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[54] **TELESCOPING ROD ANTENNA WITH HINGED**
JOINT AT A MEDIAL SECTION
5 Claims, 5 Drawing Figs.

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343/805, 343/901
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H01q 9/44
[50] Field of Search **343/702,**
805, 901; 343/723, 823, 889, 900, 903

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ABSTRACT: An antenna system including at least one set of telescoping tubes with two adjacent tubes of a set being hinged together to permit a portion of the tubes to assume a horizontal, as well as a vertical, position. The tubes, including the hinge assembly, are all retractable into the tube of largest diameter.

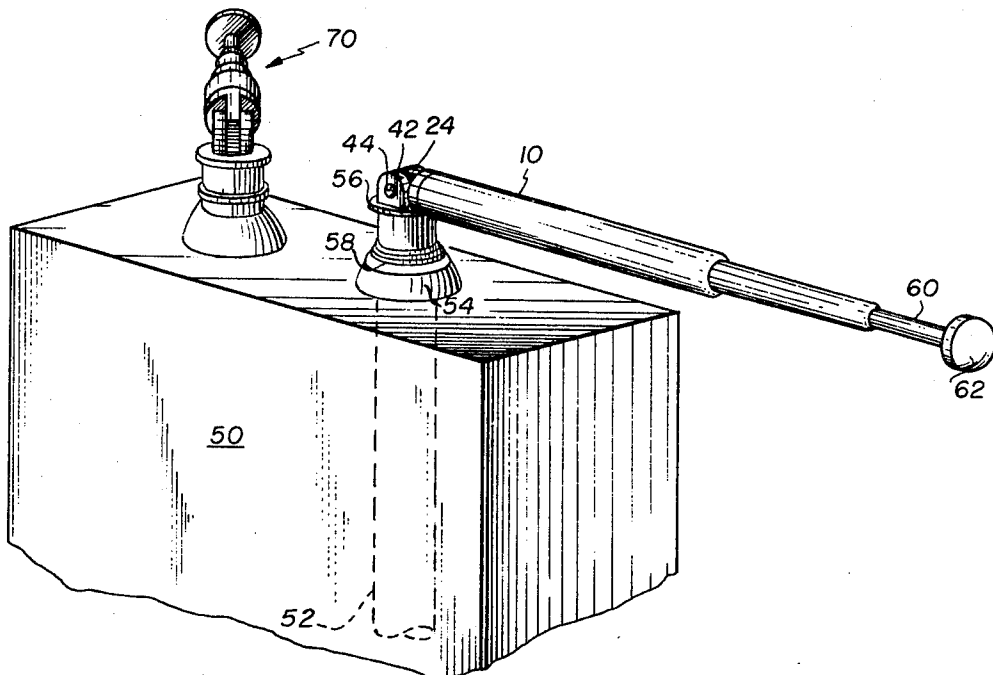


FIG. 1

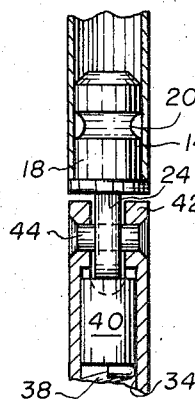
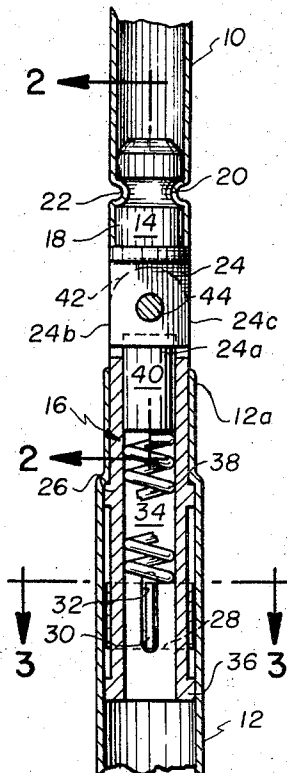


