June 19, 1951 H. BROOKS 2,557,074

LEAD-IN TERMINAL UNIT FOR ROTARY DIRECTIONAL ANTENNAE

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Fig 1.

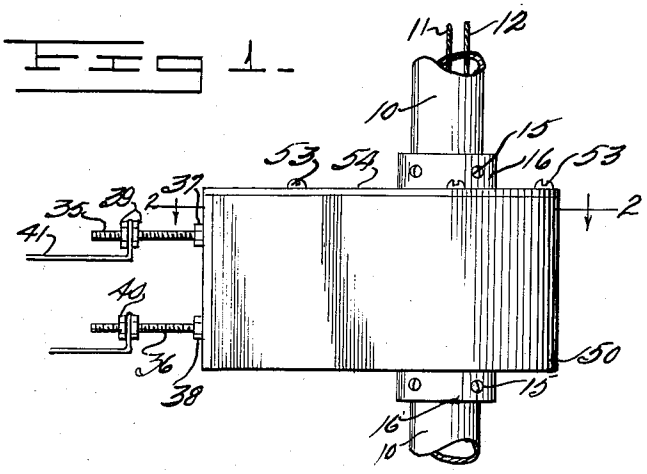


Fig 2.

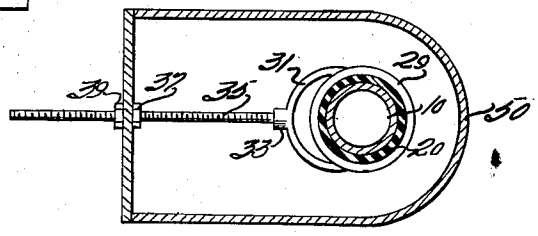


Fig 3.

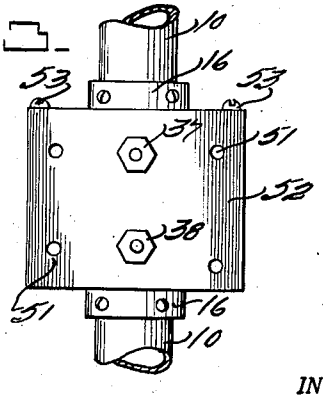
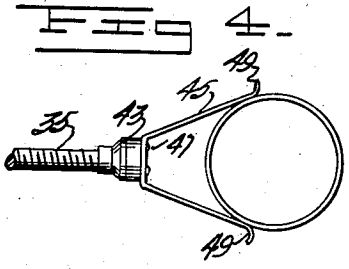


Fig 4.



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Fig 5.

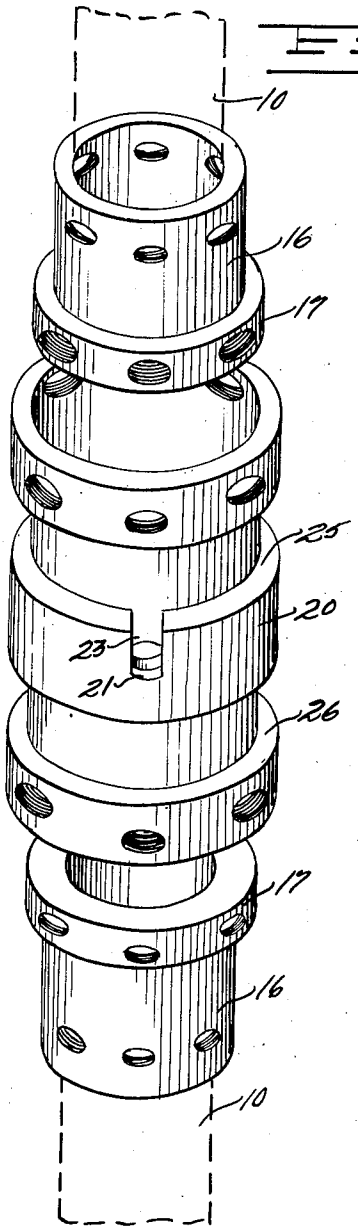
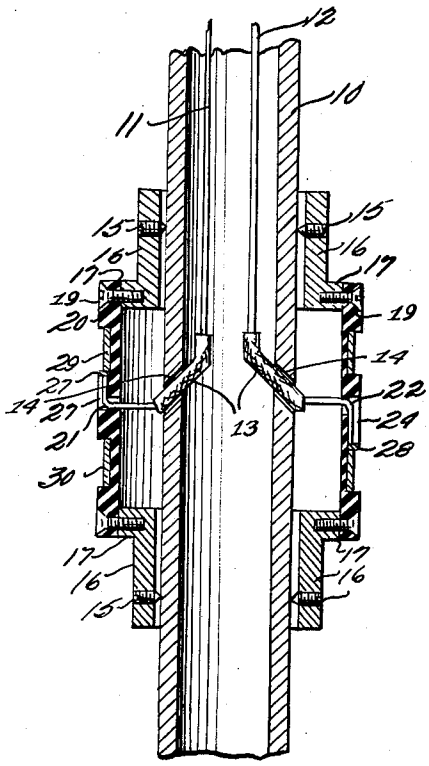


