

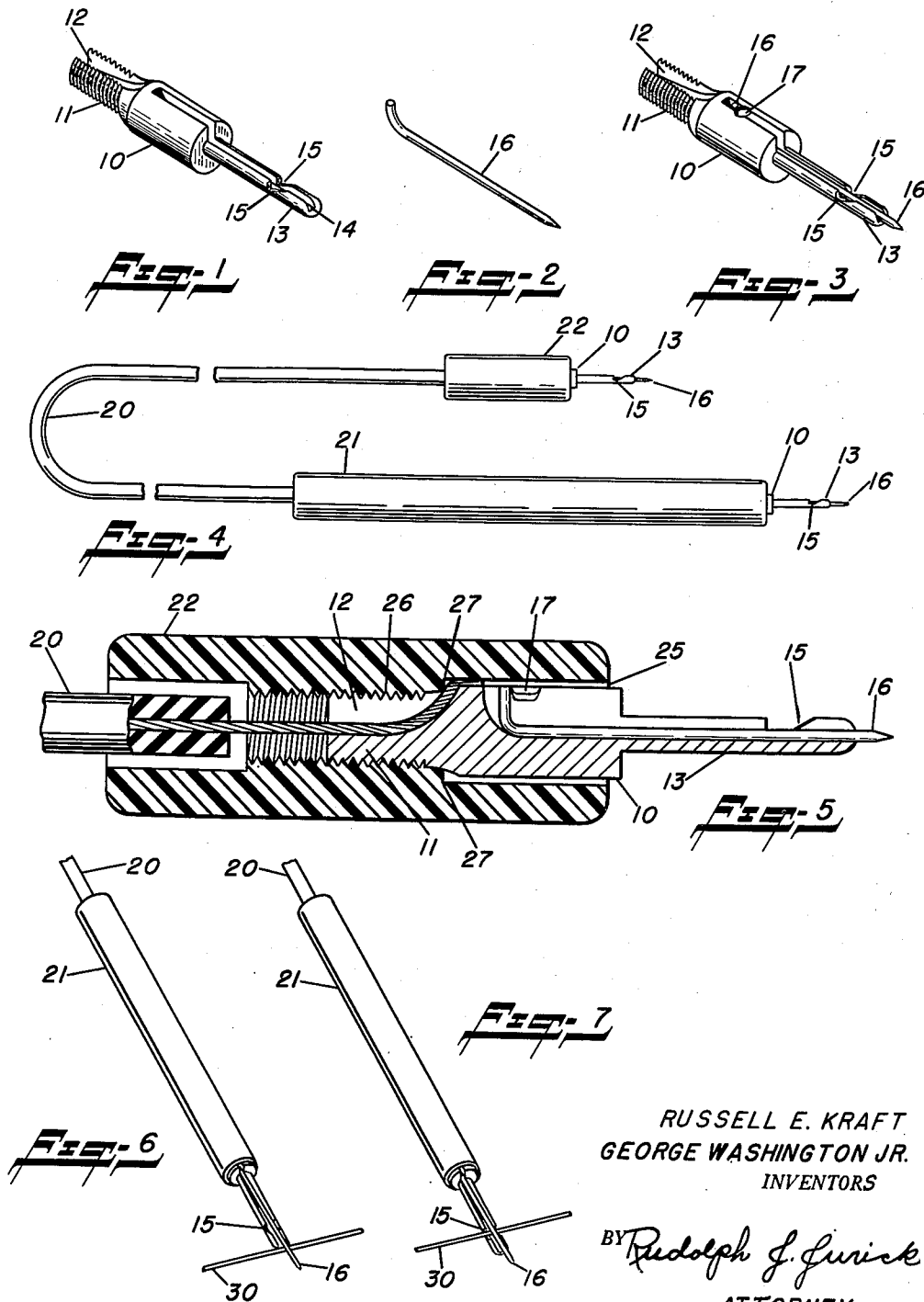
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ELECTRICAL TEST PROD

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ELECTRICAL TEST PROD

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This invention relates to electrical contacting devices and more particularly to an electrical test prod of the type employed to make electrical tests or measurements in confined spaces.

