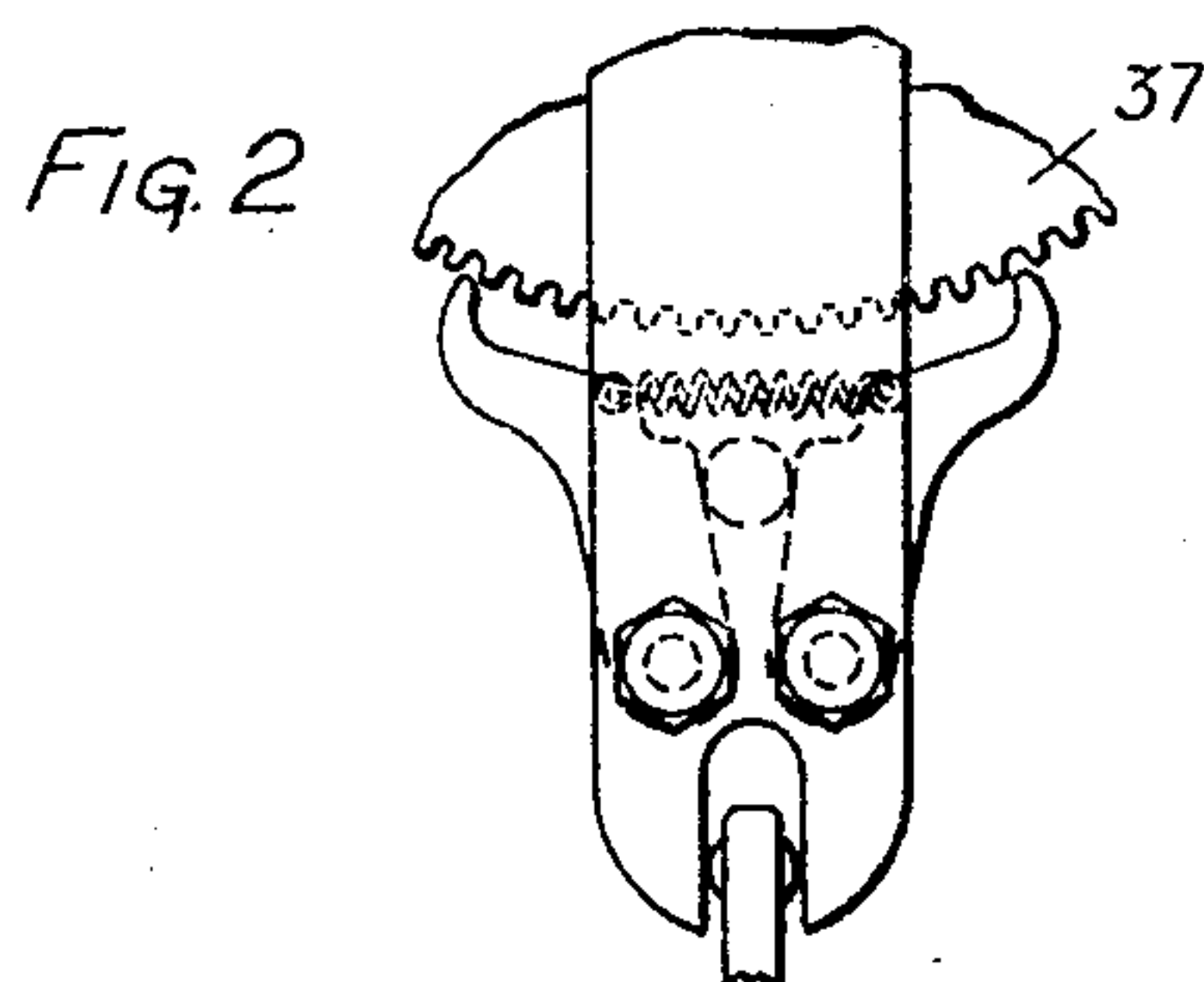
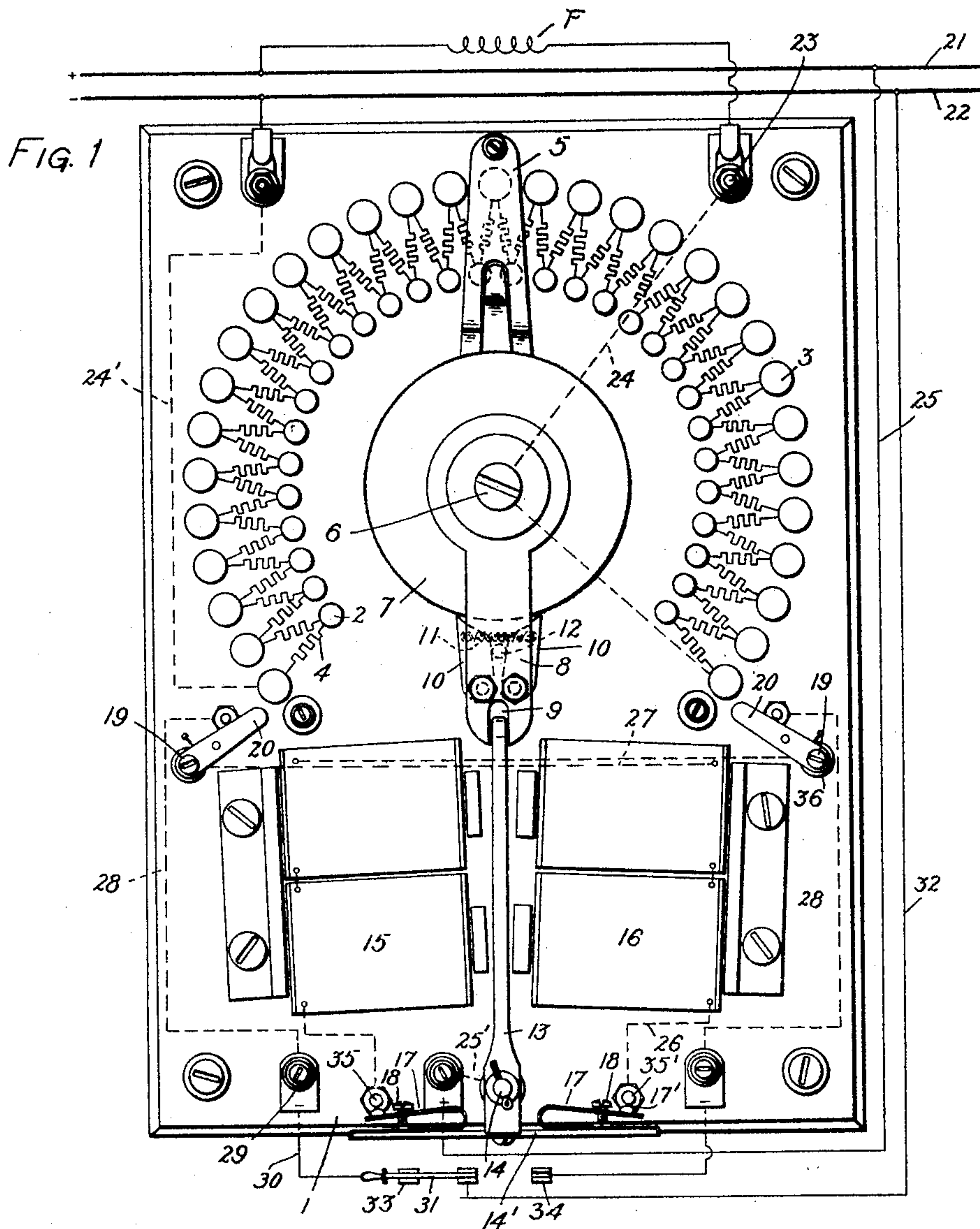


