May 19, 1953 D. J. McAULEY ET AL 2,639,426

RADAR REFLECTOR

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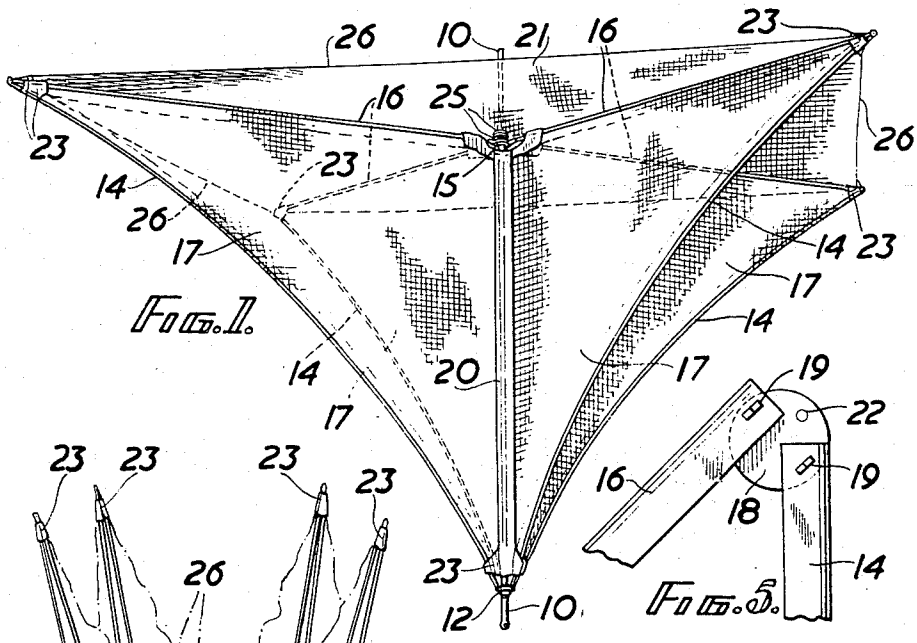



FIG. 1.

FIG. 5.

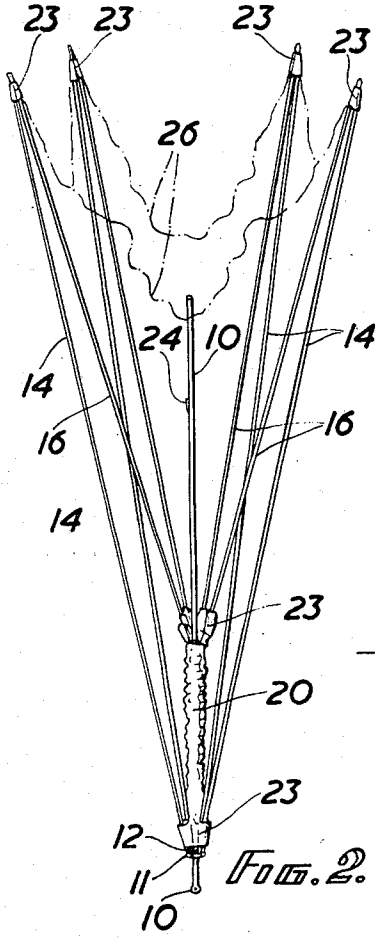



FIG. 2.

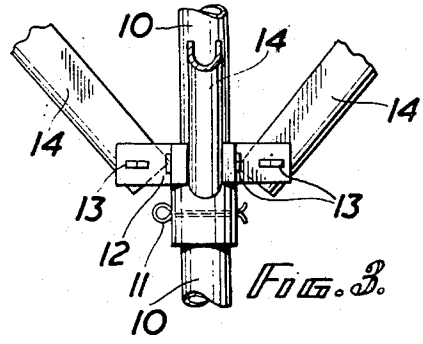



FIG. 3.

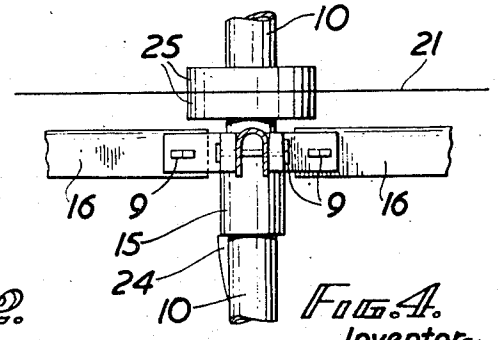



FIG. 4.

