Sept. 20, 1960 L. MILLER 2,953,400

ANTENNA REFLECTOR ASSEMBLY

Filed July 6, 1959

FIG. 1

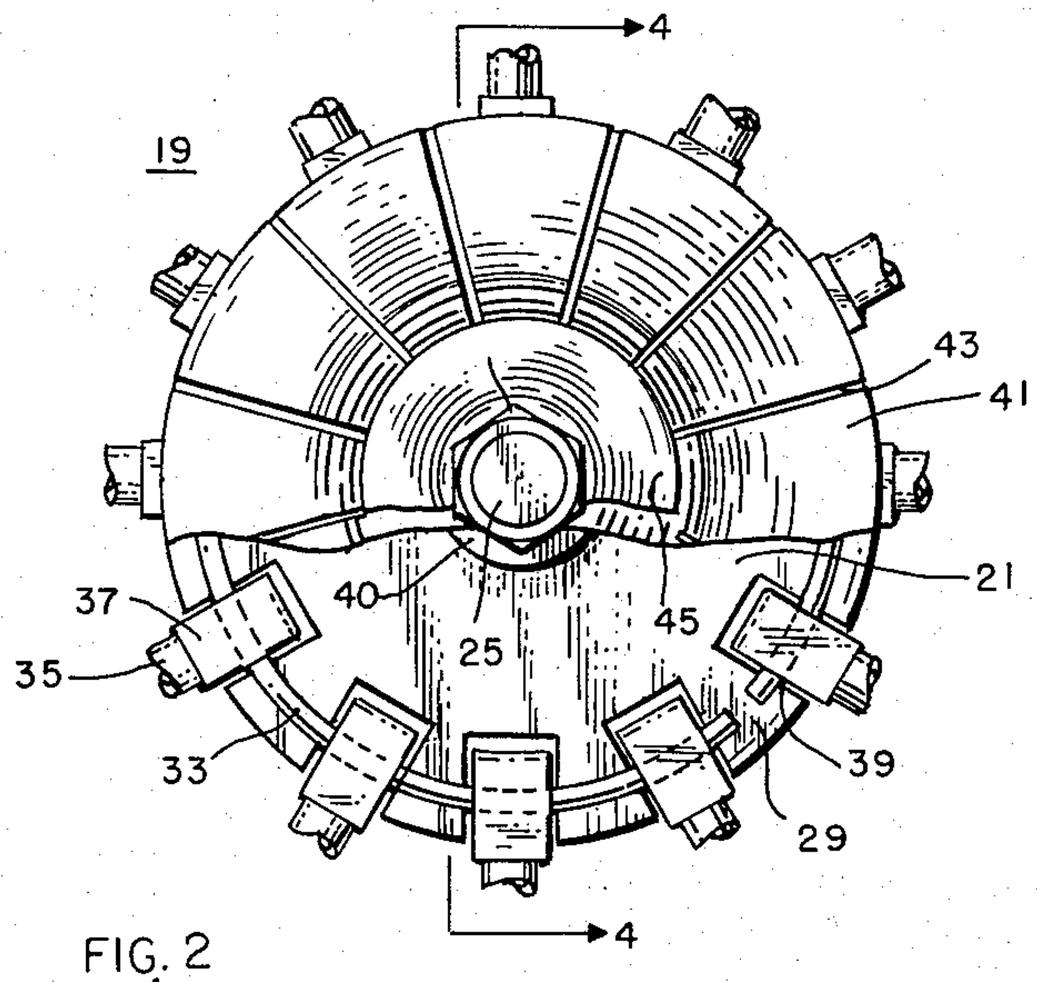


FIG. 2

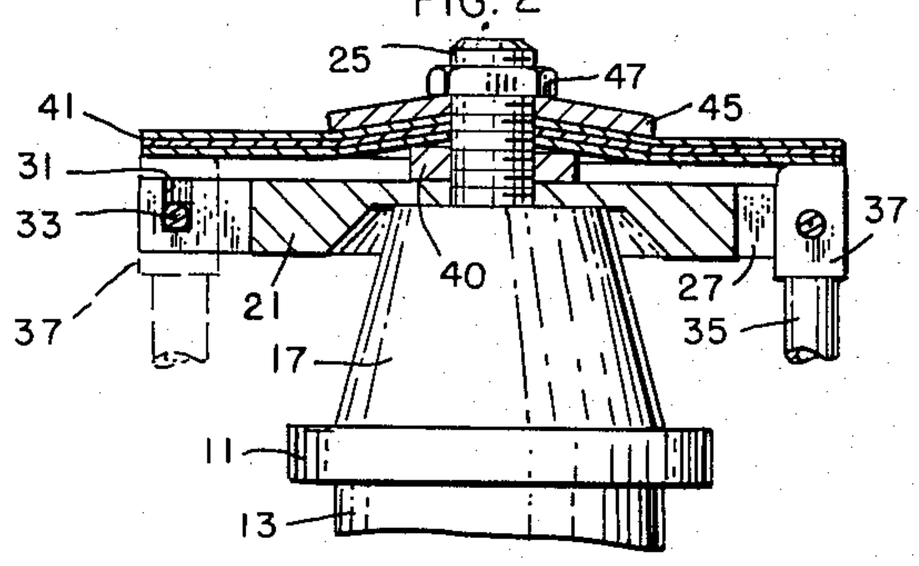


FIG. 5

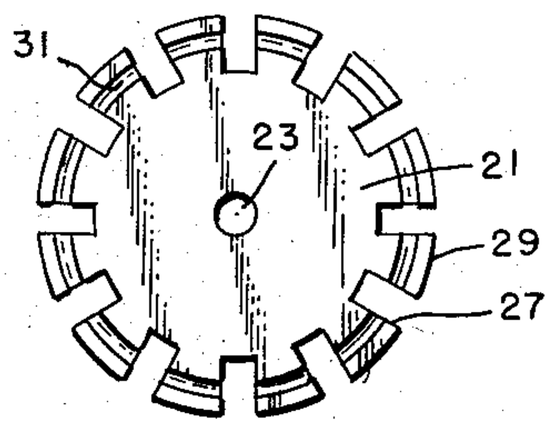


FIG. 3

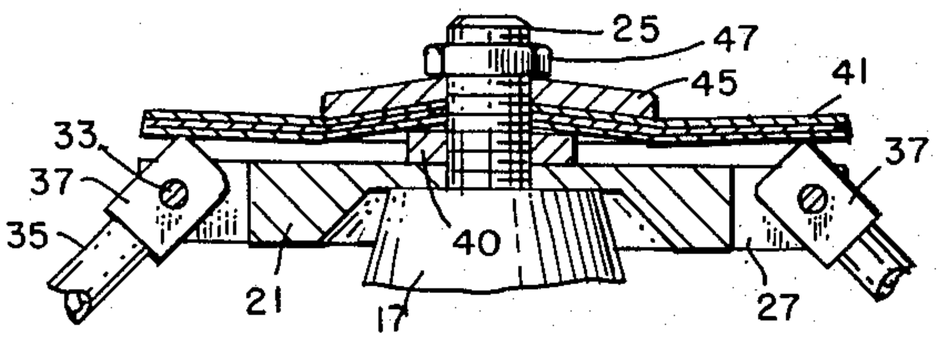


FIG. 6

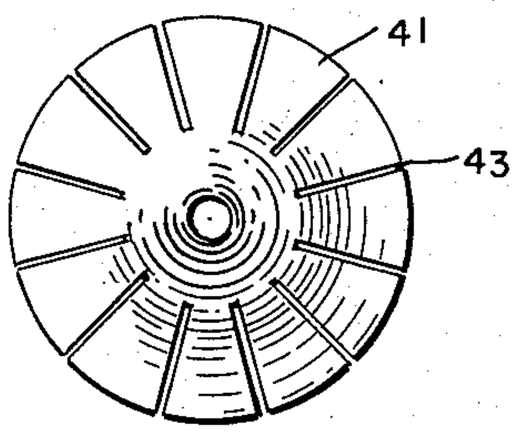
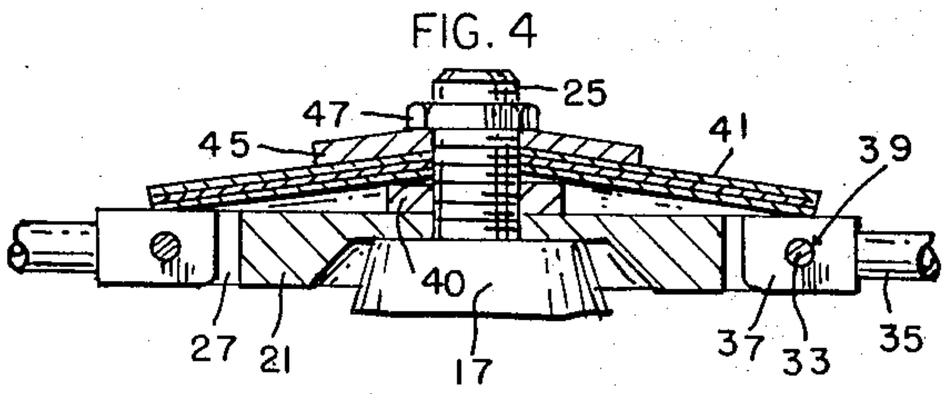


FIG. 4



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ANTENNA REFLECTOR ASSEMBLY

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2 Claims. (Cl. 287—1)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government for governmental purposes, without the payment of any royalty thereon.

The present invention relates to omni-directional type antennas and more particularly to a reflector assembly for such antennas.

Specifically, the invention is concerned with collapsible and erectable reflector assemblies that are characterized by having a plurality of rod-like elements which, when in open or extended position, serve as an element of antenna for radio receiver and/or transmitter sets, or other forms of equipments.

Such form of antennas have come into extensive use, particularly with the wide introduction of portable military equipments that require small lightweight portable antennas.

