Oct. 4, 1960 D. A. PALMER 2,955,288

BALL AND SOCKET ANTENNA MOUNTING

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FIG. 1

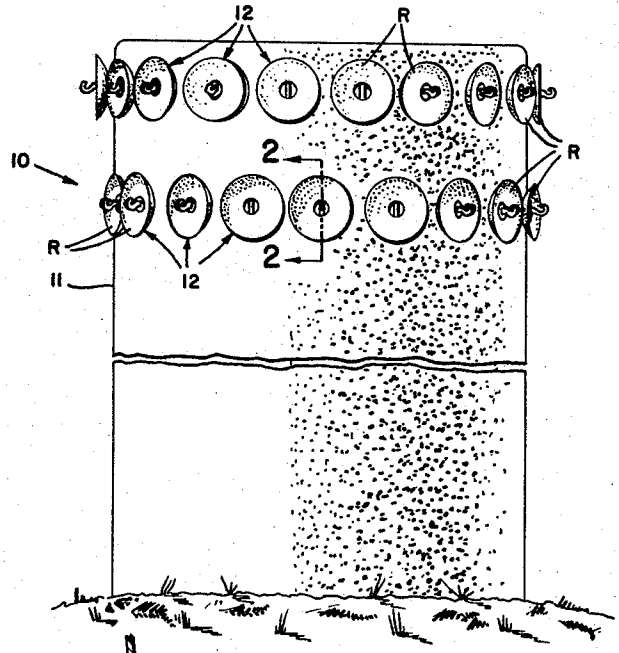
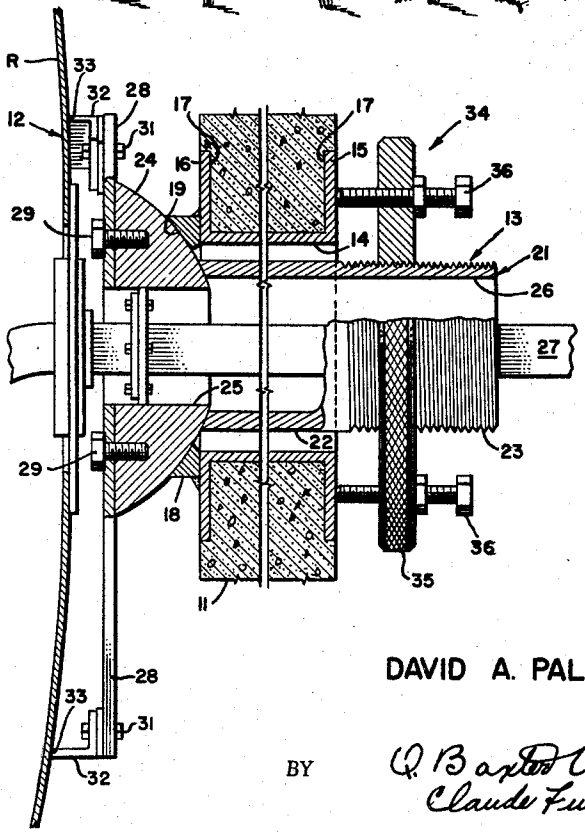


