

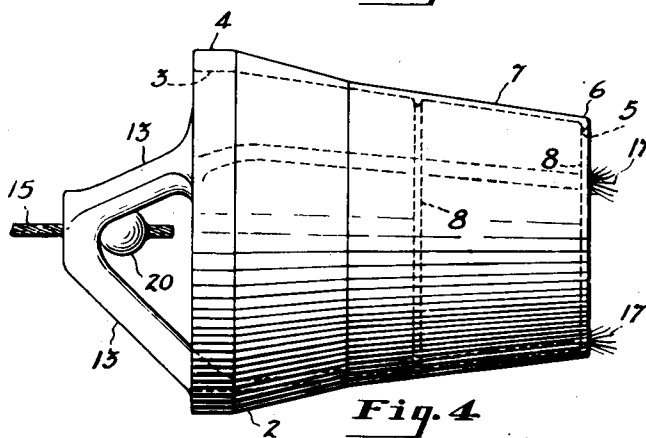
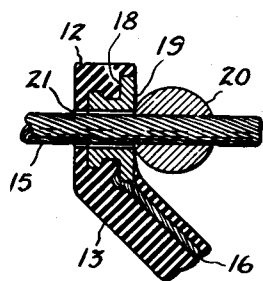
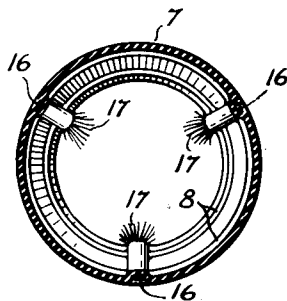
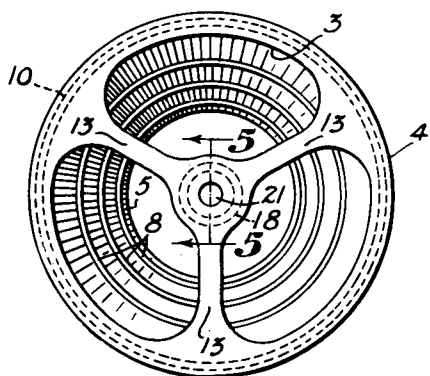
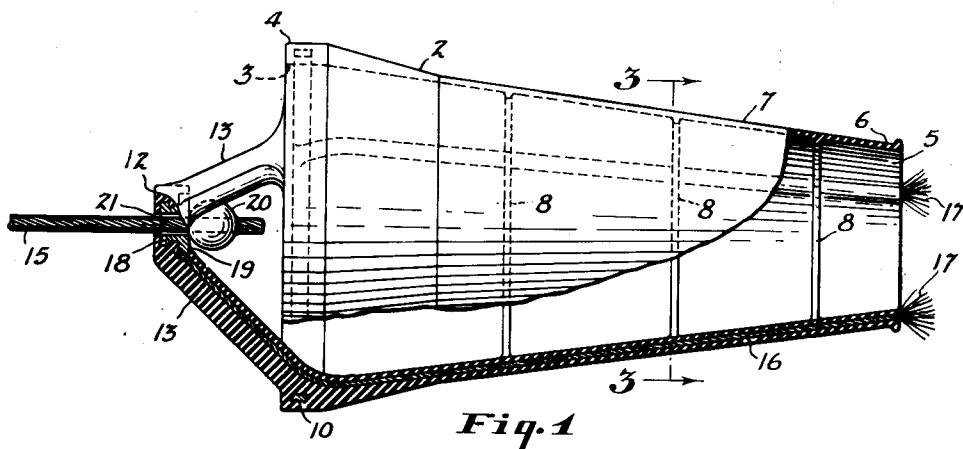
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ANTENNA CONE

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This invention relates to a device for applying tension to antennas and the like trailing from a moving vehicle, such as an airplane.

A drag is usually applied on the free end of radio antennas and the like trailing from moving vehicles, such as airplanes, in order to hold the antenna straight at all times and to prevent its interfering with operation of the vehicle. One method heretofore proposed for applying the drag has been to add metal weights to the ends of the antenna. Such weights are considered advantageous because the drag can be readily adjusted, but they are considered disadvantageous because the weight is likely to cause serious injury to objects below when breakage of the antenna occurs.

It is an object of this invention to provide a device for applying tension or drag to antennas trailing from a moving vehicle, such as an airplane, which device when dropped from a considerable height has insufficient weight and rigidity to produce injury if it should strike an animate or frail object.

It is another object of this invention to provide a device which can be adjusted to apply the desired drag to a trailing antenna and which will not produce injury when dropped from considerable distances.

It is a further object of this invention to provide a device for applying drag to trailing antennas, which device also serves to reduce static charge of electricity on the antenna of the moving vehicle.

Other objects will be apparent from the following description of the invention, as illustrated by the accompanying drawing in which:

Figure 1 is a side elevational view, with parts broken away and partly in section, showing the structure of my improved antenna cone;

Fig. 2 is an end elevational view of the cone;

Fig. 3 is a sectional view on the line 3—3 of Fig. 1;

Fig. 4 is a side elevational view of a modified form of cone which has been trimmed to decrease the drag;

Fig. 5 is a sectional view on the line 5—5 of Fig. 2.