The present invention is concerned only with the reflector assembly of such antenna and particularly with a means for securing and maintaining the rod-like elements that make up the assembly.

Since the inception of umbrella type antennas, various means and methods have been devised to maintain the rod-like reflector antenna elements in rigid extended position and yet permit the elements to collapse when not in use. One such means included screwing the tubular antenna elements to a center plate. Still another method of securing the elements was to provide a center plate having a plurality of openings or recesses into which the elements were inserted into the recesses and held by force fit. In the use of the methods described above it has been found that disadvantages arose that seriously impaired the efficiency of such antennas. Firstly, it was found that the reflector rods so rigidly secured would readily snap or break if any accidental thrust was imparted to the rods resulting in damage to the antenna. Secondly, it was found that there where the rods were separable components, such rods could be lost in transit if not secured to the main body of the antenna. Another objection to such form of holding the rods was the time consumed in the assembly of the antenna.

In view of the deficiencies of the methods heretofore utilized the primary object of the present invention is to provide a reflector assembly for an antenna that is more durable than the prior art devices. Another object of the invention is to provide a reflector assembly that can be quickly assembled and disassembled.

An important feature of the invention lies in the method of holding the reflector rod elements so that such rods form an integral part of the antenna and are permanently secured thereto at all times.

Other features and advantages will be apparent from the following description to be read in view of the accompanying sheet of drawing in which:

Fig. 1 is a top plan view, partly cut away, showing the improved reflector assembly;

Figs. 2, 3, and 4 are side elevational views in cross section showing the successive stages of bringing the reflector to its full operating position;

Fig. 5 is a top plan view of the disc forming part of the improved assembly; and

Fig. 6 is a top plan view of one of the flat spring plates.

Referring to the drawing, with particular reference to Figs. 2–4, there is shown the antenna reflector assembly secured to a base **11**. The base **11** which supports the active or driven dipole elements is affixed to the central mast **13**. Since the mast and the dipole elements form no part of the invention, no further showing or description will be made.