A test prod is a necessary tool in the art of testing radio, television and other electronic equipment. Such equipment comprises a maze of components, wires and other electrical conducting members assembled in a chassis having the smallest practicable overall dimensions. A test prod is particularly adapted for use in establishing contact with electrical wires or terminal members which are closely adjacent to other wires or terminals or which are located in the innermost sections of the chassis.

An ideal test prod should include the following features:

1. Quick, easy and positive establishment of electrical contact with a minimum possibility of causing short circuits.

2. Adapted to penetrate overlying insulation for establishment of contact with normally insulated wire.

3. Adapted for easy and positive attachment to a wire thus leaving the hands of the user free for other purposes.

4. Adapted for insertion into conventional pin-jacks and vacuum tube sockets.

5. Designed for solderless connection of the prod tip to the associated lead wire whereby a break in the lead wire can be repaired "on the job" without need of a soldering iron or other special tools.

While various prods have been proposed in the past, a prod made in accordance with this invention is, so far as we are aware, the only one incorporating all the features and advantages, listed above.

An object of this invention is the provision of a test prod of simple construction and maximum facility of use.

An object of this invention is the provision of a test prod in which the lead wire may be attached to the prod tip without recourse to a soldered joint.

An object of this invention is the provision of a test prod provided with a contact tip adapted for insertion into conventional pin-jacks and for establishing a holding contact on a bare wire, soldering lug, etc.

An object of this invention is the provision of a test prod comprising a handle of insulating material, a contact tip extending from one end of the handle, a longitudinal groove in said tip, a spring wire disposed within the said longitudinal groove and extending beyond the end of the contact tip and transverse notches extending across the longitudinal groove.

These and other objects and advantages will become more apparent from the following de-

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scription taken in connection with the accompanying drawings. The drawings are for purposes of illustration and are not to be construed as defining the scope or limits of the invention which resides in the combination and arrangement of parts as set forth in the appended claims.

In the drawings wherein like characters refer to like parts in the several views:

Figure 1 is an isometric view of the metallic contact member employed to make a test prod in accordance with this invention;

Figure 2 shows the spring wire adapted to lie in the longitudinal groove of the contact member;

Figure 3 illustrates the assembled contact tip; Figure 4 illustrates a test lead having a test prod on each end;

Figure 5 is an enlarged, cross-sectional view of a complete test prod and showing the solderless joint between the end of the lead wire and the contact tip; and

Figures 6 and 7 illustrate how the test prod may be attached to a wire to free the hands of the user for other purposes.

Referring now to Figures 1-3, the contact tip of the test prod comprises a metallic member 10 having an inner end 11 of somewhat reduced diameter and threaded, as shown. The threaded end 11 includes an axial channel 12 of varying depth, the depth of the channel being a maximum at the free end of the threaded section. The outer end of the member 10 comprises an integral, elongated rod 13 of reduced diameter. A longitudinal groove 14 extends throughout the entire length of the rod 13 and partially through the member 10, and the resulting side walls of the rod are provided with transverse notches 15, substantially as shown.

The pointed wire 16 is made of good spring steel and is disposed within the longitudinal groove 14, said wire being secured into place by peaning over the adjacent side walls of the member 10 as indicated by the numeral 17. It is pointed out that the dimensions of the longitudinal groove 14 and the wire 16 are such that when the wire is in place (Figure 3), it lies completely within the effective, outside diameter of the rod 13. Thus, the presence of the wire 16 will not in any way interfere with the insertion of the rod 13 into a pin-jack connector, the prongs of a vacuum tube socket, or etc., it being noted that the free end of the rod 13 is slightly rounded for this purpose.

The assembled contact tip, as shown in Figure 3, is threaded into an appropriate tubular shell to form a test prod. Figure 4 illustrates a cable or lead wire 20 having a test prod on each end. The shell 21 is relatively long as such prod is intended primarily for use in establishing an electrical test connection, with a wire, while the

shell 22 is relatively short and better adapted for a test prod designed for insertion into a pin-jack or vacuum tube socket. In either case the contact tips are identical and it will be apparent various combinations of long or short prods is possible as well as single prods in which case the other end of the cable can be connected to an instrument binding post.