No. 803,414.

PATENTED OCT. 31, 1905.

J. L. HALL & W. C. YATES.  
REMOTE CONTROL REGULATOR.  
APPLICATION FILED MAR. 20, 1905.



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# UNITED STATES PATENT OFFICE.

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ASSIGNORS TO GENERAL ELECTRIC COMPANY, A CORPORATION OF  
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## REMOTE-CONTROL REGULATOR.

No. 303,414.

Specification of Letters Patent.

Patented Oct. 31, 1905.

Application filed March 20, 1905. Serial No. 251,021.

*To all whom it may concern:*

Be it known that we, JOHN L. HALL and WILLIAM C. YATES, citizens of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Remote-Control Regulators, of which the following is a specification.

This invention relates to rheostats, and has for its object the provision of improved means whereby the rheostat may be controlled from a remote point.

More specifically our invention aims to provide a regulator or field-rheostat which has few working parts, is cheap to manufacture, but is thoroughly efficient and positive in its operation.

In carrying out our invention we provide the rheostat with an electromagnetic vibrator and mechanism coöperating therewith whereby a step-by-step movement in either direction may be given to the controlling-arm to automatically increase or decrease the resistance in circuit at will, the reverse movement of the controlling-arm being accomplished by simply operating a circuit-changer.

In the drawings, Figure 1 is a plan view of the regulator embodying our improvement, and Fig. 2 is a detail view of a modified form of disk and pawls for driving the same.

