

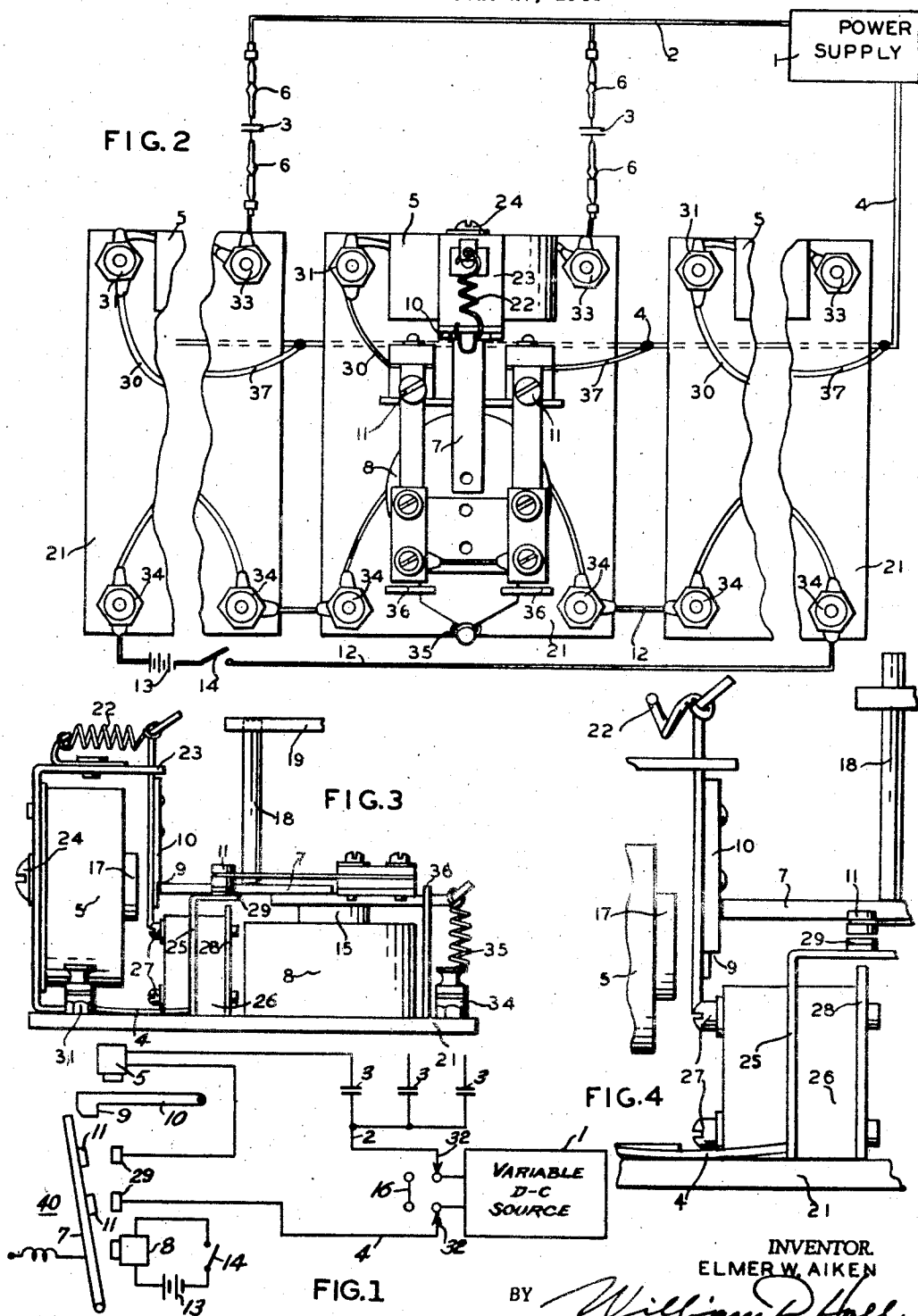
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CONDENSER TESTER

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CONDENSER TESTER

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The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

This invention relates to testing devices and more particularly to a device for testing condensers and the like.

The objects of the present invention include the provision of an apparatus for the testing of a plurality of condensers with precision and accuracy and with a minimum waste of material and with a savings of time and effort as compared with any previously known apparatus.

With the above and other objects in view which will be apparent to those who are informed in the field of testing electrical equipment and the like from the following discussion, an illustrative embodiment of the present invention is shown in the accompanying drawing, wherein:

Fig. 1 is a circuit diagram of the apparatus that forms a part of the subject matter of the present invention;

Fig. 2 is a plan view of the relay part of the apparatus with fragmentary parts of additional relay units and indicated circuit connections;

Fig. 3 is a side elevation of the relay that is shown in Fig. 2; and

Fig. 4 is an enlarged fragmentary side elevational view of an operative part of the relay that is shown in Fig. 3.

A simplified schematic circuit diagram of the invention is shown in Fig. 1 of the accompanying drawing. This circuit comprises a variable direct current power supply 1 of high voltage. A plug having two contacts 32 connects the circuit to source 1. One power supply line 2 connects one terminal of plug 32 with one or a desired plurality of condensers 3 to be tested, all having one terminal connected in parallel to line 2. Suitable means, such as spring clips 6 or the like (Fig. 2), releasably engage the terminals of the condensers 3. The other terminal of condenser 3 is connected to one terminal of the release magnet 5 of a relay 40. The other terminal of said magnet is connected to one contact of a pair of stationary contacts 29 of said relay, the other contact 29 being connected back to source 1 through line 4. The actuating magnet coil 8 of relay 40 is connected to a source of current 13 in series with a manually operated switch 14. Armature 7 of the relay carries a pair of contacts 11 which, when armature 7 is attracted by coil 8, close the circuit between contacts 29. When armature 7 is attracted by coil 8, shoulder 9 of a latch 10 engages the free

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end of armature 7 and maintains contacts 11 and 29 in contact after coil 8 is deenergized.

