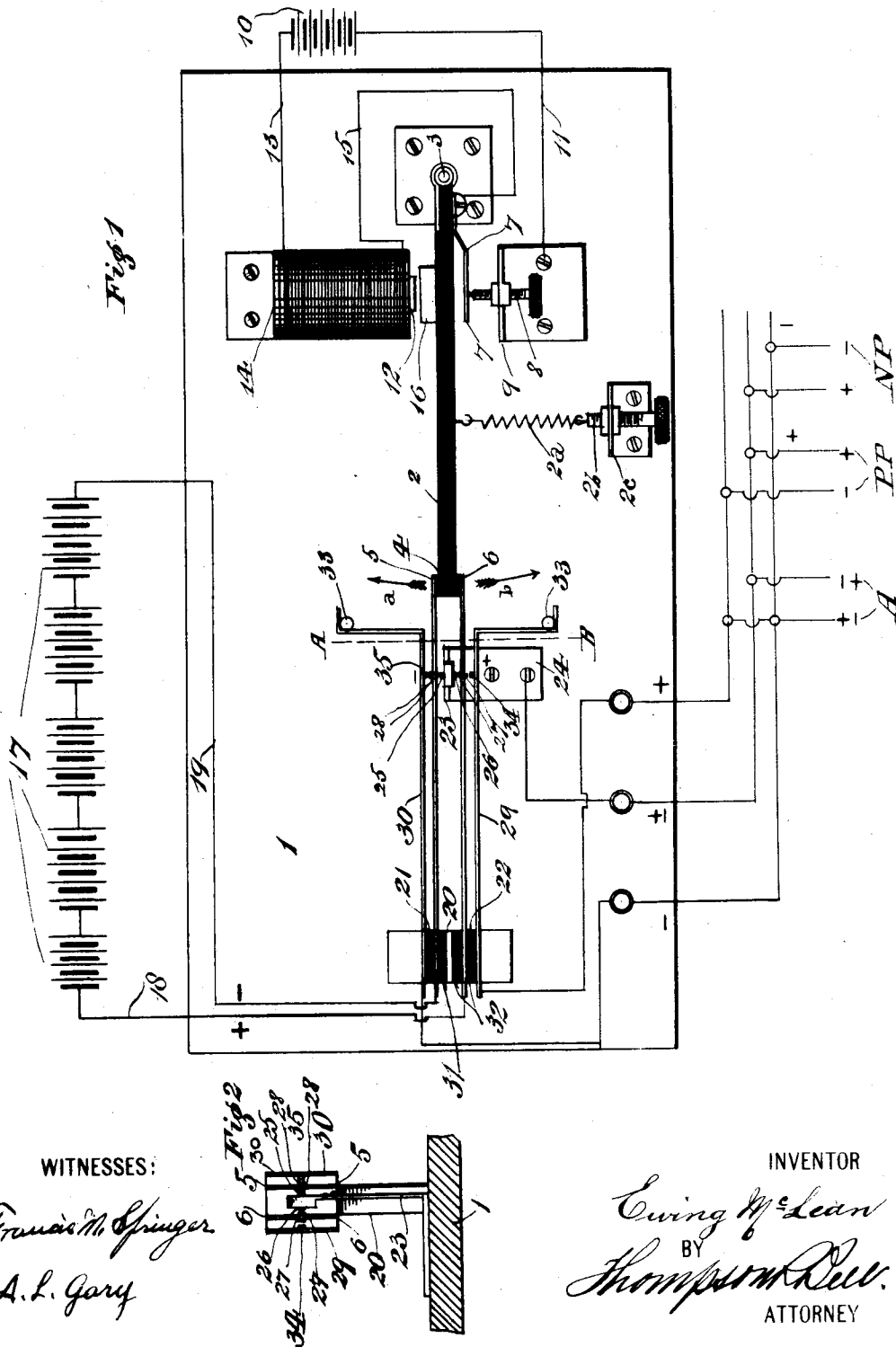


No. 868,576.

PATENTED OCT. 15, 1907.

E. McLEAN.
POLE CHANGER.

APPLICATION FILED MAR. 14, 1908.



UNITED STATES PATENT OFFICE.

EWING McLEAN, OF GREENCASTLE, INDIANA.

POLE-CHANGER.

No. 868,576.

Specification of Letters Patent.

Patented Oct. 15, 1907.

Application filed March 14, 1906. Serial No. 306,076.

To all whom it may concern:

Be it known that I, EWING McLEAN, a citizen of the United States, residing at Greencastle, in the county of Putnam and State of Indiana, have invented certain new and useful Improvements in Pole-Changers, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to mechanism for changing or alternating the polarity of an electric current and is particularly adapted for use in telephone exchanges in connection with the polarized bells thereof, as will be hereinafter more fully set forth and pointed out in the claims.