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2,639,426

## RADAR REFLECTOR

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4 Claims. (Cl. 343—18)

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This invention relates to reflectors for use with radar ranging and detecting apparatus, and of the type employing three reflecting planes mutually at right angles. Such reflectors are usually termed corner reflectors and will be so called in this specification. The invention has for its object to provide an improved form of corner reflector which is satisfactory in operation and which can be readily collapsed for transit or erected for use.

According to the present invention there is provided a radar corner reflector comprising a plurality of panels of flexible reflecting material supported by a collapsible framework so as to lie in three mutually perpendicular planes, at least those panels lying in two of said planes being secured along the whole of their periphery to relatively inflexible members forming part of said framework.

The invention also comprises a radar corner reflector comprising a central supporting post to which are pivoted four arms and upon which slides a sleeve member or the like, four struts pivoted each at one end to the sleeve and at the other to the free end of one of the arms, and four triangular panels of flexible reflecting material secured each with one side adjacent the central post, one side adjacent one of the four arms and one side adjacent the strut pivoted to that one of the four arms.

One embodiment of the invention will now be described, by way of example, in which the corner reflector is of light weight and can be collapsed into a relatively small space for transit. The embodiment will be described with reference to the accompanying drawings in which:

Figure 1 is a perspective view of the reflector erected for use, whilst

Figure 2 is a view of the framework alone in a semi-collapsed condition, the panels of reflecting material not being shown for the sake of clarity.

Figure 3 shows a detail view in side elevation of the lower end of the reflector,

Figure 4 shows a similar view of the upper end of the reflector, whilst

Figure 5 shows a detail view in side elevation of the junction between a strut and arm of the framework.

The reflector comprises a central post 10 of a lightweight metal alloy to which is attached, by means of a split pin 11 passing through the post 10, a small cruciform support block 12 (see Figure 3). Pivoted to the block 12 by rivets 13 are four arms 14 which are of lightweight channel section, and the axes of the rivets 13 are arranged

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so that the area 14 can pivot outwardly at right angles to each other.

Slidable along the post 10 is a sleeve member 15, which for convenience can be of the same shape as the support block 12, and to which are pivoted four struts 16 by means of rivets 9 (see Figure 4). The struts 16 are also of lightweight channel section material and each is pivoted at its outer end to the free end of one of the arms 14 by means of a disc 18 to which the arm 14 and strut 16 are secured by rivets 19 (see Figure 5). The arms 14 are all of the same length, as are all the struts 16, and the arms 14 and the struts 16 are given such relative lengths that when the sleeve 15 is positioned to bring the struts 16 at right angles to the post 10, the latter together with the arms 14 and the struts 16 forming four frames, each substantially the shape of a right-angled isosceles triangle, with the arms 14 curved slightly inwards at their centre as shown in Figure 1.

Four triangular panels 17 of lightweight, flexible conducting material are secured in the frames thus formed. A very suitable material for this purpose is an open mesh nylon net rendered conductive by the process described in British patent specification No. 572,071. The panels 17 are hemmed along those edges which are secured to the struts 16 and the arms 14, the struts 16 and the arms 14 being inserted in the hems, whilst the panels 17 are secured to the post 10 by means of a tube 20 of fabric surrounding the post 10, the panels 17 being sewn to the tube 20.

When the framework is opened out, as shown in Figure 1, the panels 17 lie in two intersecting planes at right angles; in order to complete the reflector it is necessary to provide a reflecting surface in a third plane at right angles to both the others. This third reflecting surface is provided by means of a square panel 21, of the same material as the others, attached at its corners to the discs 18 at the joints between the arms 14 and the struts 16, the post 10 passing through an opening in the centre of the square. A fine steel or like wire 25 passes round these joints through the holes 22 in the discs 18 and is passed through a hem round the edge of the square panel 21 to provide support for these edges.

