C. ZEEK.

ARMATURE CIRCUIT TESTING APPARATUS.

APPLICATION FILED OCT. 31, 1916.

1,276,304. Patented Aug. 20, 1918.

Fig. 1

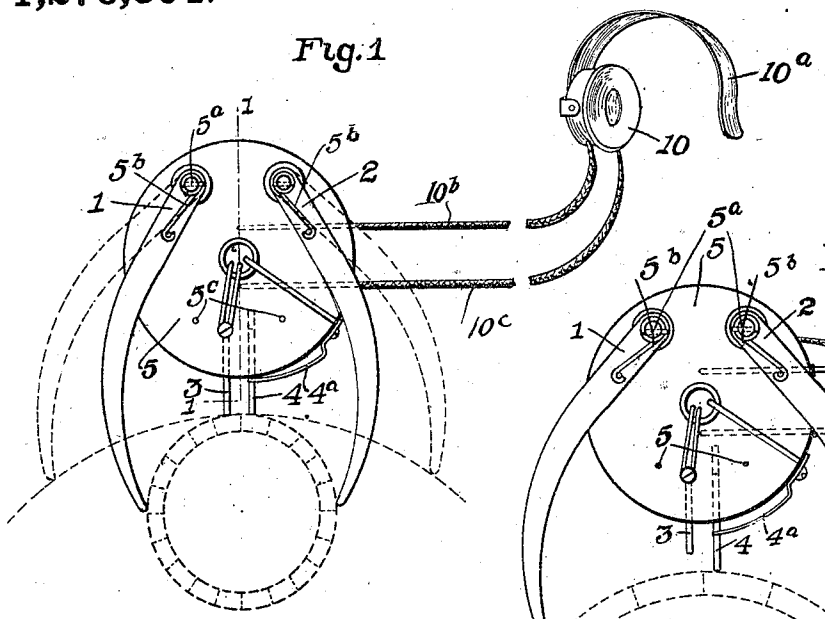
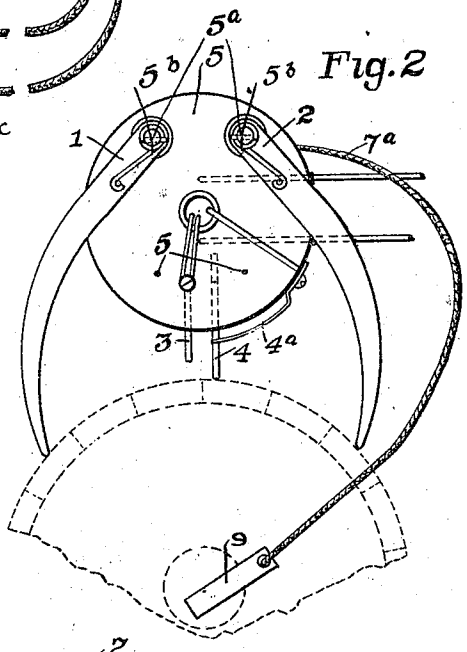


Fig. 2



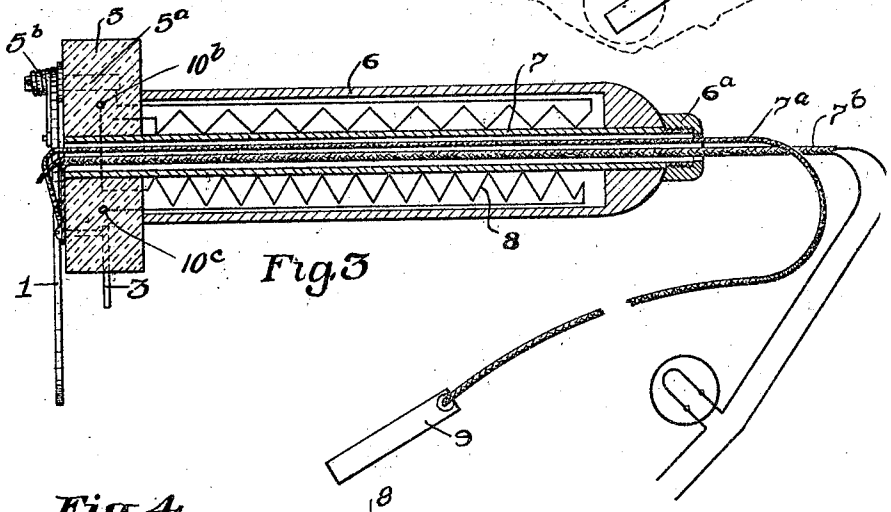
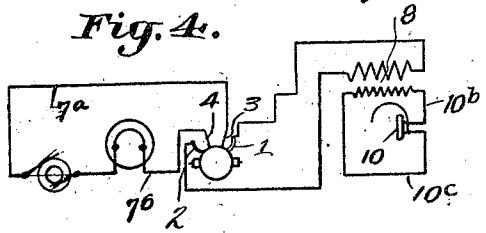


Fig. 3

Fig. 4.



