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J. L. McWEENY

1,870,462

PRETESTING DEVICE

Filed March 2, 1931

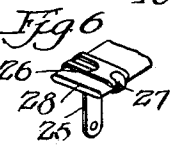
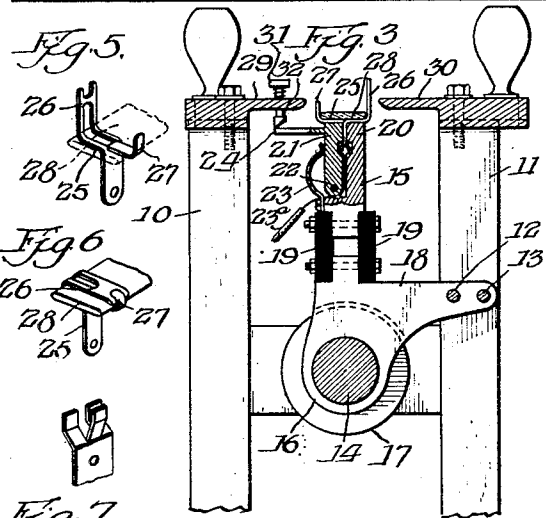
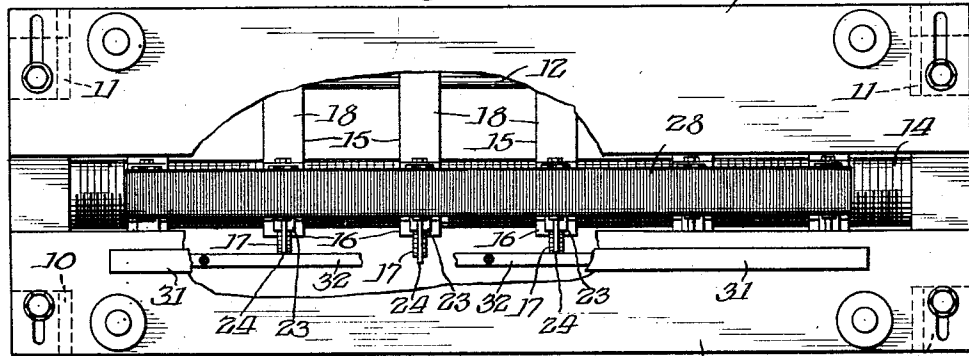
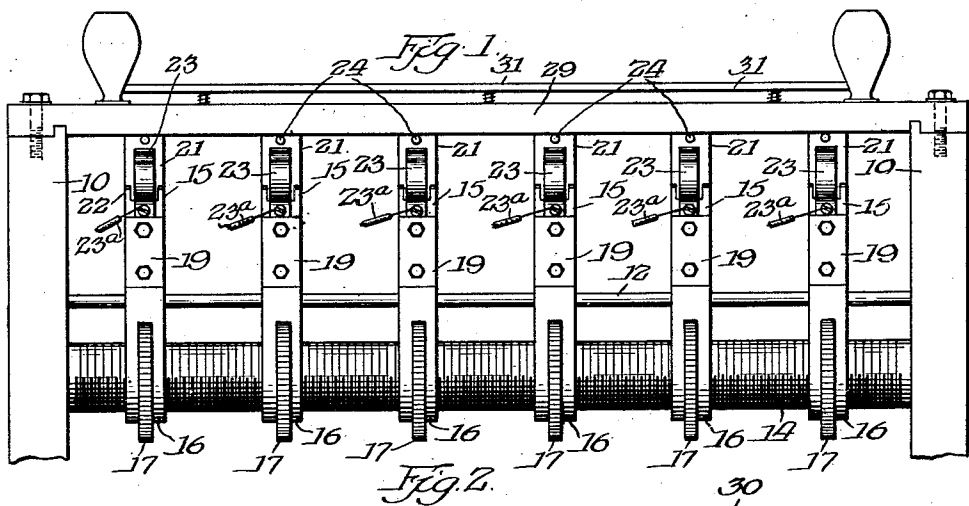
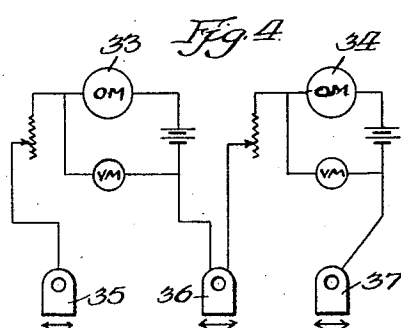


Fig. 5.