Fig 6.



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LEAD-IN TERMINAL UNIT FOR ROTARY DIRECTIONAL ANTENNAE

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2 Claims. (Cl. 173—324)

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This application relates to a feeder or lead-in terminal unit for rotary directional antennae.

At the present time directional antennae are mounted on rotary masts arranged for rotary movements through an angle of 180°. These masts are usually made up from sections of conventional pipe. The feeders or lead-in wires are draped along the outside of the mast. As the masts rotate, first in one direction and then in the opposite direction, the lead-in wires become worn in spots developing radio frequency leaks and finally short circuits.

It is a primary object of the present invention to bring the lead-in wires down the interior of the mast, that is, approximately along the center line of rotation of the mast, where they will not be subject to being wound and unwound as the mast rotates.

It is another object of the present invention to provide a terminal unit for attachment to the mast, whereby the lead-in conductors within the mast are maintained in continuous electrical connection with extension conductors leading to the receiver, or transmitter, as the case may be.

It is a further object of the present invention to provide a terminal unit for attachment to the mast and for connection of the lead-in conductors therein to extension conductors, which unit may be readily attached to the mast with a minimum modification of the latter.

Still other objects, advantages and improvements will become apparent from the following description, taken in connection with the accompanying drawings, in which:

Figure 1 is a side elevational view showing a portion of a mast with a casing enclosing the terminal unit of the present invention mounted thereon;

Figure 2 is a sectional view on the section line 2—2 of Figure 1, showing the upper spring assembly in contact with one of the collector rings;

Figure 3 is an end elevational view of the casing which encloses the terminal unit, this view showing the terminals for the receiver and transmitter connections, as the case may be;

Figure 4 is a top plan view showing one modification of the wiper spring assembly in contact with a collector ring;

Figure 5 is an enlarged and partially exploded view of the terminal unit;

Figure 6 is a vertical sectional view through the mast and the terminal unit.

Referring now to the drawings in detail, and to Figure 6, in particular, this figure shows the mast at 10 with lead-in conductors 11 and 12 extending down the interior of the same. It will be

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understood that these conductors extend from an antenna carried by the mast and enter the mast through a suitable grommet in the side wall near the top of the same. This latter feature forms no part of the present invention and is not here illustrated. The lead-in connectors 11 and 12 are brought out of the mast through holes 14—14, the conductors being covered by lengths 13 of spaghetti, or other hollow cylindrical insulating material, for some distance on either side of the holes 14.

The rotary member of the terminal unit is mounted on the mast by a pair of sleeves 16—16 which encircle the mast and are positioned in opposed relationship. These sleeves have inner circumferential flanges 17 on the opposed faces. Radially positioned set screws 15 extend through the hubs of the sleeves and secure same to the mast.