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ARMATURE-CIRCUIT-TESTING APPARATUS.

1,276,304. Specification of Letters Patent. Patented Aug. 20, 1918.

Application filed October 31, 1916. Serial No. 128,653.

To all whom it may concern:

Be it known that I, CLYDE ZEEK, a citizen of the United States, residing at San Diego, in the county of San Diego and State of California, have invented certain new and useful Improvements in Armature-Circuit-Testing Apparatus, of which the following is a specification.

My invention relates to an apparatus for testing electric circuits, more particularly for detecing grounds, broken wires, short circuits in generator or motor armatures, and the objects of my invention are: first, to provide an apparatus of this class which automatically adjusts itself to different sized commutators; second, to provide an apparatus of this class with means for producing an induced current, thus making the tone in the receiver more audible, and adding to the efficiency of the apparatus; third, to provide an apparatus of this class in which it may be readily determined whether or not a circuit is complete or whether it is shorted or grounded without disconnecting any lead wires in the armature; fourth, to provide an apparatus of this class with means for readily engaging with the separate segments of the commutator which means are so positioned as to fit the commutator regardless of its size and to be moved readily thereon so as to engage different segments without difficulty, and: fifth, to provide an apparatus of this class which is simple and economical of construction, durable, easy to operate and will not readily deteriorate or get out of order.

With these and other objects in view as will appear hereinafter, my invention consists of certain novel features of construction, combination and arrangement of parts as will hereinafter be described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon which form a part of this specification in which:

Figure 1 is a side elevational view of the apparatus complete shown in engagement with a commutator which is shown in dotted lines and showing by dotted lines a considerably larger commutator and showing by dotted lines the position of the engaging arms. Fig. 2 is a front elevational view of the engaging portion of the apparatus shown in connection with an armature, showing the engaging members in position for testing for grounds. Fig. 3 is a longitudinal sectional view through 1—1 of Fig. 1 of the engaging member of the apparatus, and Fig. 4 is a diagrammatic view of the electrical connections of the apparatus.

Similar characters of reference refer to similar parts throughout the several views.

The arms 1 and 2, stationary engaging pin 3, movable engaging pin 4, insulated head 5, handle member 6, iron tube 7, induction coil 8, ground contact 9 and receiver 10 constitute the principal parts of my apparatus.

The head 5 is composed of insulating material and is provided with a central hole therethrough which is secured onto one end of the tube 7. Secured in the upper side of said head 5 are a pair of lugs 5^a which extend outwardly and upon which are pivotally mounted the arms 1 and 2 and mounted on the extended ends of said lugs and against said arms are torsion springs 5^b which tend to pull the extended ends of the arms 1 and 2 toward each other. Mounted near the lower side of this head are a pair of pins 5^c extending from the front side thereof some distance which serve as stops for the arms 1 and 2 preventing them from coming together at their ends. Secured in the lower edge of the head is the stationary pin 3 which extends some distance from said head and adjacent thereto is another pin 4 which is reciprocally mounted in a hole, and engaging with the extending portion thereof is a spring 4^a which tends to press the pin 4 outward at all times. This spring engages in a notch in the pin for holding it positioned in the hole. Mounted over the tube 7 and against the head 5 is the handle member 6 which is a hollow member and secured in position by means of the nut 6^a on the end of the tube 7. Mounted in this handle member and outside of the tube 7 is an induction coil 8, the tube forming the core for said coil. One of the terminals from the primary winding of said coil connects with one of the lugs 5^a and the other terminal connects with the other lug 5^a while both of the terminals of the secondary winding connect with the conductors 10^b and 10^c which extend to and connect with the receiver 10. Mounted inside of the tube 8 are a pair of conductors 7^a and 7^b. The conductor 7^b is a double conductor the one ends of which connect respectively with the pins 3 and 4, the one connecting directly with the pin 3 and the other

connecting with the spring 4^a which conducts the current to the pin 4. The other ends of said conductor 7^b connect with any source of electrical energy which produces an alternating current, preferably an ordinary electric light socket. It will be here noted that this apparatus is connected in series with an electric lamp to provide resistance. One end of the conductor 7^a connects with the stationary pin 3 and its other end connects with a contact 9 which is adapted to engage with the shaft of the armature, the operator engaging said contact as desired. It will be here noted that this conductor 7^a and the contact 9 are only used in detecting grounds in which case the pin 3 does not engage with the commutator but is positioned as shown in Fig. 2 of the drawings. The receiver 10 is the ordinary or conventional type of telephone receiver and is preferably provided with a spring support 10^a to hold it in position against the ear of the operator.

