June 27, 1950 R. G. FERRIS ET AL 2,513,157

NOSE STRUCTURE FOR PROJECTILES

Filed March 17, 1943

FIG. 1.

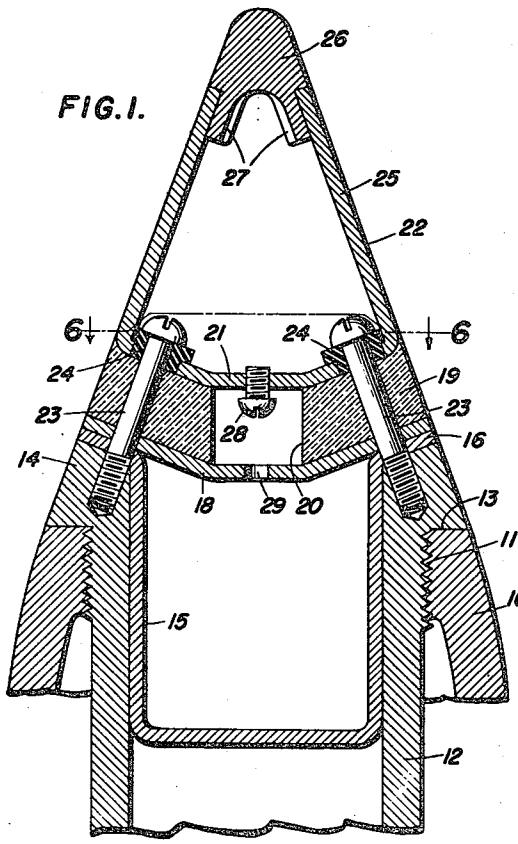


FIG. 2.

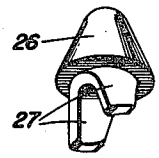


FIG. 3.

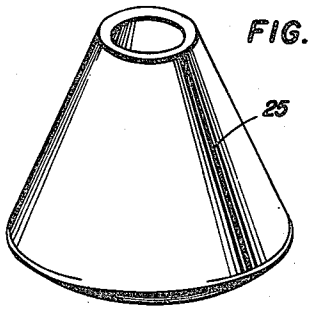


FIG. 4.

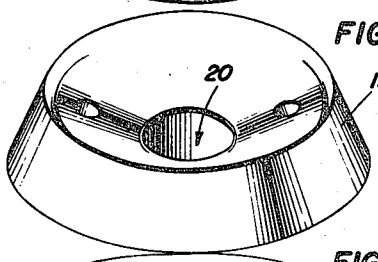


FIG. 5.

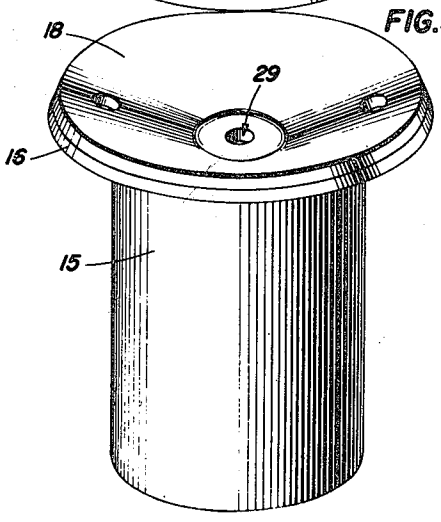
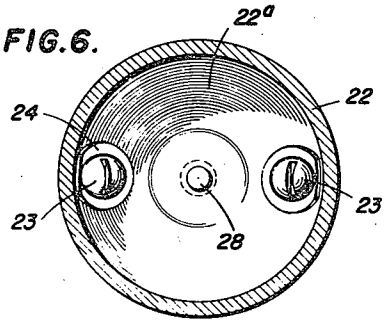


FIG. 6.



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NOSE STRUCTURE FOR PROJECTILES

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Application March 17, 1943, Serial No. 479,516

6 Claims. (Cl. 102—70.2)

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This invention relates to nose structures for projectiles and more particularly to a novel structure of this character for use in a radio-controlled projectile, which includes an antenna.

Projectiles have been devised heretofore wherein a radio apparatus in the casing is used as a control means for the projectile, as, for example, to steer it in its flight or to cause detonation of an explosive charge therein when the projectile is in proximity to a target. In such projectiles, considerable difficulty has been encountered in mounting the antenna of the radio apparatus on the projectile casing. More particularly, the mechanical shock to which projectiles are commonly subjected, as in handling, loading and firing, tend to displace or distort the antenna on the projectile, with the result that operation of the radio apparatus is impaired.

One object of the present invention, therefore, resides in the provision of a novel antenna unit included in the nose structure of a projectile, which is of rugged construction so that it is suitable to withstand the usual stresses to which projectiles are subjected, without displacement of the antenna. A nose structure made in accordance with the present invention comprises a generally conical antenna in the form of a projectile nose, and means for connecting the antenna to the casing of the projectile. Preferably, the antenna is provided with a dish-shaped base which fits closely against a member having a complementary shape and connected to the projectile casing, whereby the antenna is held securely against lateral movement on the casing.