Referring to the drawings, 1 represents the base of the regulator, which may be of any suitable material, as slate or soapstone, and provided with the usual contact-studs 2 and 3. These studs are arranged concentrically, and those of the outer circle are staggered with reference to those of the inner circle. A resistance 4 is cross-connected between the studs, as shown. The controlling-arm 5, pivoted at 6, has rigidly connected with it a disk 7, having an edge which is roughened either by being left rough in casting or by finishing and afterward roughening with a knurl. Pivoted concentrically with but independent of the disk 7 is an arm 8, having at its outer extremity the yoke 9. A pair of pawls 10 are pivoted at the outer extremity of the said arm and are mounted so as to be oppositely disposed with their engaging portions in close proximity to the edge of disk 7. A spring 11 flexibly unites the free ends of the pawls, holding them both in flexible engagement with a pin 12, fixedly mounted in the base 1. A lever 13 is pivotally mounted at 14 and has

its free end in engagement with the yoke 9. Disposed on opposite sides of this lever and equidistant therefrom are a pair of electromagnets 15 16, having their cores arranged so as to allow a slight vibratory movement of the lever between the magnets. At the opposite end of the lever 13 is a metallic bar 14', mounted at right angles thereto and provided at its opposite ends with contact-springs 17, having platinum tips 17', which are capable of adjustment by means of screws 18. At 19 are pivotally-mounted levers 20, which operate as switches to make and break the circuits of the magnets.

The leads from a generator are indicated at 21 22, the field of which is designated at F. The direction of the field-current through the resistance is as follows: from binding-post 23 through conductor 24 and arm 5 to the studs, thence through the resistance 4, conductor 24', back to lead 22. The direction of the current for operating the electromagnetic vibrator is as follows: from lead 21 through conductors 25 and 25', lever 13, bar 14', spring 17, platinum contact 17', contact 35', conductor 26 through magnet 16, conductor 27, switch 20, conductor 28 to binding-post 29, and thence through conductor 30, switch 31, and conductor 32 to main 22. By throwing the blade of the single-pole double-throw switch 31 into contact with clips 33 or 34 the current will pass through either magnet 15 or 16, as desired. It will be seen that if the current passes, for instance, through the magnet 15 the lever 13 will be drawn to the left, thus breaking the circuit between spring 17 and a contact 35' on binding-screw 35, which demagnetizes magnet 15. The lever 13 is caused to return to a central position by reason of the spring 11, which tends to maintain the bar 8 in central position, and as the lever is moved to the left a tension is placed upon the spring 11 and the left-hand pawl 10 is thrown into engagement with disk 7 and rotates the same clockwise. Upon interruption of the circuit, lever 13 and bar 8 again assume the central position, with the pawls 10 out of engagement with the disk. This permits of turning the controlling-arm by hand, if so desired. The lever 13 vibrating back and forth in the manner described will cause the controller-arm 5 to travel over the studs and vary the resistance until it is either stopped by opening the switch 31 or by reaching the limit of its movement, in which latter



case the circuit is broken by arm 5 coming in contact with the switch 20 and breaking the circuit by moving the same on its pivot against the tension of spring 36. By throwing switch 31 in contact with the opposite clip the armature will travel in the opposite direction, which movement will be interrupted in a similar manner.

Fig. 2 shows the disk 37 provided with teeth having substantially radial faces, the pawls engaging therewith being also of slightly different form, so as to properly engage the same. We prefer, however, to dispense with the use of teeth and use the form shown in Fig. 1, for the reason that it is more cheaply constructed and capable of finer adjustment as to the length of the steps through the screws 18.

It will thus be seen that we have provided a self-contained remote-control regulator which is of simple and inexpensive construction, is efficient and positive in its action, and can be operated by an unskilled person with perfect safety to himself as well as to the regulator. By simply throwing a switch in one direction or the other the controlling-arm may be operated to cut resistance in or out at will, and the speed of operation may be adjusted to suit conditions. Moreover, the travel of the arm is automatically stopped upon reaching a predetermined limit of movement in either direction.

What we claim as new, and desire to secure by Letters Patent of the United States, is—

1. A remote-control regulator comprising a series of resistances and contacts therefor, a contact-arm, and means for shifting the same over said contacts, said means including a disk mounted in fixed relation with said arm, a support mounted for movement independent of said disk, a fixed stop, oppositely-

disposed pawls pivoted to said support with their free ends adjacent to said disk and yieldingly held against said stop, an electromagnetic means for vibrating said support to rotate said disk in either direction at will.

2. A remote-control regulator comprising a series of resistances and contacts therefor, a contact-arm, and means for shifting the same over said contacts in opposite directions at will, said means comprising a disk in fixed relation with said arm, a pivoted support provided with pawls mounted adjacent to said disk, a pivoted arm having one end in engagement with said support, electromagnets disposed upon opposite sides of said arm, and means including a make-and-break mechanism at the opposite end of said arm for causing a vibratory movement of said arm.

3. A remote-control regulator comprising a series of resistances and contacts therefor, a contact-arm, and means for shifting the same over said contacts, said means including a disk mounted in fixed relation with said arm, a support mounted for movement independent of said disk, a fixed stop, oppositely-disposed pawls pivoted to said support with their free ends adjacent to said disk and yieldingly held against said stop, a pivoted arm having one end in engagement with said support, electromagnets disposed upon opposite sides of said arm, and means including a make-and-break mechanism at the opposite end of said arm for causing a vibratory movement of said arm.

In witness whereof we have hereunto set our hands this 17th day of March, 1905.

JOHN L. HALL.

WILLIAM C. YATES.

Witnesses:

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HELEN ORFORD.