Though I have shown and described a particular construction, combination and arrangement of parts, I do not wish to be limited to this particular construction, combination and arrangement, but desire to include in the purview of my invention the construction, combination and arrangement substantially as set forth in the appended claims.

The apparatus is used as follows: The spring piece 10^a is placed over the top of the operator's head so that the receiver rests against one ear. The handle 6 is taken in one hand and the arms 1 and 2 spread apart and the device positioned on the commutator of the armature as shown best in Fig. 1 of the drawings and moved around the commutator in either direction. It will be noted that the arms 1 and 2 and the pins 3 and 4 engage with separate segments of the commutator at all times. If the coil is faultless and complete the diaphragm in the receiver will be actuated causing a normal tone. If the coil is broken and is not complete the tone will be very loud, while if the coil is shorted there is no sound produced. This performance is carried throughout the several segments of the commutator thus testing it for broken circuits and shorted circuits. In order to test the same for a ground the pin 3 does not engage the commutator and the contact 9 is placed in engagement with the shaft of the armature, all as shown best in Fig. 2 of the drawings, and each segment tested as before. When the coil that is grounded is reached there will be no audible sound in the receiver and the sound will increase as the distance from the grounded coil increases in either direction.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In an armature circuit testing apparatus, the combination of a handle member, a pair of arms pivotally mounted to one end thereof, a stationary pin extending from said handle member intermediate the extending ends of said arms, a longitudinally movable pin adjacent said stationary pin, a receiver and electrical conductors connecting said arms with said receiver and said pins with a source of electrical energy.

2. In an armature circuit testing apparatus, the combination of a handle member, a pair of arms pivotally mounted thereon, a pin secured intermediate the extended ends of said arms, a longitudinally movable pin mounted adjacent said other pin, an induction coil mounted in said handle, a receiver, electrical conductors connecting said receiver with the secondary winding of said induction coil, conductors connecting said arms with the terminals of the primary winding of said coil and conductors for connecting said pins with an alternating current source.

3. In an armature circuit testing apparatus, the combination of a handle member, a pair of arms pivotally mounted thereon, means tending to hold the extended ends of said arms toward each other, a pin secured intermediate the extended ends of said arms, a longitudinally movable pin mounted adjacent said other pin, an induction coil mounted in said handle, a receiver, electrical conductors connecting said receiver with the secondary winding of said induction coil, conductors connecting said arms with the terminals of the primary winding of said coil and conductors for connecting said pins with an alternating current source.

4. In an armature circuit testing apparatus, the combination of an insulated head piece, an iron tube with one end secured therein forming a core for an induction coil, a handle secured on said tube inclosing the primary and secondary winding of the induction coil, a pair of arms pivotally mounted on said head, means tending to hold their extended ends toward each other, a pin secured to said head intermediate the extended ends of said arms and a longitudinally movable pin adjacent thereto, means tending to hold said movable pin outwardly, a receiver in electrical connection with the secondary winding of said induction coil, conductors connecting both terminals of said primary winding of said induction coil with said arms and conductors for connecting said pins with an alternating current source.

5. In an armature circuit testing apparatus, the combination of an insulated head piece, an iron tube with one end secured therein forming a core for an induction coil, a handle secured on said tube inclosing the primary and secondary winding of the induction coil, a pair of arms pivotally mounted on said head, means tending to hold their

extended ends toward each other, a pin secured to said head intermediate the extended ends of said arms and a longitudinally movable pin adjacent thereto, means tending to hold said movable pin outwardly, a receiver in electrical connection with the secondary winding of said induction coil, conductors connecting both terminals of said primary winding of said induction coil with said arms and electrical conductors for connecting said pins with any source of electrical energy producing an alternating current, and another electrical conductor connecting said movable pin and with a contact adapted to engage the shaft of the armature.

In testimony whereof, I have hereunto set my hand at San Diego, California, this 23d day of October, 1916.

CLYDE ZEEK.