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United States Patent
Sewell , et al.**4,342,474**
August 3, 1982

Waveguide hanger

Abstract

A suspension system for vertically mounting RF transmission line on a tower has stabilizing guides at spaced intervals to prevent lateral movement of the line while permitting vertical movement to accommodate differential thermal expansion and contraction. The line is suspended by a series of vertically spaced adjustable spring loaded arms to support the line vertically without lateral loading on the stabilizing guides.

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movement restraint while allowing for differential expansion. These hangers are bulky, heavy, expensive, and require extensive mounting provisioning on the support tower. These units are also awkward to tension correctly on the transmission line, and due to their pivot arm geometry, they introduce undesirable motion as the transmission line expands or contracts vertically.

The object of the invention is to provide a less complex, less expensive method to support transmission line on towers, and to eliminate the undesired lateral motion.

Rather than individually supporting each transmission line section, the invention permits support of multiple transmission line sections each with a single spring hanger assembly. The design permits tower mounting at any convenient level. Structural integrity is enhanced by attachment to the transmission line at the flange joint rather than clamping to the thin, fragile transmission line wall as required by previous existing designs.

Furthermore, the lateral restraint system is separated from the vertical support system, which allows simple bands with wear buttons to be placed at convenient locations on the tower face, as required.

SHORT STATEMENT OF THE INVENTION

In accordance with the invention there is provided a system for hanging an RF transmission line vertically on a tower which comprises a series of vertically spaced support units mounted on the tower, each unit having at least one support arm protruding away from the tower and means for resiliently hinging such arm to the tower so that its free end can swing through an arc in a vertical plane; means for suspending the transmission line from the protruding arms so that each unit supports one or more transmission line sections (i.e., assumes its portion of the load) and can swing up or down with contraction or expansion of the transmission line, and a series of stabilizing guides restraining the transmission line from lateral movement while permitting vertical movement thereof.

In a preferred embodiment, the transmission line comprises a waveguide of square cross-section and each of the spring hanger assemblies is provided with a pair of support arms which embrace the waveguide and wherein the suspending means connect each arm of each pair to the waveguide; the suspending means supports the waveguide beneath the joints between sections and the stabilizing guides engage the waveguide at locations between the joints; the suspending means may comprise cables; the hinging means comprises an adjustable leaf spring arrangement mounted on the tower in a manner to permit the support arm to swing vertically; the stabilizing guides may comprise bands affixed to the tower and surrounding the waveguide with a sliding fit so as to permit the waveguide to move vertically but not laterally, the bands being provided with wear buttons to provide anti-friction engagement with the waveguide to facilitate its movement.

Still further objects, features and advantages of the invention will become apparent from the following detailed description of a preferred embodiment thereof taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings,

FIG. 1 is an elevation of a portion of a TV antenna tower showing one of the novel waveguide hangers supporting a waveguide thereon;

FIG. 2 is a cross section taken on line 2--2 of FIG. 1 showing how the guide is suspended by a band embracing it beneath a joint interconnecting waveguide sections;

FIG. 3 is a cross section taken on line 3--3 of FIG. 1 showing means for hinging the supporting arms of the novel hanger to the tower.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

One face of a TV antenna tower is indicated generally by the numeral 10. Extending from the bottom to top of the tower is an RF transmission line in the form of waveguide 12 to carry RF energy to the antenna. The