Another object of the invention is to provide a nose structure for projectiles which includes an antenna and a container connected to the antenna for receiving part of a radio apparatus. In the preferred construction, the container is generally cup-shaped and has an insulating member mounted over its open end between the container and the antenna, the insulating member having a passage for wiring between the antenna and the container.

These and other objects of the invention may be understood by reference to the accompanying drawing, in which

Fig. 1 is an axial sectional view of part of a projectile having one form of the new nose structure;

Figs. 2 to 5, inclusive, are perspective views of parts of the structure shown in Fig. 1, and

Fig. 6 is a sectional view on the plane 6—6 in Fig. 1.

The nose structure of the present invention is

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shown mounted on a projectile comprising a hollow casing 10 having an internally threaded portion 11 adjacent its forward end. A cylindrical container 12 is secured in the forward end of the casing by means of threads mating with the threaded portion 11, the container extending rearwardly in the casing for a substantial distance. The container is designed to receive parts of a radio apparatus (not shown) for controlling the projectile, as illustrated, for example, in a copending application of M. A. Tuve, et al., Serial No. 471,388, filed January 6, 1943. In front of the threaded portion 11, the container is enlarged to form an external shoulder 13 engaging the end of the projectile casing. The side wall 14 of the enlargement is generally frusto-conical so that it conforms to and provides a continuation of the tapered contour of the front end portion of the casing. The container 12 is open at its forward end where it receives an inner, cup-shaped container 15, the bottom of which is disposed intermediate the ends of the container 12. At its open end, the inner container 15 is provided with an outwardly extending peripheral flange 16 seated on the forward end of the enlargement of the outer container.

A generally dish-shaped plate 18 is seated on the flange 16 in front of the containers and receives an insulating member 19 having a central passage 20 extending through the member. The front face of the insulating member 19 is concave, and closely fitted therein is the convex base 21 of a metal antenna 22. The antenna is spun or otherwise made in a conical shape so as to form the nose of the projectile. Bolts 23 extend through the base of the antenna, the insulating member 19, plate 18 and flange 16 and are threaded in the enlargement of the outer container 12 to hold the parts in position. The bolts 23 are suitably insulated from the antenna 22, as by means of insulating washers 24.

The antenna 22, as shown, comprises a generally frusto-conical part 25 integral with the base 21, and a conical plug 26 mounted on the reduced end of the part 25. The plug 26 may be secured in any suitable manner, as by bifurcating its rear end portion to form a pair of diverging spring legs 27 extending into the end of the hollow part 25. A screw 28 is mounted on the base 21 of the antenna and provides a terminal for electrical connection through the passage 20 and an alined opening 29 in plate 18 to part of the radio apparatus (not shown) in the container 15.

It will be evident that the nose structure of the invention is compact and rugged and is suit-

able for manufacture at low cost. The bolts 23 secure the parts against relative movement and connect the nose structure to the projectile casing through the outer container 12. By making the plate 18, the insulating member 19 and the antenna base 21 of concavo-convex form and fitting them closely together, the parts effectively resist lateral movement on the casing due to the usual shocks to which projectiles are subjected. The plate 18 serves as an electrical shield between the radio parts in the container 15 and the antenna 22 and insulating member 19.

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. In combination, a cup-shaped container adapted to fit in a projectile casing and having a chamber for receiving part of a radio apparatus, the container having a flange around its open end, a plate seated on the flange and having an opening therethrough, an insulating member on the plate and having a wiring passage communicating with said opening, an antenna on said member, and attaching means for jointly connecting the antenna, insulating member and plate to said flange.

2. In combination, a cup-shaped container adapted to fit in a projectile casing and having a chamber for receiving part of a radio apparatus, the container having a flange around its open end, a plate seated on the flange and having an opening therethrough, an insulating member on the plate and having a wiring passage communicating with said opening, a generally conical antenna in the form of a projectile nose and having a base, a connecting bolt extending through said base, insulating member, plate and flange, and means for insulating the bolt from the antenna.

3. In combination, a container adapted to fit in a projectile casing and having a chamber for receiving part of a radio apparatus, an antenna, an insulating member between the container and the antenna, an electrical shield between the container and the antenna and insulating member, and means for connecting the container, insulating member, antenna and shield to a projectile casing.

4. In combination, a container designed to fit in a projectile casing and having a chamber for receiving part of a radio apparatus, a frusto-conical hollow antenna, an insulating member between the container and the antenna, said antenna having a portion projecting inwardly at its base, and means passing through said portion, and said insulating member and secured to said container, to hold the antenna in place.

5. In combination, a cup-shaped container designed to fit in a projectile casing and having a chamber for receiving part of a radio apparatus, the container having a flange around its open end, a hollow antenna having a base, an insulating member between said base and the flange of the container, and securing means insulated from the base but extending through said base, said insulating member and said flange, to hold the antenna in place while keeping it electrically insulated from the projectile casing.

6. In combination, a cup-shaped container designed to fit in a projectile casing and having a chamber for receiving part of a radio apparatus, the container having a flange around its open end, a plate seated on the flange and having an opening therethrough, an insulating member on the plate and having a wiring passage communicating with said opening, a generally frusto-conical antenna forming an open-end projectile nose and having a base, a connecting bolt extending through said base, insulating member, plate and flange, means for insulating the bolt from the antenna, access to said bolt being provided through the said open end, and a substantially conical removable tip for closing said open end.

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