Dec. 20, 1960 W. D. PALMER ET AL 2,965,858

TERMINATION OF COAXIAL TRANSMISSION LINES

Filed June 4, 1957

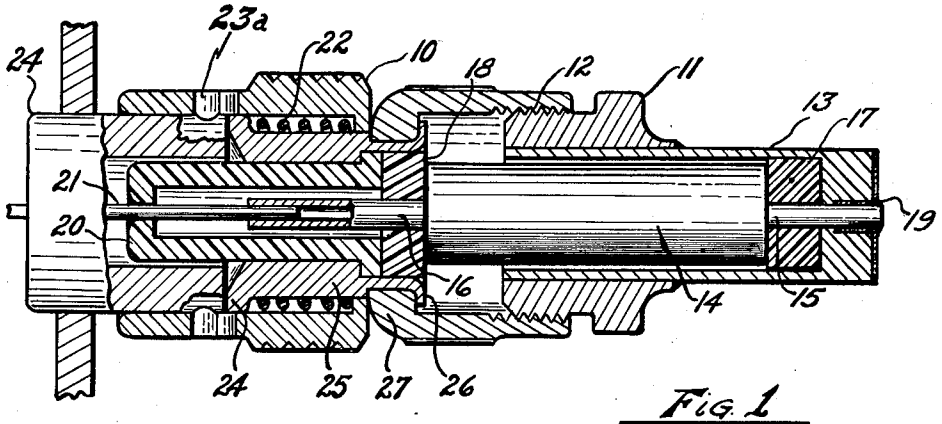


FIG. 1

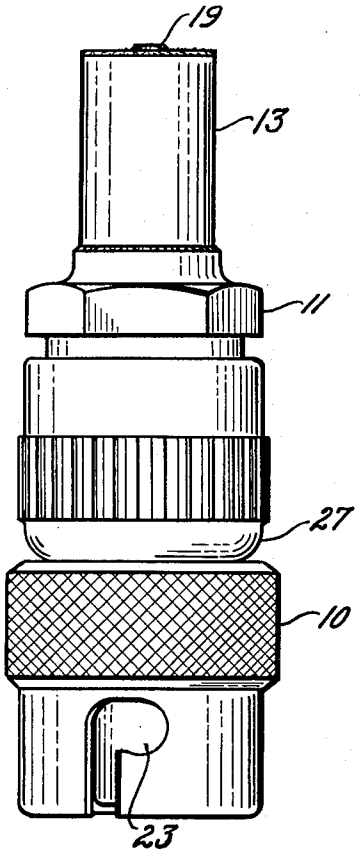


FIG. 2

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United States Patent Office

2,965,858

Patented Dec. 20, 1960

2,965,858

TERMINATION OF COAXIAL TRANSMISSION LINES

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Filed June 4, 1957, Ser. No. 663,559

3 Claims. (Cl. 333—22)

This invention relates in general to coaxial transmission lines and particularly to an improved means for termination thereof.

In the use of coaxial high frequency transmission line it is often desirable to provide a terminating impedance. This is particularly true when it is desired to connect external measuring apparatus to said line for the purpose of ascertaining voltage, current or power output of the high frequency transmission system. Unless such a termination impedance is of a value approaching the characteristic impedance of the line, readings on the measuring apparatus will be seriously affected due to the impedance mismatch which causes reflection and standing waves along the transmission line. Impedance matching devices presently known to the art are not always available at low cost. Also many of these devices have undesirable reactance effects which aggravate the reflection conditions referred to.

An object of this invention is to provide an inexpensive compact and simple device for use as a terminating impedance for a coaxial transmission line wherein the resistive component of said terminating impedance may be rapidly varied by the substitution of radio type carbon resistors of different resistive values.

Another object of this invention is to provide a novel coaxial transmission line structure incorporating a termination impedance.

It is a further object of this invention to provide a termination impedance for a coaxial transmission line which will minimize reflections at higher frequencies.

These and other advantages, features and objects of the invention, will become more apparent from the following description taken in connection with the illustrative embodiment in the accompanying drawings, wherein:

Fig. 1 shows in cross-section a coaxial transmission line embodying a resistive terminator and operative in accordance with the principles of this invention; and

Fig. 2 is an exterior view of the assembly shown in Fig. 1.

