April 23, 1957 L. E. WALDORF ET AL 2,790,171

ANTENNA MAST

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Fig. 1

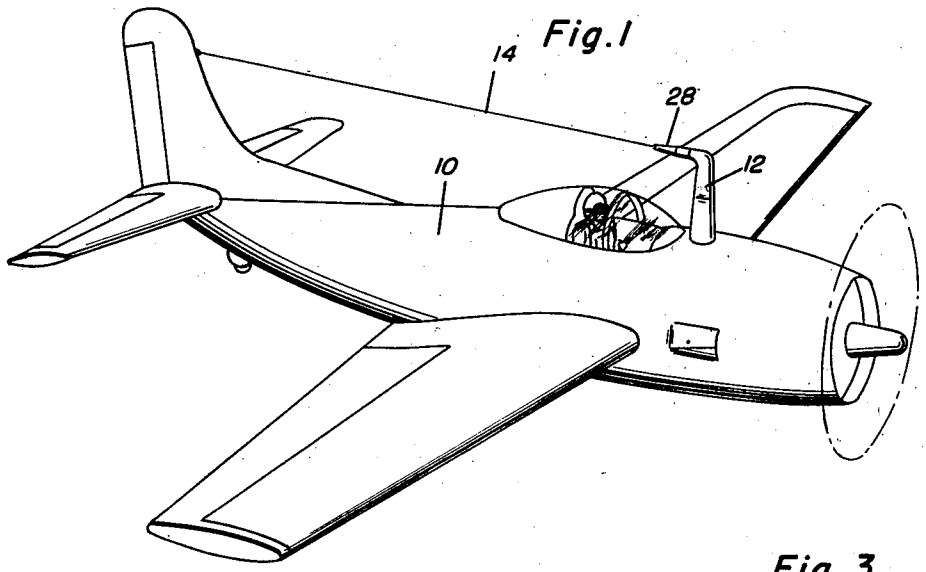


Fig. 2

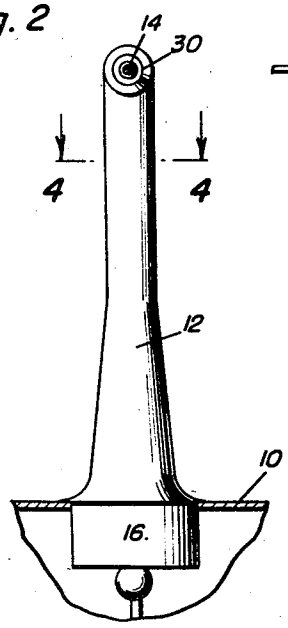
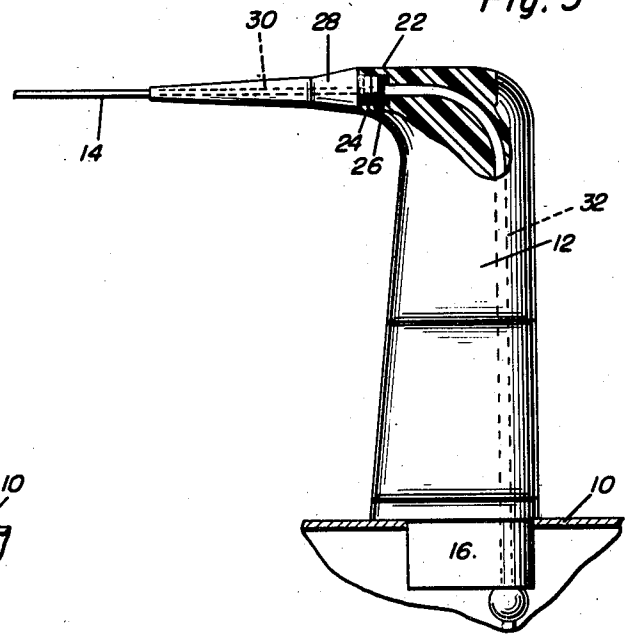