The object of this invention is to provide a simple, cheap and durable device whereby alternating and pulsating currents may be provided, the current being derived from any suitable battery, series of batteries or other service or direct current supply, whereby to ring polarized bells connected to telephone lines.

A further object is to provide a separate means, operated independently of the alternating and pulsating mechanism, whereby said alternating and pulsating mechanism may be operated continuously and uninterruptedly.

I attain these objects by means of the mechanism illustrated in the accompanying drawings in which similar numerals of reference designate like parts throughout the several views.

Figure 1. is a plan view of my invention of a pole changer, and, Fig. 2. is a sectional elevational view of the same taken through the line A. B. see Fig. 1.

Referring to the drawings 1 designates a suitable base-plate preferably of insulating material upon and to which the apparatus is secured. The vibratory arm 2, whereby the pole changer is operated, is preferably constructed of a non-conducting or insulating material such as fiber, hard rubber, or other such material, and said vibratory arm is hingedly mounted at its pivotal end on the post 3, and at its vibratory end or enlarged end situated between and in contact with the contacting retractive springs 5 and 6 to rapidly vibrate the latter.

Near the hinged or pivotal portion of the arm 2 is secured a contact spring 7 which is adapted to contact with the contact point of the set-screw 8 supported by the post 9, and by means of said screw 8 the distance of the contact point thereof from the contact spring 7 is varied and adjusted. The post 9 is connected to one pole of a closed battery circuit 10 which battery may be of any approved form of construction, by a conducting wire 11. The electric magnet is situated on that side of the vibratory arm 2 opposed to the adjusting-screw 8, and said magnet 12 is connected to the other pole of the battery 10 by means of a conducting-wire 13. The magnet 12 is secured to and supported by its post 14, and said magnet is electrically connected to the hinge-

post 3 of the vibratory arm 2 by a suitable conducting-wire 15. The armature 16 is secured on the vibratory arm 2 in position thereon to be situated directly opposite the magnet 12. A tension-spring 2^a is connected at one of its ends to the arm 2 at a point intermediate the hinged and vibratory ends thereof, and at its other end to the adjusting screw 2^b which latter is screwed into the head of the supporting-post 2^c secured to the base 1.

From the foregoing it will be readily seen that the mechanism for vibrating the vibratory arm 2 comprises a construction similar to the ordinary and well known circuit breaker.

The battery or batteries 17, for supplying the current to ring the telephone bells, may be of any suitable and approved construction, either primary, secondary or other suitable and convenient source, for supplying or generating electric current. Extending from one pole of this battery, say, for instance, the positive pole, is a conducting-wire 18 which is connected to the positive intermediate vibratory or retractive-spring 6, and from the negative pole of said battery extends the conducting-wire 19 which is connected to the negative intermediate vibratory or retractive spring 5. The vibratory or retractive springs 5 and 6 are secured at their ends to the top side portions of their supporting post 20, and between the bearing sides of said post 20 and the retractive springs 5 and 6 are suitable insulating-strips 21 and 22. The intermediate retractive springs extend edgewise and horizontally to slightly lap over the vibrating end of the vibratory arm 2, so that their resilient ends contact with the sides of the enlarged vibrating end 4 of said vibratory arm as previously stated.

Situated between the intermediate retractive springs 5 and 6 at a point intermediate the fixed and vibrating ends thereof, is a post 23 the supporting foot 24 of which is secured to the base 1. On the opposite sides of the top or head of said post are the contact points 25 and 26, with which the contact points 27 and 28, situated on the inner sides of the intermediate retractive springs 5 and 6, are alternately caused to contact.

Secured at their ends to the post 22 and situated exteriorly of the intermediate retractive springs 5 and 6 are the outer retractive springs 29 and 30 which are insulated from said intermediate retractive springs by the separating insulating liners 31 and 32, and said outer retractive springs extend horizontally and parallel to the sides of said intermediate retractive springs and have their vibrating ends bent outwardly which outwardly extending ends or bends are hooked or bent to contact the stop posts 33 which latter are secured to the base 1 and serve as stops to limit the inner movement or vibration of said outer retractive spring arms.

