

A. H. WEISS.
 FREQUENCY POLE CHANGER.
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1,058,009.

Patented Apr. 1, 1913.

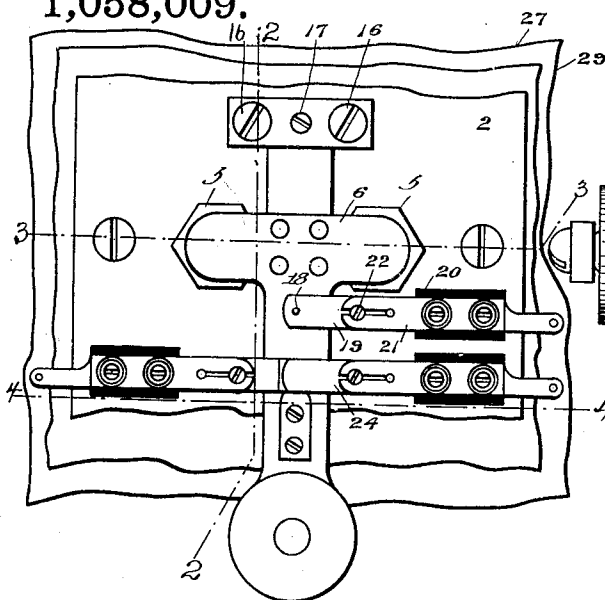


Fig. 1

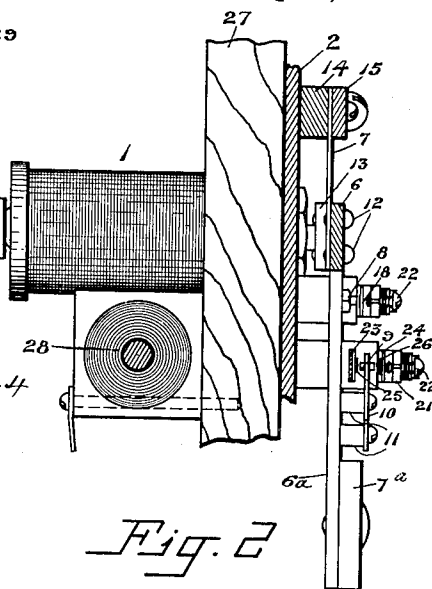


Fig. 2

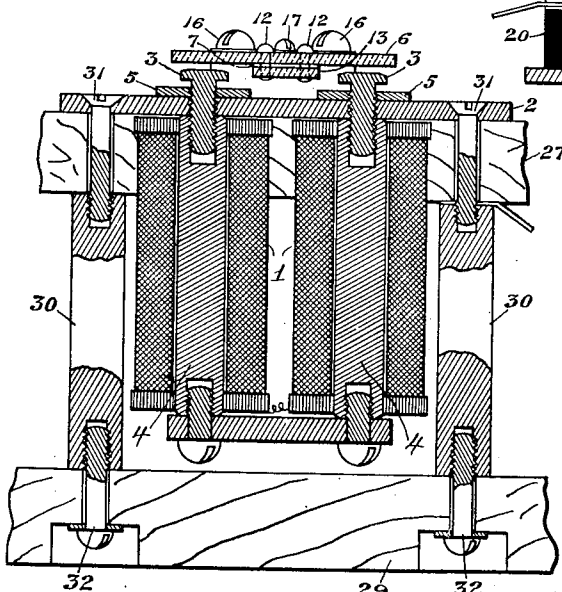


Fig. 3

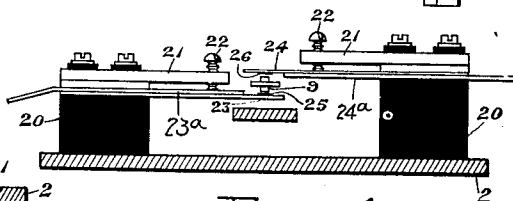


Fig. 4

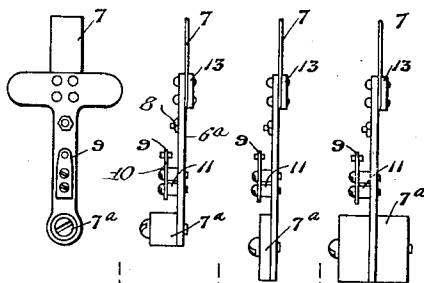


Fig. 5. Fig. 6. Fig. 7. Fig. 8.

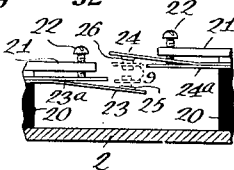


Fig. 9

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FREQUENCY POLE-CHANGER.