As will be clear from the drawings the terminator consists of two portions, **10** and **11**, separable at threaded junction **12**. Element **11** consists of a nut portion soldered to a barrel portion **13**, into which a resistive element **14**, such as a one-half watt carbon resistor, is inserted. Axial mounting of resistor **14**, as shown, will keep down reflection at higher frequencies because of symmetry of the capacitive distribution over the dissipative path. Hollow conductive terminal pins **15** and **16** are telescopically secured over the projecting ends (not shown) of the resistance wire component embodied in said resistor **14**.

Another advantage of the design lies in the fact that a plurality of elements, such as element **11**, containing resistors of different values may be kept on hand to rapidly vary the resistive component in order to vary

the load with changes in operating frequency. Such variations in load are necessary to maintain the characteristics of an infinite line, thus producing a standing wave ratio of unity. Theoretically no reflections would be produced if the load could be accurately maintained at the above stated conditions. Terminal pins **15** and **16** are maintained in an axial position free from contact with the terminator shell by means of washers **17** and **18**. Washers **17** and **18** may be readily machined to a snug diametrical fit from some suitable insulating material such as Teflon (tetrafluorethylene).

An additional function of washers **17** and **18** is to act as a bearing and take up the end play between resistor **14** and the soldered junction **19** where conductor pin **15** meets the terminator shell, and between resistor **14** and sleeve **20** when element **11** is screwed all the way into element **10**.

A further function of washers **17** and **18** is to provide a dielectric material to displace a substantial part of the air from the inside of the terminator unit. This would serve to prevent undesirable capacitance effects.

Sleeve **20** may be machined from the same material as washers **17** and **18** and is turned inwardly at one end to serve as a guide and bearing for the central conductor **21** of the coaxial transmission line or external energy source. It also brings conductor **21** into electrical contact with conductor pin **16** of resistor **14**. Pin **16** in the embodiment illustrated in Fig. 1 will act as a female receptacle to receive the solid probe **21**. However, in some cases it may be desirable to reverse this male-female arrangement. Attachment to a coaxial line or energizing source is further facilitated by means of spring **22** and female bayonet fitting **23**, which may be designed to receive an appropriate male fitting **24** carrying locking pins **23***a* properly secured to the conductor to be terminated. In addition to providing tension for the bayonet fitting, spring **22** assumes the further function of maintaining good electrical contact at all junctions by means of its action on the circumferential lip **24** of element **25** which in turn urges flange **26** of element **25** against the shoulder **27**.

Although the invention has been described with reference to a particular embodiment it will be understood to those skilled in the art that the invention is capable of a variety of alternative embodiments within the spirit and scope of the appended claims.

The invention claimed is:

1. A device for terminating a coaxial line comprising a sectional metallic housing, serving as an outer conductor, which is readily separable at a junction into a plurality of complementary sections, one of said sections having smooth-bored cylindrical portions of large and small diameters, respectively, with the larger bore carrying a cylindrical resistive element axially disposed therein, said resistor having axially aligned pins extending for a substantial distance beyond each end thereof, one of said pins being in electrical contact with the smaller bore of said metallic housing; and another of said separable sections carrying means to facilitate snap action coupling to an energizing source together with means for bringing the second of aforesaid resistor pins into electrical contact with said energizing source, and dielectric means surrounding the first of said pins and, together with said resistive element, substantially filling said housing section, to prevent undesirable capacitance effects.

2. A device as defined in claim 1 wherein said coupling means comprises interlocking inner and outer cylindrical elements, said outer cylindrical element being circumferentially slotted and said inner cylindrical element hav-

ing means extending radially therefrom for retention in the slotted portion of said outer element.

3. A coaxial line termination comprising a tubular package, containing resistance wire, said package having hollow pins at the two ends thereof to clasp the projecting ends of the resistance wire, and means for locking the end portion of an inner coaxial conductor within one of said hollow pins, said means including a smooth-bored metallic barrel fitting snugly about said tubular resistance package, said barrel having a thickened end portion fitting snugly about the other of said hollow pins, and electrically bonded thereto.

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