The contact points of the pins 27 and 28 project slightly beyond the sides of the retractive spring arms 5 and 6, and directly opposite to the outer contacting

ends of said contact pins 27 and 28 are the contact points 34 and 25 which are secured on the inner sides of the outer retractive spring arms 29 and 30, so that when the arm 2 is swung in the direction of the arrow *a* the intermediate retractive spring arm 5 will be moved in the same direction to cause the outer contacting end of the contact pin 28 to contact with the contact point 35 of the retractive spring arm 30, thereby making a circuit with the wire 19 and the wire 35, that is a negative current. At this same instant the vibrating end of the intermediate retractive spring arm 6 is released and will move toward the post 23 by its own resiliency to cause its inner contacting point of its contacting pin 27 to contact with the contact point of the pin 26 on the post 23 thereby connecting the positive wire 18 with the service wire or alternating current conducting wire 37; thus for the instant a positive current is flowing along the wire 37 and during which instant of time the wire 38 is dead or is not connected to any pole of the battery or source of electricity. Now suppose the vibratory arm 2 making its return vibration or is moving in the direction of the arrow *b*, then the intermediate retractive spring arm 6 will be moved in the same direction to cause the outer contacting point of the contacting pin 27 to contact with the contact point 34 of the outer retractive spring arm 29, thereby making the circuit between the wire 18, connected to the positive pole of the battery 17, and the service wire 38. At this same instant of time the vibrating end of the intermediate retractive spring arm 5 being released will move toward the post 23 by its own resiliency to cause the inner contacting point of its contact pin 28 to contact with the contact point of the pin 25 on said post 23, thereby connecting the negative pole of the battery 17 with the alternate service wire 37; thus for the instant a positive current is flowing through the service wire 38 while a negative current is flowing through the service wire 37, during which instant of time the service wire 36 is dead or its connection with the battery is broken. And thus it will be readily understood from the above description and a reference to the drawings that the service wire 37 will alternate, positive and negative, and the wire 36 will be negative and the wire 38 positive, and the currents in all three wires will be pulsating. It is also clear that the current flowing through the wires 36 and 37 will be respectively negative and positive; and when the current flows through the wires 37 and 38, the wire 37 will be negative while the wire 38 will be positive; and thus by a proper system of wiring as shown in Fig. 1. of the drawings and designated by the letters A alternating, N. P. negative pulsating, and P. P. positive pulsating currents may be produced by this machine.

It is to be understood that the foregoing described alternating, positive pulsating, and negative pulsating currents are to be taken off and used serially or intermittently, rather than contemporaneously. In order to obtain an alternating current it is necessary to connect the translating device or devices in series—one side to the center wire, the other side to both the upper

and the lower wires. To obtain a pulsating current, either positive or negative, it is necessary to connect the translating device in series—one side to the center wire and the other side to either the upper or the lower wire as respectively necessary.

The translating or connective device herein referred to may be the usual well known cam, key, or switch device, well known and in common use on telephone switch boards or connective purposes.

I claim:

1. In a pole changer for transferring direct constant currents into alternating and pulsating currents of positive and negative polarity, the combination with a source of direct electric current, a pair of horizontally extending retractive spring arms, a retractive arm supporting post where to one end of each of said spring arms is fixedly secured, and a contact post situated between the free ends of said retractive spring arms to be in contact with each of said retractive spring arms alternately to relieve alternate positive and negative currents of electricity, of a horizontally extending vibratory arm having a vibrating end of an insulating material, said arm oppositely disposed relatively to said retractive arms and having its insulated vibrating end situated between the vibrating ends of said retractive spring arms, opposing contact points on each side of said post and on said retractive arms and independently electrically operated means for vibrating said vibratory arm.
2. In a pole changer for transferring direct constant currents of electricity into alternating and pulsating currents of positive and negative quality, the combination with a regular source of direct electric current, a pair of intermediate resilient retractive longitudinally extending spring arms, a pair of outer resilient retractive spring arms situated in parallel relation to said intermediate retractive spring arms, a supporting post where to said retractive spring arms are fixedly secured, each at one of its ends, and suitable insulating liners situated between each of said retractive spring arms and said post whereby each of said arms and said post are insulated, of a contact post situated between the free ends of said intermediate retractive spring arms in position to be in contact with each of said intermediate retractive spring arms alternately to receive alternate positive and negative currents, means for connecting said retractive spring arms to the poles of the source of electricity and means for connecting said outer retractive spring arms with the service lines.
3. In a pole changer for transferring direct constant currents into alternating and pulsating currents of positive and negative quality, the combination with a source of direct electric current, a pair of intermediate resilient retractive horizontally extending spring arms, a pair of outer resilient retractive spring arms situated in parallel relation to said intermediate retractive spring arms, outwardly extending stop arms or bends on the vibrating ends of said outer retractive spring arms and outer retractive spring arm stops, a supporting post where to said retractive spring arms are secured, each at one of its ends, and suitable insulating liners situated between each of said retractive spring arms and said supporting post, of a contact post situated between said intermediate retractive spring arms in position to be in contact with each of said intermediate retractive spring arms alternately to receive alternate positive and negative currents, means for connecting said retractive spring arms to the poles of the source of electricity and means for connecting said outer retractive spring arms with the service lines.

In testimony whereof I affix my signature in presence of two witnesses.

EWING McLEAN.

Witnesses:

JOHN P. ALLEE,
JENNIE BRIDGES.