The panels 17 and 21 are provided at their corners where they are attached to the supporting framework with small reinforcing pieces 23 of a suitable fabric material.

In use, to erect the reflector it is necessary only to draw the sleeve member 15 up the post 10;

thereby the struts 16 are pivoted outwardly, so as to tension both the triangular panels 17 and the square panel 21. The sleeve 15 is held in this position by means of a catch 24 in the post 10 (see Figure 4) which is manually depressed against spring pressure to allow the sleeve member 15 to ride over it.

For the satisfactory operation of a reflector of the type described it is essential that the reflector planes should be maintained accurately at right angles. With the construction described the triangular panels 17 are so maintained in use, since these will generally be in the vertical plane, with no tendency to sag out of that plane. In the case of the square panel 21, however, this will usually be horizontal and being of large area may tend to sag at its centre. To check this tendency, the square panel 21 is attached at its centre to the post 10 by means of a pair of rubber washers 25 between which the panel 21 is clamped, the washers 25 surrounding and being frictionally secured to the post 10 as shown in Figure 4.

It may be stated, by way of example, that a reflector has been made having the above-described construction, in which the distance apart of the support block 12 and the sleeve member 15 was just over three feet, and the lengths of an arm 14 and a strut 16 were approximately four and one half feet and just over three feet respectively. The complete framework without the reflecting panels weighed approximately twenty ounces.

Reflectors according to the present invention have the normally-vertical panels of reflecting material supported throughout their peripheral length along two edges by a strut and arm respectively which are embraced by a hem and along the third edge by attachment to the tube surrounding the central post. The panels can thus be retained substantially in a predetermined plane. The square or normally horizontal panel is similarly retained in a desired plane by means of the wire passing through its hemmed edge and the central rubber washers.

We claim:

1. A radar corner reflector comprising in combination a central supporting post, four arms pivoted each at one end to said post, a sleeve member slidably mounted on said post, four struts each pivotally secured at one end to that end of one of said arms not pivoted to said post and pivotally secured at their other end to said sleeve member, means for securing said sleeve member in a position on said post at which said four struts all lie in a plane, and four panels of flexible reflecting material each secured with one side adjacent the central post, one side adjacent one of the four arms and the other side adjacent that strut which is pivotally secured to the latter one of said arms.

2. In a radar corner reflector, a main post; a sleeve member slidable on said post; fixing means for selectively securing said sleeve member in a predetermined position on said post; four reflecting-material supporting frames uniformly angularly spaced around said post, said frames each comprising two longitudinal relatively inflexible members linked together at their one ends and secured by their other ends to said post and said sleeve member respectively; a tube of flexible material closely surrounding said post; four panels of flexible radar-reflecting material whose size corresponds to the space enclosed by a frame and said post with said sleeve member in said predetermined position, one edge of each of said panels being secured along its length to said tube and the other edges of said panels being hemmed, the hemmed edges of said panels enclosing said frames.



3. A radar corner reflector comprising in combination a central supporting post, four arms pivoted each at one end to said post, a sleeve member slidably mounted on said post, four struts each pivotally secured at one end to that end of one of said arms not pivoted to said post and pivotally secured at their other end to said sleeve member, means for securing said sleeve member in a position on said post at which said four struts all lie in a plane, a tube of textile material secured closely around said central post, four triangular panels of flexible radar reflecting material, one edge of each of said panels being secured throughout the length of the edge to said tube of textile material and the other two edges of said panels being hemmed, the hemmed edges of said panels embracing one of said four arms and one of said four struts, and a further panel of flexible radar reflecting material suspended between the four junctions of said arms and struts in a plane to which said central post is perpendicular.

4. In a radar corner reflector, a tubular metal member; a further member slidable on said tubular member; catch means for securing said further member against sliding movement when desired in a predetermined position on said tubular member; four collapsible supporting frames secured to said post at equi-angular spacing therearound, said frames being connected to said further member whereby said frames are collapsed against said tubular member by movement of said further member from said predetermined position; a plurality of panels of flexible metallised fabric each supported along their edges by one of said frames and by said tubular member; and a further panel of flexible metallised fabric supported by said frames in a plane perpendicular to the longitudinal axis of said tubular member.

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