FIG. 2



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FIG. 3

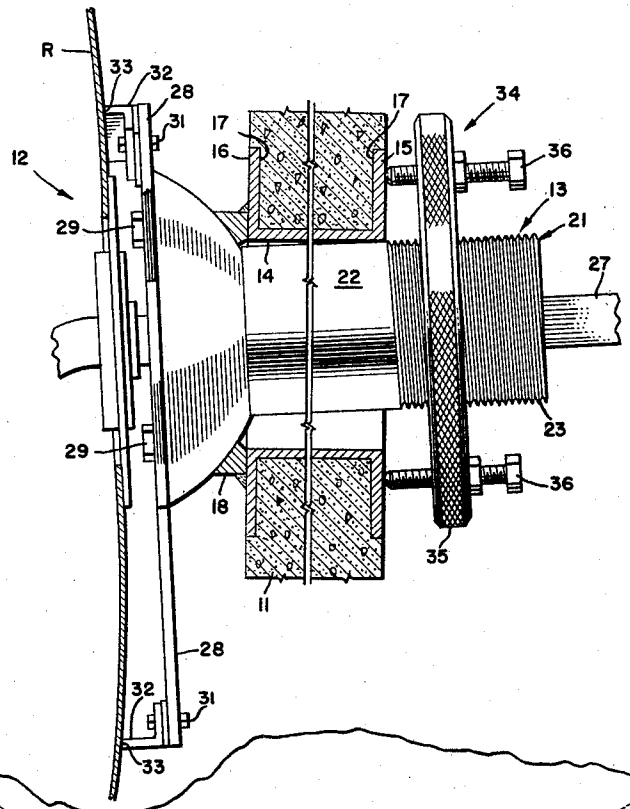
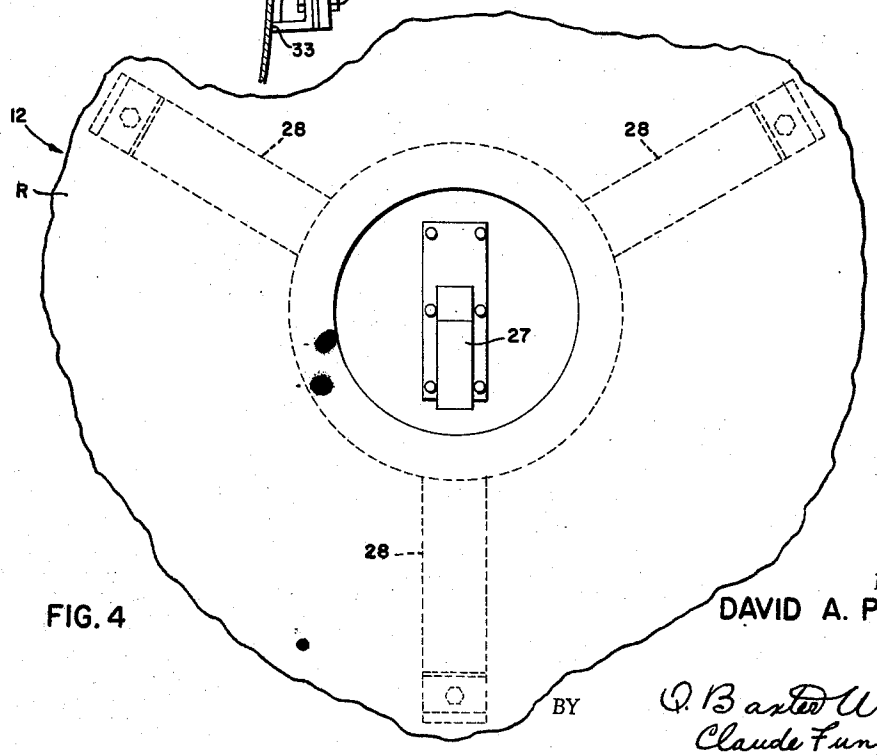


FIG. 4



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BALL AND SOCKET ANTENNA MOUNTING

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3 Claims. (Cl. 343—779)

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

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

The present invention relates to an antenna and more particularly to a device for adjustably mounting an antenna on a rigid structure and is similar to the device disclosed in application for patent by John M. O'Keefe et al., filed February 27, 1959, Serial No. 796,180.

More specifically the invention contemplates the provision of a new and improved structural arrangement for mounting a radar antenna of the parabolic type in such a manner as to permit angular adjustment thereof, quick removal and replacement of the antenna to and from the supporting structure, and for releasably locking the antenna and mounting means in the desired adjusted position. Furthermore, under combat conditions and in the event that the antenna is damaged, as by the effects of a nearby explosion or a direct hit and it becomes necessary to remove the damaged antenna from the supporting structure such, for example, as a tower, the invention provides new and improved means whereby such an operation may be accomplished within a minimum amount of time.

Accordingly, an object of the present invention resides in the provision of a new and improved quick detachable mounting device for a parabolic antenna which is movabls to a plurality of adjusted positions and capable of being maintained in any desired adjusted position.