Referring more particularly to the drawing, in which like parts are designated by like numerals of reference throughout the several views, it will be seen that the device of the present invention has a hollow, relatively thin-walled, substantially frusto-conical portion 2 of flexible rubberlike material. The frusto-conical portion has an opening 3 at a leading end 4 to receive air and

an opening 5 at a trailing end portion 6 to discharge air. The wall 7 of the conical portion is relatively thin and is preferably reinforced with a plurality of annular, integrally molded, flexible ribs 8, which are preferably spaced along the internal surface of the wall 7. The ribs 8 are adapted to prevent the tearing of the wall 7 when the length of the frusto-conical portion 2 is trimmed to shorten it so that its drag is decreased. An annular stiffening member, such as ring 10, which is preferably of a metal such as brass, is integrally molded and preferably adhesively attached to the rubber of the wall in the conical portion 2 adjacent the leading end 4 to prevent collapse of the opening 3 when the cone or windsock is attached to a moving antenna.

A towing spider having a central hub portion 12 and flexible, molded lanyards 13, preferably of a rubberlike material, such as polymerized chloroprene or other rubberlike compound having relatively high electrical conductivity, is provided at the leading end of the frusto-conical portion for attaching the device to the free end of an antenna 15. The lanyards 13 are attached to the hub 12 and to the wall 2 adjacent the leading end 4. They are preferably inclined to the axis of the conical portion so that the hub 12 is carried ahead of the leading end of the conical portion. The stresses in rubberlike material at the point where the lanyards are attached to the conical portion are then more uniform when tension is applied by the antenna and cracking is less likely to occur.

In the preferred modification of the invention, one or more metal static discharge members, such as wires 16 which are preferably of the stranded type and have a plurality of fine ends 17, which protrude in brushlike or weblike manner from the trailing end of the device, are molded within the wall 7. The metal discharge members such as the wires 16 preferably extend longitudinally through the wall 2 and through one or more of the lanyards 13, forming electrical contact with a bushing 18, which is preferably disposed within the hub 12 and adhesively attached to the rubber thereof by suitable means. Longitudinal ribs may be provided in the wall 7 to facilitate the embedding of the wires 16, if desired.

The bushing 18 and the hub 12 have a central opening 21 which is adapted to receive the antenna 15. Surface 19 of the bushing is preferably bare and is adapted to contact the means such as the locking sphere 20, which is applied

to the end of the antenna in order to hold the drag device on the antenna.

In operation the antenna cone is applied to the aerial, as shown, and the air is caused by motion of the vehicle to enter the cone through the opening 3 in the leading end 4 and is discharged through the opening 5 at the trailing end portion 6.

Static on the airplane or on the aerial 15 is readily conducted through the bushing 19 and the wire 16 to the plurality of relatively fine strands 17, where it is readily discharged into the air which is passing in high velocity through the opening 5. The drag on the antenna 15 is determined by the speed of the vehicle and the relative size of the openings 3 and 5. The higher the speed, and with a given opening 3, the smaller the opening 5 the greater will be the drag. With airplanes of the high speed type the drag on the antenna may be too great when an antenna cone adapted for slow speed is used.

In accordance with this invention, antenna cones suitable for airplanes of the slow speed type may be readily adapted for use on high speed models by cutting off a suitable portion of the cone adjacent its trailing edge. The conical portion should preferably be trimmed adjacent a rib 3, which prevents tearing of the trimmed edge of the rubber. An antenna cone which has been modified by cutting so as to be more desirable for high speed planes is illustrated in Fig. 4.

When a cone contains static discharge members molded in the wall of the conical portion, the discharge members should be permitted to extend beyond the trimmed end and they should be frayed out, as shown, to increase the discharge rate.

If the windsock or the antenna cone becomes disconnected from the antenna, it has been found the velocity acquired when it falls through the air is insufficient to cause injury to animate objects. If the hub portion 12 should strike an object the energy would be absorbed by deformation of the flexible, molded lanyards 13; if the end portion 3 should be the first to come in contact with the object the energy would be absorbed to a large extent by deformation of the extremely flexible wall 7.

It is to be understood that variations and modifications of the specific device herein shown and described for purposes of illustration may be made without departing from the spirit of the invention.

What I claim is:

1. An antenna cone for applying tension to an antenna trailing from a moving vehicle, comprising a hollow molded relatively thin-walled frusto-conical portion of flexible rubberlike material, said conical portion having an opening at the leading end to receive air and an opening of smaller diameter in the trailing end to discharge air, a plurality of annular integrally molded flexible ribs which are adapted to resist longitudinal tearing of the wall of the conical portion and which are spaced along the length thereof, a stiffening ring integrally molded in the wall of the conical portion adjacent the leading end to prevent collapse of the air inlet opening, and a towing spider at the leading end of said conical portion, said towing spider having a central hub portion carried by flexible molded lanyards which are attached to the wall of said conical member near said stiffening ring.