1,058,009.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, ALFRED H. WEISS, a citizen of the United States, residing in Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Frequency Pole-Changers, of which the following is a specification.

My invention relates to frequency pole changers of the type used in connection with telephone systems provided with party lines having annunciators at the substations adapted to be operated by alternating currents of different frequencies.

The object of my invention is to provide the apparatus and circuits necessary for carrying out the above, of a more simple form than has heretofore been known, and to eliminate a number of parts which in former mechanisms have been necessary to the operation of the devices.

A further object of my invention is to produce a device which will convert direct current into alternating current of substantially sine wave form.

Other objects of my invention are the means for eliminating the effect of the variation in the direct current used in the device, upon the primary source, which is usually the storage battery of the telephone system.

Still further objects of my invention will be evidenced by the following description and claims which relate to the accompanying drawings forming a part of this specification.

In these drawings, Figure 1 is a front elevation of my device. Fig. 2 is a section of my device taken upon line 2, 2 of Fig. 1. Fig. 3 is a section of the device taken upon line 3, 3 of Fig. 1. Fig. 4 is a section of the device taken upon line 4, 4 of Fig. 1. Fig. 5 is a front elevation of the reed-portion of one of the pole-changers. Fig. 6 is a side elevation of the reed shown in Fig. 5. Figs. 7 and 8 are side elevations of reeds of slower periods of vibration than that shown in Fig. 5. Fig. 9 illustrates two of the relatively stationary contacts moved to their alternate positions by the vibratile contact 9 which is shown in its extreme alternate position by dotted lines.

In carrying out my invention, I preferably secure the operating coils 1 to the face-plate 2 by means of the adjustable pole-pieces 3 which thread into the ends of the cores 4 and have the lock-nuts 5 threaded

thereon in such manner as to lock the adjustable pole-pieces and at the same time to secure the plate between the nut and the end of the magnet-core. The two coils 1 as shown in Fig. 1 are placed horizontally side by side and are adapted to actuate the armature 6 of the vibrating reed portion. This reed portion comprises a resilient spring 7, preferably of steel, the armature 6 having the depending portion 6^a, the tuning device 7^a carried thereon, the operating contact 8 and the pole changing contact 9. This latter contact is carried upon the off-set portion 10 secured parallel to the portion 6^a by the cylindrical posts 11. The resilient portion 70 and the armature may be secured together by any means, here shown as rivets 12 passing through the armature and the spring, and through the auxiliary riveting block 13. It is essential that the spring 7 be secured 75 to the face plate in a very rigid and stationary manner. This is accomplished by means of the blocks 14 and 15 between which the upper end of the spring is tightly clamped by means of the screws 16, which pass 80 through both blocks and into the face-plate 2, and by means of the center-screw 17 which passes simply into the larger block 14.

The stationary operating contact 18, normally in contact with movable contact 8, 85 is carried upon the spring 19 secured to the insulating block 20 beneath the rigid adjusting screw carrying strip 21. This strip extends out from the block and carries the screw 22 in such manner that the spring 19 90 may be moved toward and from the operating contact 8. The springs 23 and 24 carry the pole-changing contacts 25 and 26 normally out of contact with the movable contact 9, and arranged to be adjusted in the 95 same manner as the spring 19.

The contact spring strip 23 and relatively stiff supporting spring 23^a are positioned at right angles to the reed and fastened to the insulating block 20, the rigid strip 21 serving as a clamping plate for said springs 23 and 23^a. The said strip 21 carries an adjustment screw 22 passing through its slotted end into engagement with spring 23^a, the slotted end clamping the screw in a well 105 known manner. Contact spring 23 normally rests under tension against the stiff spring 23^a, its contact 25 being normally out of engagement with the armature or vibratile contact 9. To adjust the contact spring 110

23 the adjustment screw 22 is turned in the proper direction, thereby acting upon the stiff spring 23^a, which in turn acts upon contact spring 23 moving it either toward or
 5 away from contact 9, according to the adjustment required. The contact spring 24 which rests under tension against the relatively stiff spring 24^a, is adjusted by the associated adjustment screw 22, the said screw
 10 22 passing through an opening in contact spring 24, into engagement with stiff spring 24^a for adjustment of contact spring 24. The contact spring 19 is similar to the contact spring 24, the associated adjustment
 15 screw of contact spring 19 passing through an opening in said spring 19 to engage its associated stiff supporting spring for adjustment thereof.