While it will be obvious that the end of the lead wire 20 can be soldered within the channel 12 of the contact member, we prefer to make a firm connection between the cable and the tip without the use of a soldered joint. The solderless connection is shown in Figure 5 which is a longitudinal cross-sectional view of the short test prod illustrated in Figure 4. The shell 22 which is made of plastic or other electrical insulating material is provided with a bore 25 having a diameter slightly greater than the outside diameter of the member 10, and a threaded section 26 corresponding to the threaded end 11 of the said contact member. Inasmuch as the threaded section 26 is of a smaller diameter than the bore 25 there is provided a shoulder 27 within the shell 22. In assembling the test prod the insulation is removed from the end of the lead wire 20 and this end of the wire is passed through the shell 22. The bare end of the wire is placed into the channel 12 in the contact tip with the end of the wire projecting slightly over the member 10. The contact member is then threaded into the shell until the end of the lead wire is clamped firmly between the member 10 and the shoulder 27 of the shell, as shown in Figure 5. There is thus provided a good secure electrical connection between the lead wire and the metallic contact tip.

The described solderless connection of the lead wire to the contact tip makes it possible to repair a test prod in the field and also increases the flexibility of the device as the user can change at will the size or length of the associated lead wire.

Figures 6 and 7 illustrate the manner of attaching our test prod to a bare wire in order to free the hands of the user for other purposes. The projecting end of the spring wire 16 is placed into contact with the wire 30 and a slight downward pressure is exerted upon the test prod as a whole. This causes the wire 16 to flex, as shown in Figure 6, to a point where the wire 30 can be grasped between the rod 13 and the spring wire 16. An axial movement of the shell 21 will now cause the wire 30 to slip into the transverse notches 15 after which the hand may be removed from the test prod, the latter being held in firm contact with the wire 30 by reason of the tension exerted thereon by the spring wire 16. To remove the test prod a reverse procedure is followed.

Having now described our invention the universal adaptability of the test prod is apparent. Any portion of the rod 13 may be used to establish electrical contact with an uninsulated wire or circuit component. Alternatively, the pointed end of the spring wire 16 may be employed to puncture through insulation, films of oil or grease, or to penetrate into metal to prevent accidental slippage of the prod as a whole. The attachment of the test prod to a wire in order to free the hands of the user can be done quickly and conveniently. In addition the prod may be employed as the plug-in element of a pin-jack arrangement as the rod 13 is of uniform diameter throughout its length.

While we have described and illustrated a preferred embodiment of our invention it will be apparent the handle portion of the device need not be a tubular shell. The lead wire can be soldered to the metallic contact tip and a suitable plastic or rubber handle molded around such combination.

Other modifications in the form, shape and arrangement of the parts will be apparent to those skilled in the art. Such modifications can be made without departing from the scope and spirit of the invention as set forth in the following claims.

We claim:

1. A metallic contact member for a test prod comprising a unitary, cylindrical body having a thread on one end and the other end being a cylinder of reduced diameter forming a tip section; a slot in the threaded end of the body; a longitudinal groove extending the full length of the tip section and partially into the body; a pair of transverse aligned notches in the opposed side walls formed by the groove of the tip section; and a spring wire having one end disposed within the groove in the body and secured to said body, a central portion disposed within the groove in the tip section, and a pointed end extending beyond the said tip section, said wire having a diameter substantially equal to the radial depth of the groove in the tip section.

2. An electrical test prod comprising a tubular shell of insulating material having an internally-threaded section proximate to one end; an enlarged-diameter bore in one end of the shell said bore communicating with the internally-threaded section; a unitary metallic member having an externally-threaded inner end that is threaded into the threaded section of the shell, a central section disposed within the said bore, and a uniform, reduced diameter tip section extending outwardly of the shell; a radial slot in the threaded end of the metallic member, a lead wire extending from the other end of the shell said lead wire having an end disposed within the radial slot in the threaded end of the metallic member and clamped between the central section of the metallic member and the bottom wall of the said enlarged-diameter bore; a longitudinal groove extending the full length of the said tip section and partially into the central section of the metallic member; a pair of transverse, aligned notches in the opposed side walls formed by the groove of the tip section; and a spring wire having an end secured to the central section of the metallic member and a pointed end extending beyond the said tip section, said wire having a central portion disposed within the groove in the tip section and the diameter of the wire being substantially equal to the radial depth of the groove in the said tip section.

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