Witness:
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UNITED STATES PATENT OFFICE

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PRETESTING DEVICE

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My invention relates to measuring apparatus and more particularly to apparatus for pre-testing the resistance between any two terminals on a fixed resistor.

6 In the manufacture of fixed resistors of the general type disclosed in the prior patent of McWeeny and McCord No. 1,789,150 of January 13, 1931, the usual practice is to place an insulating paper within a can, then place a plurality of terminal clips within the insulating paper at predetermined intervals, and then placing a resistor over the clips and thereafter closing the entire assembly. Notwithstanding great care and caution in the assembly of units such as heretofore disclosed in the manner described, a relatively large number are subject to rejection when later tested for a predetermined ohmage.

It is well known that where resistors are wound with wire, considerable relative variation in the resistors as a unit will occur, due to a number of variations in the various parts comprising the resistor. For example, it is known that in the drawing of the resistance wire, certain micrometric variations in cross section will occur over a given length of wire. In addition, the whole chemical structure of the wire has been found to vary over a given length. As to the resistor, a certain variation is apt to occur in the width of the terminal clips utilized, as well as a variation in the thickness or width of the non-conducting base over which the wire is wound. Thus it will be readily seen, that an attempt to determine the resistance between two points on a wound resistor by merely applying clips over a template, is not only unsatisfactory, but results in a large number of resistors so formed to be so inaccurate as to require rejection on a later test, notwithstanding an allowance, for example, of plus or minus 5%. The resistors having been completely assembled before the test is made, it has been found unprofitable to tear them apart and re-set the terminals.

45 An object of my invention is to eliminate all possible inaccuracies in obtaining the resistance desired. This is accomplished by pre-testing a given desired resistance before the terminal clips are finally applied.

50 A further object of my invention is to provide

vide apparatus including micrometer adjustment for each terminal clip that is to be utilized on the resistor, so that any variation either in the base, wire, or terminal clip can be taken care of by moving the terminal clip from the point at which it is originally placed, to a point at which the true resistance desired is obtained.

A further object is to provide means for firmly securing the clips to the resistor after they are properly placed for the resistances desired.

My invention will be more readily understood by reference to the accompanying drawing, in which:

Fig. 1 is a side elevation of a device constructed in accordance with my invention;

Fig. 2 is a top plan view, partly broken away, of the device shown in Fig. 1;

Fig. 3 is an end elevation, partly in section, of the device;

Fig. 4 is a diagrammatic explanation of the electrical circuit for testing;

Fig. 5 is a perspective view of a terminal clip such as utilized in the apparatus disclosed;

Fig. 6 is a similar view showing the clip in closed position, and

Fig. 7 is an enlarged perspective view of a modified form of a clip terminal.

By reference to the drawing, it will be seen that I provide a support comprising the members 10, 11 connected by a pair of slide bars 12, 13. Between the supports is located the micrometer bar 14, the same being threaded from end to end. Riding on the bar 14 are any desired number of terminal clamps generally designated as 15 of duplicate construction, the lower portion of which forms a yoke 16 overlying the bar 14. Within the yoke 16 and surrounding the bar 14 is the micrometer adjustment wheel 17 having threaded engagement with the micrometer bar 14. As best shown in Fig. 3, the yoke 16 is extended rearwardly to provide the arm 18 which is adapted to ride on the sliding bars 12, 13. Thus, any of the clamps 15 may be moved in either direction along the bar 14 by the simple expedient of rotating the wheels 17.