FIG. 2

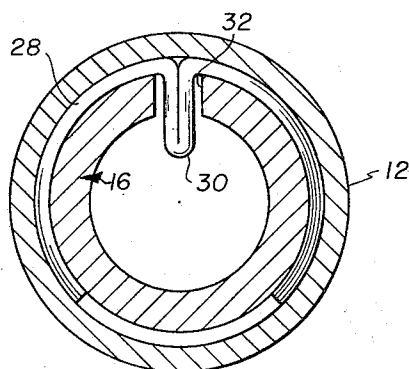


FIG. 3

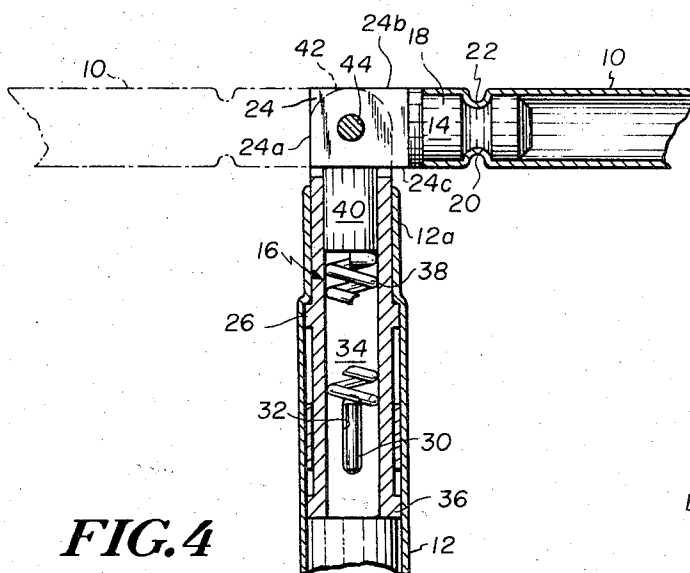


FIG. 4

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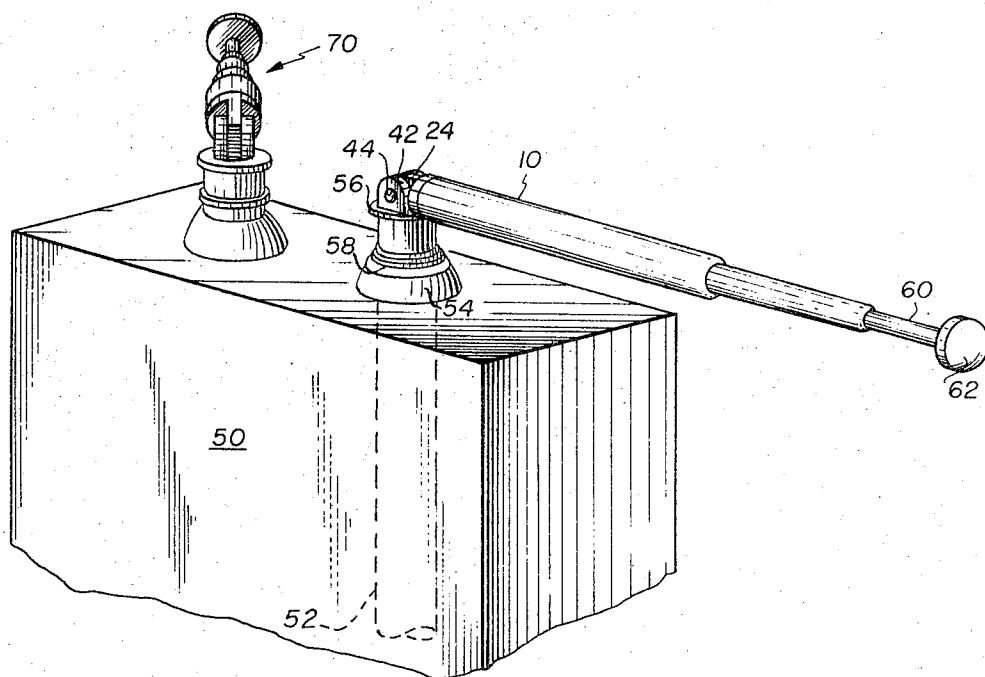


FIG. 5

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TELESCOPING ROD ANTENNA WITH HINGED JOINT AT A MEDIAL SECTION

BACKGROUND OF THE INVENTION

This invention relates to an antenna system, and, more particularly, to a telescoping antenna system which can be used for both UHF and VHF television reception.

Television receivers which are capable of receiving both very high frequency (VHF) programs and ultra high frequency (UHF) programs are well known. In the past it has been generally common to provide two separate antenna systems for each of these frequencies. In the use of portable receivers, that is, receivers that are commonly moved about thus negating the use of an outdoor roof antenna, a pair of telescoping antennas have been mounted to the receiver for VHF reception, which antennas, in use, are normally extended to their maximum vertical positions to receive the VHF broadcast. However, a separate antenna for UHF reception, usually in the form of a loop or the like, is normally provided in addition to the VHF antenna. Of course, these separate antennas are relatively expensive to manufacture and detract from the portability of the receivers since they require two separate lead in assemblies and corresponding terminals on the receiver, and add undesirable bulk and weight.