2. An antenna cone for applying tension to an

antenna trailing from a moving vehicle, comprising a hollow molded relatively thin-walled frusto-conical portion of flexible rubberlike material, said conical portion having an opening at the leading end to receive air and an opening of smaller diameter in the trailing end to discharge air, a plurality of annular integrally molded flexible internal ribs which are adapted to resist longitudinal tearing of the wall of the conical portion and which are spaced along the length thereof, a metal stiffening ring integrally molded in the wall of the conical portion adjacent the leading end to prevent collapse of the air inlet opening, and a towing spider at the leading end of said conical portion, said towing spider having a central hub portion carried by flexible molded lanyards which are attached to the wall of said conical member near said stiffening ring.

3. An antenna cone for applying tension to an antenna trailing from a moving vehicle, comprising a hollow molded relatively thin-walled frusto-conical portion of flexible rubberlike material, said conical portion having an opening at the leading end to receive air and an opening of smaller diameter in the trailing end to discharge air, a stiffening ring integrally molded in the wall of the conical portion adjacent the leading end to prevent collapse of the air inlet opening, and a towing spider at the leading end of said conical portion, said towing spider having a central hub portion with an adhesively attached stiffening bushing therein carried by flexible molded lanyards of conducting rubberlike material which are attached to the wall of said conical member near said stiffening ring.

4. An antenna cone for applying tension to an antenna trailing from a moving vehicle, comprising a hollow molded relatively thin-walled frusto-conical portion of flexible rubberlike material, said conical portion having an opening at the leading end to receive air and an opening of smaller diameter in the trailing end to discharge air, a stiffening ring integrally molded in the wall of the conical portion adjacent the leading end to prevent collapse of the air inlet opening, a towing spider at the leading end of said conical portion, and a metal static discharge member molded in the wall of said conical portion and protruding from the trailing end portion of said cone, said towing spider having a central hub portion with an adhesively attached stiffening bushing therein carried by flexible molded lanyards of conducting rubberlike material which are attached to the wall of said conical member near said stiffening ring.

5. An antenna cone for applying tension to an antenna trailing from a moving vehicle, comprising a hollow molded relatively thin-walled frusto-conical portion of flexible rubberlike material, said conical portion having an opening at the leading end to receive air and an opening of smaller diameter in the trailing end to discharge air, a stiffening ring integrally molded in the wall of the conical portion adjacent the leading end to prevent collapse of the air inlet opening, a towing spider at the leading end of said conical portion, and a metal static discharge member molded in the wall of said conical portion and protruding from the trailing end portion of said cone in brush-like manner, said towing spider having a central hub portion with an adhesively attached stiffening bushing therein carried by flexible molded lanyards of conducting rubberlike material which are attached to the wall of said conical

member near said stiffening ring, said discharge member forming a connection with said bushing in said spider, whereby static may be more readily discharged from the antenna.

6. An antenna cone for applying tension to an antenna trailing from a moving vehicle, comprising a hollow molded relatively thin-walled frusto-conical portion of flexible rubberlike material, said conical portion having an opening at the leading end to receive air and an opening of smaller diameter in the trailing end to discharge air, a stiffening ring integrally molded in the wall of the conical portion adjacent the leading end to prevent collapse of the air inlet opening, a towing spider at the leading end of said conical portion, said towing spider having a central hub portion with an adhesively attached stiffening bushing therein carried by flexible molded lanyards of conducting rubberlike material which are attached to the wall of said conical member near said stiffening ring, and a stranded metal wire molded in the wall of said conical portion protruding from the trailing end thereof and making electrical connection with the antenna, whereby static may be readily discharged from the antenna into the air.

7. An antenna cone for applying tension to an antenna trailing from a moving vehicle, comprising a hollow molded relatively thin-walled

frusto-conical portion of flexible rubberlike material, said conical portion having an opening at the leading end to receive air and an opening of smaller diameter in the trailing end to discharge air, an annular stiffening member in the wall of the conical portion adjacent the leading end to prevent collapse of the air inlet opening, and a towing spider at the leading end of said conical portion, said towing spider having a central hub portion carried by flexible lanyards which are attached to the wall of said conical member near said stiffening member.

8. An antenna cone for applying tension to an antenna trailing from a moving vehicle, comprising a hollow molded relatively thin-walled frusto-conical portion of flexible rubberlike material, said conical portion having an opening at the leading end to receive air and an opening of smaller diameter in the trailing end to discharge air, an annular stiffening member in the wall of the conical portion adjacent the leading end to prevent collapse of the air inlet opening, and a towing spider at the leading end of said conical portion, said towing spider having a central hub portion with a stiffening bushing carried by flexible molded lanyards of rubberlike material which are attached to the wall of said conical member near said stiffening member.

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