A cylindrical sleeve 20, of suitable insulating material, such as "Bakelite," is mounted over the flanges 17—17 on the sleeves 16—16 and is secured to these flanges by annular rows of radially positioned set screws 19. The insulating sleeve 20 has two circumferential grooves 25 and 26 thereon, these grooves being rectangular in cross-section. Within the grooves 25 and 26 there are mounted flat collector rings 29 and 30, respectively, these being made of brass, copper, or other suitable metals or alloys. The collector rings 29 and 30 may be of split construction and may be sprung into place in the grooves 25 and 26, respectively. Diametrically opposed holes 21 and 22 are formed through the cylindrical sleeve 20, intermediate the grooves 25 and 26, and from the hole 21 a longitudinal channel 23 extends to the groove 25; similarly, from the hole 22 a longitudinal channel 24 extends in the opposite direction to the groove 26. The lead-in conductor 11 extends through the hole 21 and channel 23 to the ring 29 in the groove 25, being connected to the ring through a lug 27 positioned in the channel 23; likewise, the lead-in conductor 12 extends through the hole 22 and channel 24 to the ring 30 in the groove 26, being connected to the ring through a lug 28 positioned in the channel 24.

The radio frequency pulsations induced in the antenna are transmitted by the lead-in conductors 11 and 12 through the collector rings 29 and 30, respectively. From these rings they are picked up by wiper spring assemblies. Figure 2 shows only the upper wiper spring assembly in contact with the upper collector ring 29. This device, as here shown, is comprised of an arcuate spring member 31 having an integral central boss 33, the radius of curvature of the spring section

31 being less than that of the collector ring 29. A screw-threaded rod 35 is mounted in the boss 33 on the arcuate spring member 31, this rod having a first pair of opposed nuts 37—37 thereon on either side of an end panel 52 of a casing, and a second pair of opposed nuts 39—39 thereon between which latter the extension conductor 41 is secured; the extension conductor 41 extends to the radio receiver, or transmitter, as the case may be. It will be understood that the second or lower wiper spring assembly is identical in construction with the first, only the threaded rod 36 and the external nut 38 of the first pair, the second pair of nuts 40—40, and the conductor 42 gripped therebetween being shown in Figure 1.

Figure 4 shows a modification of the wiper spring assembly. In this modification, the screw-threaded rod 35 or 36, as the case may be, has a closed end ferrule 43 on its inner end. The wiper spring 45 proper is formed of truncated V construction, secured at its flattened apex to the ferrule 43 by screws 47. The outer ends of the wiper spring 45 are bent outwardly, as at 49. Again, it will be understood that the second wiper spring assembly is identical to that here disclosed. The entire rotary terminal unit is enclosed by a weatherproof box comprised principally of a main body 50 of U-shaped construction. Over the open end of the U-shaped body an end panel 52 is secured by suitable screws 51 extending into suitable end flanges (not shown) on the U-shaped body. The end panel 52 is made of some suitable insulating material, such as "Bakelite." The casing has a bottom (not shown) and a removable top 54 which is secured to the U-shaped body 50 by screws 53 extending into inturned flanges (not shown) on the body. The top 54 and the bottom (not shown) are provided with aligned holes adapted to receive the hubs of the sleeves 16—16.

As previously stated, the screw-rods 35 and 36 extend through suitable holes in the insulated end panel 52, and these rods may be shifted through the end panel by adjusting the pairs of nuts 37—37 and 38—38, respectively, to vary the contact pressure of the wiper spring assemblies on the collector rings 29—30, respectively.