The terminal clamp generally designated as 15 is best shown in Fig. 3 in detail, wherein it is seen that the upper portion of the clamp is separated from the lower or yoke portion 16 by the insulators 19, the upper portion of which is connected to the metal clamping jaws 20, 21, the jaw 21 being pivoted at 22 and held against the jaw 20 by the spring 23. Projecting from the face of the jaw 21 is the release finger 24. Preferably the jaws 20, 21 are provided with a substantial well at a distance from the top to receive variations in the terminals such as the one shown in Fig. 7. If desired the screw on the spring 23 may be utilized to hold the wires 23a leading to the ohmmeters 33, 34.

As shown in Fig. 3 the jaws are adapted to receive the terminal of the clip 25 having the upstanding portion 26 and the short portion 27 formed therefrom. After the clip is inserted in the clamp, a resistor 28 is laid therein. When it is found that the terminal clips are properly placed the ends 26, 27 may be formed over the resistor by pressing inwardly the forming bars 29, 30, which are disposed across the supports and travel within slots, as best shown in Fig. 2. After the terminal clip has been firmly secured to the resistor by the forming bars 29, 30, the spring bar 31 is pressed down forcing the release bar 32 against the finger 24, thus rotating the jaw 21 and permitting the withdrawal of the resistor and attached clips.

Having described the apparatus comprising my invention, I will now proceed to explain the use and purpose thereof.

In operation, the lever 31 is depressed, thus opening all the jaws 21 of the clamps 15. The clips 25 are then inserted into the clamps and the bar 31 released. Thereafter, a resistor 28 of either inductive or non-inductive form is laid on the clips, as shown in Fig. 3. A reading may then be taken directly on the ohmmeters 33, 34 placed adjacent the apparatus.

Obviously a separate ohmmeter will be provided for a reading between each of the clamps provided in the device. If for instance, it is desired to have 1000 ohms between the terminals 35 and 36 shown in Fig. 4, and 800 in the portion between 36 and 37, if the ohmmeter 33 shows for instance 900 ohms, the wheel carrying the clip 36 is rotated to the right, or the wheel carrying the clip 35 is rotated to the left, thus increasing the interval between the two terminals 35, 36 until the meter reads the resistance 1000 ohms. Thereafter in testing the resistance between the clips 36 and 37 it will be necessary to move the terminal 37 until the meter reads 800 ohms the correct resistance. This same procedure is followed for any number of terminals on a resistor of any desired length and the reading taken directly for the resistance between any two terminals. Any inaccuracy in the

cross section of the base, wire or terminals can be compensated for readily and simply by moving the terminal along the resistor in the direction desired before the clips are closed. After the clips are found to be properly positioned for the resistances desired, the forming bars 29, 30 are closed, thus firmly fixing the terminals 25 to the resistor at the proper places and thereafter the tapped resistor may be removed from the device by depressing the bar 31, and are then ready for installation in a protector if desired.

Thus it will be seen that by the use of the apparatus herein disclosed, the percentage of resistors rejected because of inaccurate resistances between any two terminals, is reduced to a substantial minimum, with the additional advantage of the economy of labor and material heretofore expended on rejected material.

Obviously the device herein described may be modified to suit any individual requirement, and any number of clamps may be disposed upon the micrometer bar without interference with the proper functioning of the device. In the event only two or three terminals are desired on a particular resistor, the formation may be effected without interference by the remaining unused clamps.

I claim:

1. Apparatus for determining the resistance between two terminals of a resistor before the assembly thereof is complete, which comprises a support, a micrometric shaft thereon, a pair of terminal clamps cooperating with said shaft, said clamps having jaws adapted to receive and hold terminal clips, means cooperating with said shaft for moving said clamps thereon relative to each other, and an electric circuit including an ohmmeter connected across said clamps for determining the resistance of the portion of a resistor lying between said terminal clips.

2. Apparatus for determining the resistance between two terminals of a resistor before the assembly thereof is complete, which comprises a support, a micrometric shaft thereon, a pair of terminal clamps cooperating with said shaft, said clamps having jaws adapted to receive and hold terminal clips, means for opening the jaws of said clamps, means cooperating with said shaft for moving said clamps thereon relative to each other, and an electric circuit including an ohmmeter connected across said clamps for determining the resistance of the portion of a resistor lying between said terminal clips.