SUMMARY OF THE INVENTION

It is therefore an object of the present invention to provide a single antenna system for a television receiver which is capable of providing optimum reception of both VHF and UHF broadcasts, and which retains the flexibility of separate systems.

Briefly summarized, the antenna system of the present invention comprises at least one set of telescoping tubes, a first hinge member connected to the inner tube of two adjacent tubes of a set, and a second hinge member connected to the outer tube of said two adjacent tubes, said hinge members being pivotably connected to permit relative pivotal movement between said inner tube and said outer tube, and said hinge members and said inner tube being retractable within said outer tube.

BRIEF DESCRIPTION OF THE DRAWINGS

Reference is now made to the accompanying drawings for a better understanding of the nature and objects of the antenna system of the nature and objects of the antenna system of the present invention, which drawings illustrate the best mode presently contemplated for carrying out the objects of the invention and its principles, and are not to be construed as restrictions or limitations on its scope. In the drawings:

FIG. 1 is a vertical cross-sectional view showing two adjacent tubes of the antenna system of the present invention;

FIG. 2 is a cross-sectional view taken along line 2-2 of FIG. 1;

FIG. 3 is an enlarged cross-sectional view taken along line 3-3 of FIG. 1;

FIG. 4 is a view similar to FIG. 2, but showing the inner tube in a horizontal position; and

FIG. 5 is a perspective view, showing the antenna system of the present invention mounted on a housing.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring specifically to FIGS. 1-3 of the drawings, there is shown a pair of adjacent tubes forming a portion of the antenna system of the present invention, it being understood that these tubes may be a part of an entire telescoping assembly, as will be explained in detail later. Specifically, an inner tube 10 is provided which is slidably mounted with respect to an outer tube 12, the inner tube being shown in its fully extended position. Both tubes have a portion of reduced diameter near their upper ends, this portion of the tube 12 being shown at 12a in FIG. 1.

An upper hinge member 14 is fixed within one end of the tube 10, and a cooperating lower hinge member 16 is fixed within the adjacent end of the tube 12. The upper hinge member 14 includes a cylindrical portion 18 which has a circular notch 20 formed in the outer periphery thereof. A corresponding portion of the tube 10 is staked or crimped into the notch as shown at 22 to fix the tube 10 with respect to the upper hinge 14 member. A tab 24 extends from the cylindrical portion 18 of the upper hinge member 14, and cooperates with the lower hinge member 16 in a manner that will be described in detail later.

The lower hinge member 16 is of a generally cylindrical shape and has a flange 26 adapted to engage the shoulder portion of the tube 12 to restrain the lower hinge member from further outward movement with respect to the tube. A shim 28, better shown in FIG. 3, extends around the lower hinge member 16 and engages the inner wall of the tube 12 to provide a bearing for the hinge member with respect to the tube and to provide a slight resistance to slidable and rotative movement of the hinge member with respect to the tube 12. A tab 30 is formed on the shim 28, and extends through a notch 32 formed in the lower hinge member, and into a bore 34 formed through the lower hinge member and extending axially for the length thereof. A flange 36 is provided on the bottom portion of the lower hinge member 16 to aid in centering the hinge member inside the tube 12 and to relieve the bearing load on the shim 28.

A spring 38 is disposed in the bore 34 of the lower hinge member 16, and has one end abutting the tab 30 of the shim 28. A cylindrical slug 40 is also disposed in the bore 34 and engages the other end of the spring 38, the spring being of a size to normally urge the slug outwardly through the top of the lower hinge member.

The upper portion of the lower hinge member 16 is in the form of a clevis 42 which receives the tab 24 of the upper hinge member 14. A pin 44 extends through holes formed in the clevis 42 and the tab 24, and is riveted or staked in any known manner to the clevis to provide a pivotal movement between the upper hinge member 14 and the lower hinge member 16, and therefore between the inner tube 10 and the outer tube 12.

The tab 24 of the upper hinge member 14 is provided with a flat surface 24a which engages the flat upper surface of the slug 40 in the vertical position of the tube 10, as shown in FIG. 1, so that the tube 10 is retained or held in this position. Similarly, the tab 24 is provided with flat surfaces 24b and 24c which are perpendicular to the surface 24a and which permit the tube 10 to be held in a horizontal position to either side of the vertical position of FIG. 1. These horizontal positions of the tube 10 are shown by the solid and dotted lines in FIG. 4, with surface 24c engaging the slug 40 in the former position and the surface 24b engaging the slug in the latter position. Of course, the tube 10 is easily moved from these vertical and horizontal positions by simply manually overcoming the added resistance provided by the engaging flat surfaces.

