May 2, 1961 C. C. JONES 2,982,961

DUAL FEED ANTENNA

Filed March 20, 1957

FIG. 1

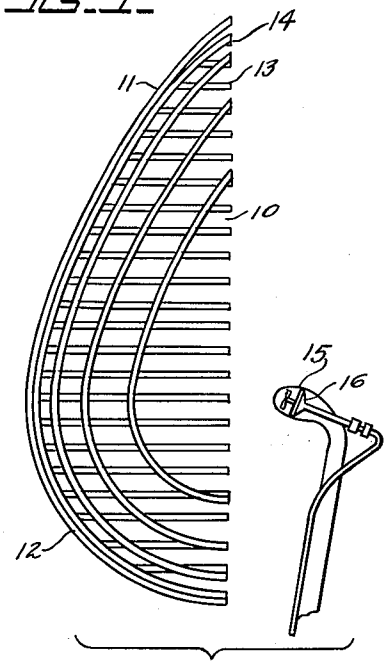
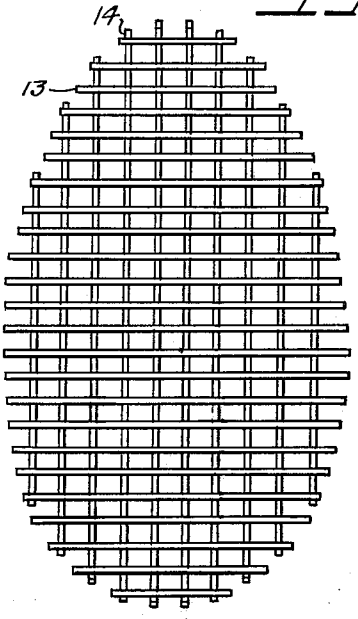


FIG. 2



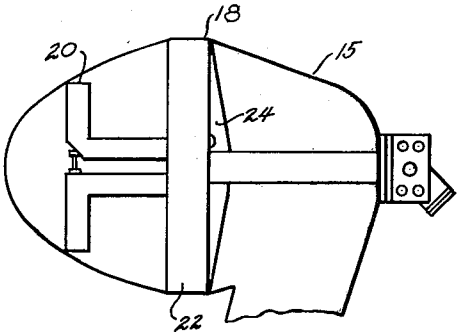


FIG. 3

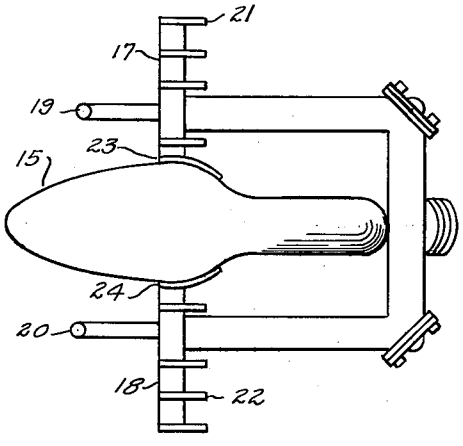


FIG. 4

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DUAL FEED ANTENNA

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2 Claims. (Cl. 343—840)

This invention relates to a dual feed antenna system wherein a radar antenna system which radiates and receives horizontally polarized energy is modified by adding an Identification Friend or Foe feed which radiates and receives vertically polarized energy. The Identification Friend or Foe feed shall hereafter be referred to as the identification feed.

The object of the invention is to provide an identification feed system at the focal point of a radar reflector with parasitic reflectors, for the identification dipole elements, that do not affect the operation of the radar system.

This and other objects are accomplished by providing vertical slats as the parasitic reflecting elements, which intercept the vertically polarized identification energy but do not affect the horizontally polarized radar energy.

In the drawing,

Fig. 1 is a side view of the dual feed system together with the modified reflector.

Fig. 2 is a front view of the modified reflector.

Fig. 3 is a side view showing the radar feedhorn and the identification feed.

Fig. 4 is a top view of the radar feedhorn with the identification feed attached thereto.

Referring more particularly to Fig. 1, reference numeral **10** refers to a radar reflector having a parabolic section **11**, a barrel section **12** and a plurality of horizontal slats **13** for reflecting horizontally polarized radar energy. The reflector was modified to reflect vertically polarized identification energy by adding a plurality of vertical slats **14**.

Beam shaping antennas having a parabolic section and a barrel section are well known in the art. One such antenna is shown in Figs. 13–17 on page 484 of volume 12 of the MIT Radiation Laboratory Series.

The antenna system has a radar feedhorn **15** and an identification feed system **16** located at the focal point of the reflector **10**, with the identification feed attached to the feedhorn **15**.

An identification feed consisting of two dipoles with metal plates for parasitic reflectors was first tried. Since the focal point of the return energy from the barrel section is also the focal point for the parabolic section, an energy field of high intensity results in this region. The metal plates intercepted a considerable amount of the radar beam energy. This effect was eliminated in a manner which will be explained with reference to Figs. 3 and 4.

In Figs 3 and 4, the reflecting elements **17** and **18** for dipoles **19** and **20** consist of a plurality of vertical slats **21** and **22**, respectively. When vertical slats are substituted for the reflecting plates, they intercept the vertically polarized identification energy, but do not intercept the horizontally polarized radar energy. The identification feed is attached to the radar feedhorn by means of plates **23** and **24**.

There is thus provided a dual feed system wherein the detrimental effect of the dipole parasitic reflectors is greatly reduced, if not eliminated entirely.

While a certain embodiment of the invention has been described in some detail, it will be understood that numerous changes may be made without departing from the general principles and scope of the invention.

What is claimed is:

1. An antenna system comprising reflecting means for reflecting energy in two planes of polarization which are displaced 90° from each other, said reflecting means having a focal point, a radar feedhorn located at said focal point for receiving and radiating energy in one of said planes of polarization, an identification feed located at said focal point and mounted on the external surface of said said radar feedhorn for receiving and radiating energy in the other of said planes of polarization, said identification feed comprising two dipole elements and two parasitic reflectors, each of said dipole elements being adjacent to and carried by one of said parasitic reflectors, said parasitic reflectors being mounted on opposite sides of said radar feedhorn, each of said parasitic reflectors consisting of a plurality of parallel slats for directing energy from said dipole elements toward said reflecting means.

2. The system of claim 1, wherein said radar feedhorn receives and radiates energy in a horizontal plane of polarization and said edntification feed receives and radiates energy in a vertical plane of polarization.

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