An insulating collar **17** such as of a plastic, is secured to the base **11** and serves as the immediate support for the reflector assembly generally designated as **19**. The reflector assembly **19** includes a retaining disc or holder designated as **21** and shown in detail in Fig. 5. Referring to said figure, it can be seen that holder **21** is generally circular in configuration having a central opening **23** that accommodates a bolt **25** which secures the holder **21** to the collar **17** which is provided with a threaded bore in its top surface to receive said bolt. The disc holder **21** is characterized by having a series of cutouts **27** extending radially inwardly from the peripheral edge of the disc. Such cutouts on the peripheral edge serve to provide a series of peripheral tabs **29**. Each of the tabs **29** is provided with an arcuate groove **31** on its surface of such contour, that if the disc **21** did not have the cutouts **27**, the grooves **31** would form a continuous circle. Within the groove **31** is a split ring **33** which serves as the means for supporting the reflector elements **35**. The elements **35** in the specific embodiment shown herein are of lightweight aluminum tubes, though it is to be understood that any form of conductive material can be used whether tubular or solid. Each of the reflector elements **35** terminate at one of their respective ends in a connector block **37** which is rectangular in cross section and of a width slightly smaller than the width of each of the cutouts **27**. Each of the blocks **37** is provided with a central bore **39** having a diameter slightly larger than the thickness of the ring **33** so that when said blocks and their associated reflector elements **35** are threaded upon the ring and held thereby said elements are pivotably mounted thereon. Fig. 1 of the drawing indicates the manner in which the reflector elements are pivotably mounted and supported on the ring. In abutment with the holder **21** is a washer **40** which has a central opening whereby said washer can be held in position by the bolt **25**. In partial abutment with the washer **40**, is a multiple-plate flat spring generally designated as **41**. One of the multiple-plates is shown in detail in Fig. 6 and, as shown, comprises a substantially flat circular plate having a series of radial slots **43** whereby when a plurality of plates of similar form are stacked a plurality of discrete leaves are formed, each stack of which can be slightly elevated or raised as hereinafter described. Completing the antenna is a cup-shaped washer **45** positioned over the flat spring **41** and which, in conjunction with nut **47** which is threadable on the bolt **25**, serves both to maintain the components of the assembly in position and further serves as a means for increasing or decreasing tension of the spring assembly **41**.

While it is believed that the manner in which the reflector assembly operates is apparent from a study of the drawings, the following brief description of operation is set forth. In this regard attention is directed to Fig. 2 which shows the reflector elements in collapsed or inoperative position. When it is desired to place the reflector in use, the elements **35** are lifted upwardly such as shown in Fig. 3. It is to be noted that in this stage of operation the individual grouped leaf sections are urged upwardly so that the connector blocks **37** of the rods **35** can clear into their extended position. It is

noted that one edge of the connector block is rounded to permit ease of movement. Fig. 4 shows the reflector elements in the operative position at which time the spring assembly is urged normally downward to maintain the rods in position. As indicated supra, the nut can be adjusted to tension the spring assembly as desired. When it is desired to collapse the antenna assembly, reversal of the steps in erecting the antenna is used.

As already mentioned, the embodiment as applied to an antenna reflector is given only for the purpose of explaining the invention and it is to be understood that the invention is not restricted to such embodiment. Thus, for example, the invention herein can be applied equally to the active or driven elements of an antenna or any other component part of antennas or similar structures as the need arises.

While there has been described what is at present considered a preferred embodiment of the inevntion, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from the invention, and it is therefore aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What is claimed is:

1. A supporting means for a plurality of rod-like antenna elements comprising a substantially circular holder having a series of cutouts to form a series of peripheral tabs, each of said tabs having a circumferential arcuate groove therein to form a broken series of grooves, a ring in said series of grooves for pivotally supporting each of said elements within each of said cutouts, a first washer in abutment with said holder, spring tension means comprising a plate in abutment with said first washer and the pivotal ends of said elements, a second washer in abutment with said spring means for normally urging said spring means into engagement with said rod-like elements and means for maintaining all of said aforesaid components in operable engagement.

2. A supporting means for a plurality of rod-like elements in either collapsed or extended position comprising a substantially circular holder having a series of radial cutouts to form a series of peripheral tabs, each of said tabs having a circumferential arcuate groove therein for supporting a ring upon which each of said elements are pivotally mounted when each of said elements are confined within their respective cutouts, spring tension means comprising a plurality of substantially circular plates, wherein each of said plates is provided with a series of radial slots extending inwardly from the peripheral edge of said plates, said spring tension means being in abutment with the pivotal ends of each of said elements.

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