It is understood that the outer tube 12 can in turn be mounted into one or more tubes of a larger diameter, and that one or more tubes of a smaller diameter can be mounted in the tube 10. In these cases each tube can be prevented from extending completely out from, or retracting completely in to, its adjacent tube, and can be slightly restrained from slidable or rotative movement by any known means, such as that shown in connection with the tube 12.

FIG. 5 depicts the complete antenna system of the present invention mounted on a housing 50 which may be in the form of a television receiver cabinet, or the like. Since the system shown consists of two telescoping antennas of identical structure, only the right hand one as depicted in FIG. 5 will be described in detail. Particularly, an outer tube 52 is slidably mounted within a hollow ball 54 which in turn is mounted with respect to the housing. It is understood that these mountings are achieved in a known manner, and are such as to permit the tube 52 to be retained at any desired height with respect to the

ball 54, and to permit the ball to swivel with respect to the housing 50. A pair of beads 56 and 58 are provided on the tube 52 and are spaced apart to facilitate gripping of the tube for extending the remaining tubes.

The tube 12 extends, along with any number of other tubes as desired, within the tube 52 and is completely retracted in the position of FIG. 5. The clevis 42 associated with the lower hinge member permits pivotal movement of the tube 10 to a horizontal position shown. One or more additional tubes may be disposed in the tube 10, and an additional inner rod 60 is provided which has a cap 62 fixed to the end thereof. Since the inner rod 10 as well as the upper and lower hinge assemblies are rotatable with respect to the outer rod 12, the horizontally extending portion of the antenna, as shown in FIG. 5 can be rotated into any position within a complete 360° range. As emphasized above, an antenna shown by the reference numeral 70 is provided adjacent the antenna just described and is identical in structure and operation to the latter.

In operation, and assuming UHF reception is desired, the antennas are collapsed and pivoted into a position shown generally in FIG. 5. Although it has been determined that optimum reception is normally obtained when the horizontal portions of the antennas extend in a straight line, the horizontal portion of the antenna 70 is shown offset slightly in FIG. 5 to emphasize the various positions the antennas can take, and to better show the particular structure involved. Of course the horizontal portion of either assembly can be expanded or collapsed as desired to obtain optimum reception.

The antennas are positioned for VHF reception by simply expanding all of the tubes, including the inner rod, to a generally vertical position, and by adjusting their height and relative position for optimum reception.

It is understood that two sets of lead in wires will be provided which may be within the same harness and which may be separately connected to the separate UHF and VHF receiving systems internally of the set. As an alternate, one set of wires may be used in conjunction with a crossover circuit disposed within the receiver housing.

It is thus seen that the antenna system of the present invention eliminates the need for separate VHF and UHF antennas and is therefore less expensive to manufacture and does not detract from the portability of the receiver, while retaining the

flexibility of separate antennas.

It is understood that the above-described antenna system is not necessarily limited to the use of two telescoping assemblies for television reception, and that variations of the specific construction and arrangement disclosed above can be made by those skilled in the art without departing from the invention as defined in the appended claims.

We claim:

1. An antenna system comprising a plurality of telescoping tubes retractable one within the other with all of said tubes being retractable within the tube having the largest diameter; a first hinge member connected to one of two adjacent tubes; and a second hinge member connected to the other of said adjacent tubes; said hinge members being pivotally connected to permit relative pivotal movement between said adjacent tubes; said first hinge member being formed with a bore and including a cylindrical slug disposed in said bore, said slug having a flat surface, and resilient means urging said slug outwardly towards said first hinge member; said second hinge member having at least two flat portions formed thereon, said flat portions adapted to engage said flat surface of said slug to hold the inner of said two adjacent tubes in at least two positions relative to the outer of said two adjacent tubes, said hinge members and said inner tube being retractable into said outer tube.

2. The system of claim 1 wherein said inner tube is held in a position coaxially aligned with said outer tube and in a position angularly disposed relative to said outer tube.

3. The system of claim 2 wherein said first hinge member has a pair of arms on either side of said bore projecting toward said second hinge member, and said second hinge member has a projecting portion projecting between and pivotally connected to said arms, said two flat portions being formed on said projecting portion.

4. The system of claim 1 further comprising means to mount said outer tube in a generally perpendicular direction with respect to a housing.

5. The system of claim 1 wherein said tubes include at least one additional tube connected to and retractable within said inner tube to enable the length of the tubes beyond said hinge members to be adjusted when said inner tube is coaxially aligned with and angularly disposed relative to said outer tube.

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