The operation of the lead-in terminal unit should be obvious from the preceding description. It may, however, be summarized as follows:

The directional antenna is carried by the mast 10 which is adapted to rotate through an angle of 180°. Since the lead-in conductors 11 and 12 are adjacent the axis of the mast, these are subjected to a minimum of torsional stress. The radio frequency pulsations induced in the antenna are carried through the lead-in conductor 11, collector ring 29, wiper spring 31, rod 35, and conductor 41, to the receiver or transmitter, as the case may be; similarly, the lead-in conductor 12 is connected through the collector ring 30, and through the lower wiper spring (not shown), the rod 36, and the conductor 42 again to the receiver or transmitter, as the case may be.

It will be apparent that, while the preceding description and annexed drawings present the invention in its preferred embodiment, various changes may be made in the size, proportions, and relative arrangement of the various parts without departing from the spirit of the invention as defined in the appended claims.

Having now described my invention, what I claim as new and useful and desired to secure by Letters Patent of the United States is:

1. In a terminal unit for a hollow rotatable antenna with a hollow mast having a pair of diametrically-opposite and downwardly-directed apertures, a casing enclosing the terminal unit with the latter rotatably mounted in the casing, an insulated wall upon the latter, a pair of wiper spring contacts supported inwardly of the insulated wall within said casing and having terminal portions extending externally upon said insulated wall for a connection with a pair of external conductors, and a pair of internal conductors in the hollow mast extending with the ends thereof outwardly through the opposite and downwardly-directed apertures in said hollow mast, the features which include a pair of opposed sleeves secured upon the latter mast, an insulating sleeve mounted between the opposed sleeves and provided with a pair of annular recesses spaced apart and located between the ends of the insulating sleeve with an intermediate peripheral portion of the latter between the recesses, said insulating sleeve having in the intermediate peripheral portion thereof a pair of centrally-disposed and diametrically opposite apertures and a pair of longitudinally-directed channel portions exteriorly connecting one of the latter apertures in one direction with one of the annular recesses and the other of the apertures in the opposite direction with the other of the annular recesses, a pair of collector rings seated in said annular recesses and engaged by said wiper spring contacts, and a pair of lugs individually disposed on the collector rings and seated in said longitudinally-directed channel portions upon said insulating sleeve, and the outwardly-extending ends of said internal conductors projecting through said centrally-disposed apertures and being individually connected to the lugs on said collector rings.

2. In a terminal unit for a hollow rotatable antenna with a hollow mast having a pair of diametrically-opposite and downwardly-directed apertures, a casing enclosing the terminal unit with the latter rotatably mounted in the casing, an insulated wall upon the latter, a pair of wiper spring contacts supported inwardly of the insulated wall within said casing and having terminal portions extending externally upon said insulated wall for a connection with a pair of external conductors, and a pair of internal conductors in the hollow mast extending with the ends thereof outwardly through the opposite and downwardly-directed apertures in said hollow mast, the features which include a pair of opposed sleeves secured upon the latter mast in spaced-apart relation, an insulating sleeve of substantially the same internal diameter as the external diameters of the mutually-opposite ends of the pair of opposed sleeves and fitting upon the latter in such manner as to bridge the resulting space between said opposed sleeves, the insulating sleeve being provided with a pair of annular recesses spaced apart and located between the ends of the insulating sleeve with an intermediate peripheral portion of the latter disposed between the recesses, said insulating sleeve having in the intermediate peripheral portion thereof a pair of centrally-disposed and diametrically-opposite apertures and a pair of longitudinally-directed channel portions exteriorly connecting one of the latter apertures in one direction with one of the annular recesses and the other of the apertures in the opposite direction with the other of the annular recesses, a pair of collector rings seated in said annular recesses and engaged by said wiper spring contacts, and

a pair of lug individually disposed on the rings and seated in said longitudinally-directed channel portions upon said insulating sleeve, and the outwardly-extending ends of said internal conductors projecting outwardly through the space between said pair of opposed sleeves and bridged by said insulating sleeve and then out through said centrally-disposed apertures in the latter and being individually connected to the lugs on said collector rings externally upon said insulating sleeve.

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