In Fig. 9 I have shown the contact springs 20 23, 24, in the positions they assume when engaged by the vibratile contact 9 when moved to its alternate positions, said positions of contact 9 being indicated by the dotted lines. Also this figure illustrates the
 25 manner in which screw 22 passes through contact spring 24 to engage the stiffening spring 24^a this construction being similar to the construction of the contact spring 19, its supporting plate and its screw 22.

30 Due to the construction and arrangement of the contact springs 19, 23, 24 and their associated adjustable supporting strips, it will be seen that accurate adjustment of the contacts can be secured as the adjusting
 35 screws are close to the contacts of each contact spring, and furthermore, it will be noted that the adjusting screw serves as a rigid stop for the stiff springs, thus preventing any undue vibration of the free
 40 ends of the contact springs and consequent follow up motion thereof, after the vibrating contacts of the reed leave the relatively stationary contact springs during the operation of the device.

45 I preferably mount a plurality of my converters on a single front-board 27 allowing the coils 1 to extend through openings in this board, thus bringing the face-plates flush with the face of the board. Beneath
 50 the coils 1 and secured to the backs of this front-board is the non-inductive resistance coil 28. I still further preferably mount the back-board 29 parallel to the front-board, the two boards being secured together
 55 by means of the metallic columns 30, having screws 31 threaded therein from the front of the face plate and screws 32 threaded therein from the rear of the back-board.

60 While I have shown and described my improvements in connection with certain details it is to be understood that many variations may be made therefrom without departing from the spirit or scope of my invention.
 65

I claim—

1. In a pole-changer, the combination of a flat vibratile reed comprising a single conductor having an operating contact, and a pair of pole changing contacts carried thereon in electric connection therewith, a stationary contact to coöperate with the operating contact and engaging therewith when the reed is not in motion, and a pair of relatively stationary long flat spring contacts, one on each side of and positioned at right angles to the reed out of contact with the vibratile pole changer contacts: when the reed is not in motion and adapted to alternately register with said pole-changer contacts when the reed is in motion, said pair of contacts also lying in a plane substantially parallel to a plane through the flat of the reed, substantially as described.

2. In a pole-changer, the combination of a vibratile reed, an auxiliary contact support secured in metallic connection with the reed, a pair of contacts carried one on each side of said auxiliary support, a long flat spring supported at right angles to said reed and carrying a stationary contact between the reed and the auxiliary support and coöperating with one of the movable contacts, a long flat spring supported at right angles to said reed and carrying a stationary contact coöperating with the other of said movable contacts, said auxiliary contact support being readily removable from the reed without disturbing the adjustment of either of the stationary contacts, and means for adjusting the stationary contacts, substantially as described.

3. In a pole-changer, the combination with a vibratile contact, of a relatively stationary contact adapted to be engaged thereby, a flexible member carrying the latter contact, a stiff spring stop lying along the surface of the first flexible member and limiting its movement to prevent any consequent follow up motion toward the movable contact, suitable means for rigidly securing said member and stop relative to said vibrating contact, and an adjusting screw for adjusting the position of the stiff spring stop without disturbing said rigid securing means.

4. In a pole-changer, the combination with a face-plate, of a reed supported on one side of said plate and carrying a pair of contacts adapted to vibrate toward and from said face plate, an armature carried by said reed, an electromagnet attached to said plate and adapted to coöperate with said armature to vibrate said reed, a pair of contact springs carried on said plate, one adapted to be engaged by one of said vibrating contacts when the latter is vibrated toward the face-plate, and the other adapted to be engaged by the other vibrating contact when the latter is vibrated away from

the face-plate, and a pair of adjusting screws, each accessible from in front of the face-plate for regulating the position of the contact springs, substantially as described.

- 5 5. A pole-changer comprising a face plate, a vibratile reed secured to said plate, a pair of contacts carried by said reed and adapted to be vibrated toward and from said plate, a pair of contact spring strips positioned at right angles to said vibrating reed, said contact spring strips being adapted to be alternately engaged by said reed contacts when said reed is vibrating, a stiff supporting spring lying along the surface
10 of each of said spring strips positioned to prevent any consequent follow up motion of

said contact strips during vibration of said reed contacts, means for rigidly fastening said contact spring strips and supporting springs to said face plate in said relative positions, and adjusting means engaging each of said stiff springs and accessible from in front of said face plate for adjustment thereof without disturbing said rigid fastening means. 20

Signed by me at Chicago, county of Cook, and State of Illinois, in the presence of two witnesses. 25

ALFRED H. WEISS.

Witnesses:

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EDITH F. GRIER.