Another object of the invention resides in the provision of an antenna mounting device which may be quickly disconnected from a tower in the event of damage to the antenna.

Still another object of the present invention is to provide a mounting device for a radar antenna wherein the mount and the antenna may be quickly connected in a predetermined adjusted position on the tower.

Still another object is to provide an antenna mounting device of a character which will permit radar operation over a complete circle, while simultaneously permitting each of a plurality of mounts to be moved to a predetermined position and locked in such position.

A still further object of the invention is to provide a mounting device for adjustably and removably supporting a parabolic type radar antenna on a silo-type tower.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawings wherein:

Fig. 1 is a side elevational view of a silo-type tower in which a plurality of radar antenna are mounted in accordance with the present invention;

Fig. 2 is an enlarged sectional view taken substantially on the line 2—2 of Fig. 1 and illustrates the detail construction of the mounting device and the manner in which it is secured to the tower wall;

Fig. 3 is a view similar to Fig. 2 illustrating the antenna supporting structure in a locked adjusted position; and

Fig. 4 is a front elevational view of the mounting device.

Referring now to the drawings and more particularly to Fig. 1, there is illustrated a silo-type tower generally indicated by the numeral 10 and composed of any material suitable for the purpose such, for example, as concrete or the like and provided with a relatively thick cylindrical wall 11, within which is mounted a plurality of conventional parabolic radar antennae 12. Each antenna is carried by an adjustable mounting device generally indicated by the reference character 13, Figs. 2 and 3, so that each antenna may be adjusted independently with respect to each other and locked in a predetermined position to provide radar coverage through as much of a complete circle as may be desired in any particular installation. It will be apparent that a plurality of towers or silo-type structures, as disclosed in Fig. 1, may be employed and arranged in such a manner, as to provide a suitable warning net or the like.

Referring now to Figs. 2 and 3 for a more complete understanding of the mounting device, it will be noted that the device is provided with a tubular member 14 having an inner flange 15 and an outer flange 16 extending outwardly therefrom and disposed within recesses 17 to secure the member 14 to the wall 11 of the tower 10. The outer flange 16 is provided with a socket member 18 secured thereto in any suitable manner such, for example, as by welding the parts together, the socket having a semicircular recess 19 formed therein.

A paraboloidal reflector supporting member generally indicated by the reference character 21 is releasably and adjustably mounted on the wall 11, Figs. 2 and 3, the reflector R being arranged for nutating and scanning action for purposes which are conventional and familiar to those versed in the art. The member 21 comprises an elongated tubular element 22 disposed within the member 14 and in spaced relationship with respect thereto. Member 21 is threaded at one end as at 23, the other end thereof being provided with a semispherical element or member 24, seated in the recess 19 for oscillatory movement thereby to allow angular adjustment of the reflector R. The element 24 is provided with a centrally disposed bore 25 in communication with the bore 26 of member 22 through which extends a conventional wave guide 27 for connection to the reflector R, as shown in Figs. 2 and 3.

A plurality of arms 28 are secured to the outer surface of member 24, as by screw or the like 29, the terminal ends of the arms having secured thereto as at 31 supports 32, the supports being secured to the reflector as at 33 in any conventional manner such, for example, as welding the parts together to provide a rigid supporting structure for the reflector, Figs. 2 and 3.

A locking and retaining device generally indicated by the reference character 34 is carried by the member 22 and includes a circular plate or handwheel 35 in threaded engagement with the threaded portion 23 of member 22 and having a plurality of mutually spaced locking screws or elements 36 carried thereby for locking the reflector support 21 in an adjusted position, Figs. 2 and 3.