It will be understood that the circuit and relay above described will be duplicated for each condenser 3 to be tested. All magnets 8 in such circuits may be connected in series with switch 14 to the same source 13.

To conduct the test, the variable D.-C. source 1 is initially set at a very low voltage so that when the circuit is completed the magnitude of the transient currents will be insufficient to energize release coil 5. When key 14 is depressed, coil 8 attracts armature 7 and contact is made between contacts 29 and 11 thus completing the circuit through condenser 3. At this time, since the release coil 5 is not energized, latch 10 maintains the relay in operative position. Key 14 is then released and the source voltage is gradually increased until the desired voltage is applied to the plates of the condenser under test. Since there is no appreciable current flow during this procedure, latch 10 continues to engage the free end of armature 7. When the magnitude of the voltage is increased to the point where the condenser breaks down, the high current surge resulting therefrom energizes release coil 5 which attracts latch 10, thus freeing armature 7 and breaking the circuit.

In the event that the condenser withstands the desired voltage without breaking down, the plug, including contacts 32, is removed from its socket in the power supply 1 and inserted in the shorting jack 16. This causes the condenser to dissipate its entire charge through coil 5 which becomes sufficiently energized to attract latch 10, releasing armature 7 and breaking the circuit to the power supply. The discharged condenser may then be removed from clips 6 and replaced by another condenser to be tested in the manner above outlined.

For the breakdown testing of a plurality of condensers 3, a similar procedure is followed to the point of increasing the voltage of the power supply until the condenser plate dielectric fails. In making breakdown tests, any suitable indicator is mounted upon the armature 7 of each relay in such a manner as to indicate motion of the armature 7 from outside of the apparatus. A preferred indicator 18 consists of a cylindrical rod of insulating material such as Bakelite or the like that serves as both an indicator and as a manual reset for the individual armatures 7. The lower end of the indicator 18 rests upon the armature 7 and its upper end is disposed within an aperture in a plate 19 and preferably terminates

substantially flush with the upper surface of the plate 19 when the armature 7 is engaged by the shoulder 9 of the latch 10, as shown in Fig. 3 of the drawing. When the armature 7 is released by the shoulder 9 of the latch 10, as by a potential pressure upon the plates of the condenser 3 sufficient to overcome the dielectric therebetween and the resultant energization of the coils 5, the upper end of the indicator 18 extends above the upper surface of the plate 19, as shown in Fig. 4, of the accompanying drawing. The depression of the exposed end of a rod 18 resets the particular armature 7 that supports the rod 18.

When breakdown tests on a plurality of condensers 3 are being made on this apparatus, the voltage of the variable power supply 1 is increased until a click indicates that one of the condensers has blown. When this occurs, one of the indicators 18 will designate which one of the condensers has blown, and a voltmeter, not shown, in the power supply 1 gives the reading at which that condenser has broken down. The voltage of the power supply 1 may continue to be increased until another click and elevated indicator shows that another condenser has broken down. The designation of the condenser and the voltage at which it failed are then made matters of record for the test. In a similar manner, all of the condensers are consecutively broken down by a gradual increase in the voltage from the power supply 1, and the data thereon recorded.

The type of relay that has been developed as a part of the present invention is preferably suitably mounted upon a base 21. A spring 22 imparts yielding return motion to the latch 10, which is mounted for supported lever action about an unattached end of a support 23 whose attached end is secured to the base 21. The coil 5 and its iron core 17 are secured to the support 23 in any suitable manner, as by a screw 24, or the like. A pair of supports 25 are clamped between insulating blocks 26 by bolts 27 whose threaded ends enter nut plates 28 and are adequately insulated from the support 25. The blocks 26 are secured to the base 21. Contacts 29, to releasably engage the contacts 11, are mounted on the upper ends of the supports 25. The lower end of one of the pairs of supports 25 is connected by a wire 30 to a post 31. The lower end of the other of the pair of supports 25 is connected by a wire 37 to the line 4 from the power supply 1. The post 31 and a

condenser connecting post 33 are bridged by the winding of the coil 5. Posts 34 provide connections for the windings of the coils 8. A spring 35 engages an end of the armature 7 to yieldingly urge it away from the attractions of the iron core 15 of the coil 8. The armature 7 is preferably pivotally mounted upon the upper end of a support 36, the lower end of which is secured to the base 21.

It is to be understood that the embodiment of the present invention that is shown in the accompanying drawing has been submitted for the purposes of illustrating and explaining the present invention, and that various modifications and substitutions may be made in the parts thereof, and in the particular connections shown, without departing from the present invention as defined in the appended claim.

What I claim is:

An apparatus for testing capacitors comprising a switch normally biased in open position, a releasable latch to retain said switch closed upon closure thereof, a release coil for releasing said latch to restore said switch to open position, a circuit for connecting a capacitor to be tested in series with said coil and switch to a source of variable direct-current potential, whereby upon closure of said switch the potential of said source will be impressed upon said capacitor, breakdown of said capacitor causing a current surge through said coil to release said latch and open said switch, and means to disconnect said circuit from said source and connect it across a short circuiting element whereby a capacitor which has not broken down may be discharged through said coil, said coil being so constructed that it will release said latch in response to the discharge current of said capacitor and open said switch.

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