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H. R. FOSTER ET AL

2,779,002

COAXIAL TRANSMISSION LINE TERMINATION

Filed Feb. 10, 1954

FIG. 1

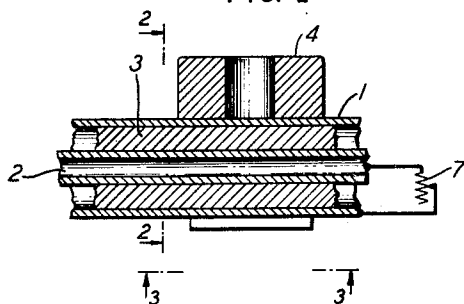


FIG. 2

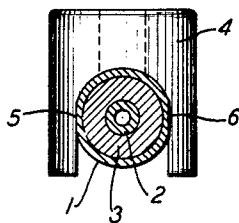


FIG. 3

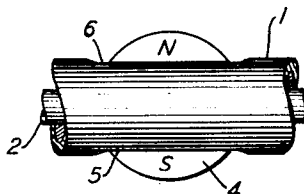
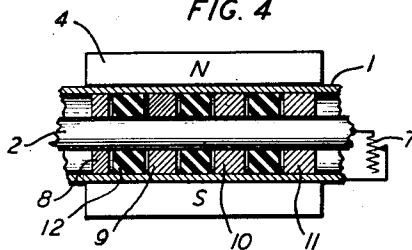


FIG. 5



FIG. 4



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COAXIAL TRANSMISSION LINE TERMINATION

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3 Claims. (Cl. 333-22)

This invention relates to a new and improved means for providing a termination to a co-axial line especially within a wide range of high frequency. It is the object of our invention to provide a termination for a co-axial line or cable over a range of approximately 30 to 3000 mc. Another object of our invention is to provide a means for simultaneously feeding direct current or 60 cycle A. C. through this termination in either direction without loss. Another object of our invention is to provide a low impedance connection for simultaneously feeding direct or ordinary sixty cycle currents through this present termination without loss. To get a perfect termination all the energy in the line must be absorbed and that is the object which we accomplish as will be illustrated and defined as follows:

Figure 1 is a sectional view through our invention.

Figure 2 is a view looking in the direction of the line arrows 2—2 of Figure 1.

Figure 3 is a view on the line arrows 3—3 of Figure 1.

Figure 4 is a part sectional and part elevational view through a modification of the construction shown in Figure 1.

Figure 5 is a plan view of one of the interior parts shown in Figure 4.

Referring now to the details wherein like numbers refer to corresponding parts, 1 is an outer tube of the co-axial transmission line and 2 is the inner tube of co-axial transmission line such as used in high frequency transmission work. These tubes are usually of non-magnetic material such as copper or brass. Mounted between the tubes 1 and 2 is a cylindrically formed member 3 preferably moulded from finely divided magnetic material such as ferrite. While the ferrite material might be assembled in tube 1 in a different way we prefer to use the moulded form as illustrated. Mounted outside of the tube 1 is a member 4 of strong permanent magnetic material. Preferably the sides of the tube 4 where it passes over the horizontal diameter of the tube 1 is provided with slightly flat surfaces 5 and 6 so as to make it easier to mount the magnet 4 onto the tube 1 and at the same time the flat surfaces 5 and 6 serve to hold the magnet in this position. The magnet 4 will pass the magnetic field through the ferrite material 3 and this construction will absorb practically all of the high frequency energy that may exist in the transmission line. To take care of any energy that might be left we utilize an adjustable resistor 7 connected across the open ends of the transmission line members 1

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and 2. This resistor should have a value equal to the characteristic impedance of the line. When the frequency of the current being transmitted over the line is approximately below 500 mc. then this resistor has its greatest influence.

In place of the ferrite construction shown in Figure 1 we may split the tubular member 3 into short cylindrically shaped ferrite members as illustrated by the parts 8, 9, 10 and 11. These parts are separated by circular discs 12 which may be, as illustrated, of the same thickness but all being of suitable insulating material.

The energy coming from the transmission line towards its end follows a descendant energy field so the length of the ferrite material 3 will depend to some extent on the amount of energy and frequency that is to be absorbed. We have obtained excellent results by the foregoing means of termination.

Having thus described our invention, what we claim is:

1. Termination means for a co-axial high frequency electrical transmission line, comprising a mass of finely divided magnetic material located between the parts of said line near their ends, said mass being divided into relatively small groups by spacers of insulating material, means for applying magnetic lines of force across said finely divided magnetic material, and a resistor connected across the coaxial parts of the line, said resistor being adjustable so as to take care of any energy not absorbed by said magnetic material.

2. Termination means for a coaxial high frequency electrical transmission line, comprising a moulded tube of finely divided magnetic material positioned over the inner coaxial part of the line and substantially filling the space between said line parts at their ends and means for applying magnetic lines of force across the line near its end, together with a resistance connected across the coaxial parts of the line, such that the combination will have a value equal to the characteristic impedance of the line.

3. Termination means for a coaxial high frequency electrical transmission line comprising, at least one tubular member of suitable finely divided magnetic material, such as ferrite located between the parts of said line near their ends, means for applying magnetic lines of force across said line over said magnetic material and a resistor connected across the coaxial parts of the line adjacent said magnetic material and being cooperative with said magnetic material to produce a perfect termination.

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