3. Apparatus for determining the resistance between two terminals on a resistor before the assembly thereof is complete, which comprises a support, a micrometric shaft thereon, a pair of terminal clamps cooperating with said shaft, means for opening the jaws of said clamps to receive termi-

nal clips, means cooperating with said micrometer shaft for moving said clamps relative to each other, and an electric circuit including an ohm meter, connected across said resistor terminals for determining the resistance of the portion of a resistor lying between said terminals.

4. Apparatus for determining the resistance between two terminals of a resistor before the assembly thereof is complete, which comprises in combination a support, a threaded shaft supported thereon, a pair of terminal clamps adapted to be slidably connected to said shaft, means on said support for opening said clamps to permit the reception therein of terminal clips, means on said terminal clamps and cooperating with said shaft for moving said clamps along said shaft relative to each other, and an electric circuit including an ohm meter connected to the respective clamps whereby the resistance between two terminals of a resistor lying therein can be visually determined.

5. Apparatus for determining the amount of resistance between two terminals of a resistor before said terminals are permanently attached to said resistor, comprising in combination, a support, a threaded micrometer bar thereon, a pair of terminal clamps adapted to be connected to said bar and to have slidable engagement therewith, means on said support for simultaneously opening said clamps to permit the reception of terminal clips therein, means on said clamps and cooperating with said micrometer shaft for permitting relative movement of said clamps thereon, and an electric circuit including an ohm meter, between said clamps whereby to permit visual determination of the resistance between said terminals.

6. Apparatus of and for the purpose described, including a support, a threaded shaft thereon, a plurality of terminal clamps cooperating with said shaft, said clamps having a pair of jaws thereon adapted to receive the terminal of a terminal clip, means on said support for simultaneously opening all of said jaws to receive and discharge said clips, means on said clamp members and cooperating with the threads on said shaft for permitting movement thereof along said shaft, and an electric circuit including an ohm meter and volt meter disposed between each two adjacent terminals, for visually indicating the resistance of that portion of a resistor lying between any two terminals.

7. Apparatus of and for the purpose described, including a support, a threaded shaft thereon, a plurality of terminal clamps cooperating with said shaft, said clamps having a pair of jaws thereon, one of said jaws being adapted for partial rotation about a pivot to permit the reception of the terminal portion of a terminal clip, means on said support for simultaneously opening all of

said jaws to receive and discharge said clips, means on said clamp members and cooperating with the threads on said shaft for permitting movement thereof along said shaft, and an electric circuit including an ohm meter and volt meter disposed between each two adjacent terminals, for visually indicating the resistance of that portion of a resistor lying between any two terminals.

8. Apparatus of and for the purpose described including a support, a threaded shaft thereon, a plurality of terminal clamps cooperating with said shaft, said clamps having a pair of jaws thereon, one of said jaws being adapted for partial rotation about a pivot to permit the reception of the terminal portion of a terminal clip, means on said support and cooperating with said pivoted jaw for simultaneously opening all of said jaws to receive and discharge said clips, means on said clamp members and cooperating with the threads on said shaft for permitting movement thereof along said shaft, and an electric circuit including an ohm meter and volt meter disposed between each two adjacent terminals, for visually indicating the resistance of that portion of a resistor lying between any two terminals.

9. Apparatus for determining the resistance between two terminals of a resistor before the assembly thereof is complete, which comprises a support, a micrometric shaft thereon, a pair of terminal clamps cooperating with said shaft, said clamps having jaws adapted to receive and hold terminal clips, means cooperating with said shaft for moving said clamps thereon relative to each other, an electric circuit including an ohm meter, connected across said clamps for determining the resistance of the portion of a resistor lying between said terminal clips, and means for permanently fixing said terminal clips to said resistor.

In testimony whereof I have affixed my signature.

JOHN L. McWEENY.