In operation, it will be understood that by unscrewing the plate 35, the threaded locking elements or screws 36 move out of engagement with flange 15 and thus the reflector support 21 may be oscillated to the desired adjusted position by reason of the aforesaid semispherical element and socket arrangement. When the plate or handwheel 35 and locking elements 36 are in the positions as shown on Figs. 2 and 3, however, the support 21 and reflector R are in a locked condition and thus move-

ment thereof is prevented. In the event the reflector R has been damaged as by the effects of a nearby explosion or from other causes such, for example, as a direct hit, the member **35** and elements **36** carried thereby may be completely removed from the support **21**, whereupon support **21**, reflector R and wave guide **27** is released and detached from the tower **10**. Upon detachment of the aforesaid damaged structures from the tower a new reflector, support and wave guide may be installed and secured in a predetermined adjusted position by handwheel **35** and adjusting screws **36**.

It will be apparent that the structure disclosed herein also provides an efficient seal for protecting personnel and equipment within the tower not only from weather but also from the effects of the explosion or direct hit, as the case may be.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claims the invention may be practiced otherwise than as specifically described.

What is claimed is:

1. A device for mounting a parabolic antenna on a silo-type wall structure provided with a transversely disposed opening extending therethrough and comprising an annular member disposed within the opening and secured to the wall, means carried by said annular member for securing the member to the wall within the opening, a tubular member disposed within said annular member in spaced relation with respect thereto and having one terminal end disposed externally of the wall structure and the other terminal end thereof disposed internally of the wall structure, an annular socket carried by said annular member in alignment therewith and disposed externally of the wall structure, a semispherical member carried by said tubular member at said one terminal end thereof and having a centrally disposed bore in registration with a bore in said tubular member for providing a wave guide passageway extending from the interior to the exterior of the wall structure, means including a plurality of arms carried by said semispherical member for supporting a parabolic antenna externally of the wall structure, said semispherical member being movable within the socket to move the antenna from an initial position to a selected position, and means including a handwheel rotatably mounted on said other terminal end of the tubular member for moving the semispherical member to a selected position and for locking said semispherical member to the socket thereby to maintain the antenna in a selected position.

2. A device for mounting a parabolic reflector on a silo-type wall structure for oscillatory movement and comprising an annular member secured to and within an opening extending through the wall structure, an annular socket carried by said annular member externally of the wall structure, a semispherical member disposed within said socket member for oscillatory movement therein, a tubular member secured at one end to said semispherical

member and movable therewith, said tubular member extending through said annular member in spaced relation with respect thereto and having the other end thereof disposed internally of the wall structure, a plurality of radially disposed arms carried by and movable with said semispherical member for supporting the antennae externally of the wall structure in spaced relation with respect thereto, a handwheel adjustably and detachably mounted on said other end of the tubular member for imparting oscillatory movement to the semispherical member, tubular member and the reflector from an initial position to a selected position, and a plurality of locking elements carried by said handwheel in threaded engagement therewith and movable into engagement with the annular member for locking the semispherical member to the socket to maintain the tubular member and reflector in said selected position.

3. In combination with an antenna mounting device, a silo-type tower having a cylindrical wall provided with a plurality of mutually spaced circumferentially disposed openings extending therethrough, an annular member disposed in one of each of said plurality of openings and secured to said cylindrical wall, flange means carried by each annular member for securing each member to said cylindrical wall, a tubular member disposed within and extending through each annular member in spaced relation with respect thereto, a semispherical member secured at one end of each tubular member and disposed externally of the cylindrical wall, a socket carried by each annular member and disposed externally of the cylindrical wall and cooperating with one of each of the semispherical members in a manner to allow oscillatory movement thereof, a parabolic reflector supported on each semispherical member and movable therewith, means carried by each semispherical member and movable therewith for supporting a parabolic reflector thereon externally of said cylindrical wall and in spaced relation with respect thereto, each semispherical member having a centrally disposed bore extending therethrough in registration with the respective tubular members for providing a wave guide passageway to each parabolic reflector, a handwheel adjustably and detachably mounted at the other end of each tubular member internally of the cylindrical wall for imparting oscillatory movement to their respective semispherical members and reflectors from an initial position to a selected position, and means including a plurality of locking elements carried by each handwheel in threaded engagement therewith for locking each semispherical member to their respective sockets thereby to maintain the reflector associated therewith in a selected position.

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