Fig. 3



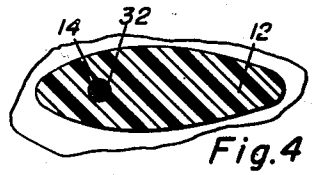


Fig. 4

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Fig. 5

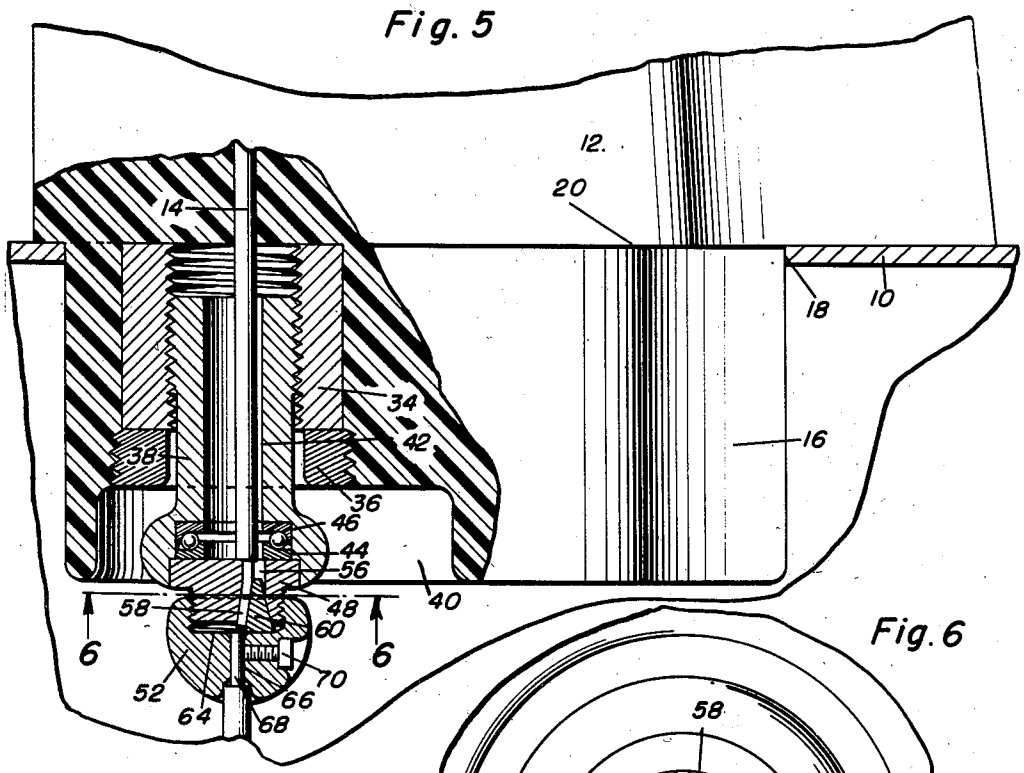


Fig. 6

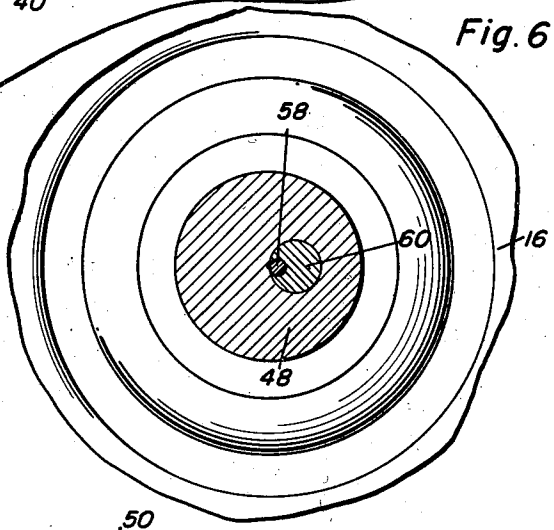
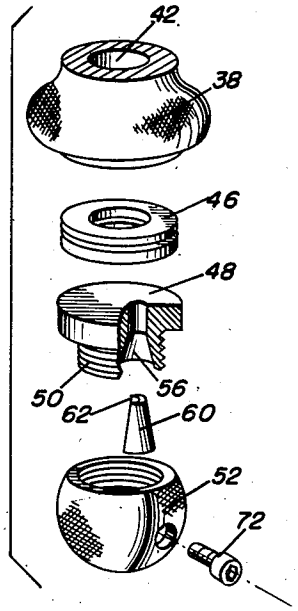


Fig. 7



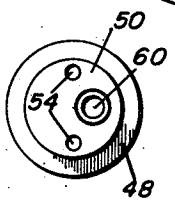


Fig. 8

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ANTENNA MAST

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Application January 15, 1954, Serial No. 404,335

7 Claims. (Cl. 343—886)

This invention relates to an antenna mast, and more particularly to an apparatus for supporting antennas of the nature that are now utilized in aircraft.

The primary object of this invention resides in the provision of an antenna mast for use with aircraft having a small frontal surface, thereby causing little drag while permitting the necessity for a splice between the antenna aerial or wire mounted outwardly of the skin of the aircraft and the antenna lead connected to the aircraft radio or other electronic equipment, thereby reducing the possibility of a high resistance connection and insuring optimum operation of the equipment.

A further object of this invention resides in the provision of an antenna mast which employs no metallic parts outwardly of the skin of the aircraft, thereby reducing the possibility of attenuation of the signal.

One of the advantages of this antenna mast is that it is molded, utilizing a metallic core of a low melting point which may be melted out from the antenna, the meltable core being capable of being shaped so as to permit complicated internal patterns to be formed in the antenna mast.

Still further objects and features of this invention reside in the provision of an antenna mast that is strong and durable, comparatively simple in construction and manufacture, thereby permitting wide distribution at a relatively low cost, which may be used and designed for high speed aircraft, and which is comparatively light in weight, thereby being highly efficient for aircraft use.

These, together with various ancillary objects and features of the invention which will become apparent as the following description proceeds, are attained by this antenna mast, a preferred embodiment of which has been illustrated in the accompanying drawings, by way of example only, wherein:

Figure 1 is a perspective view of an aircraft utilizing the antenna mast comprising the present invention;

Figure 2 is a rear elevational view of this antenna mast;

Figure 3 is a side elevational view of the antenna mast with parts thereof being broken away to show other parts in detail;

Figure 4 is an enlarged horizontal sectional view as taken along the plane of line 4—4 in Figure 2;

Figure 5 is a vertical sectional detail view illustrating the construction of the means utilized for adjustably lockingly holding the antenna wire taut;

Figure 6 is a horizontal sectional view as taken along the plane of line 6—6 in Figure 5;

Figure 7 is an exploded perspective view of the holding means for the antenna wire; and

Figure 8 is a bottom plan view of the chuck.

With continuing reference to the accompanying drawings, wherein like reference numerals designate similar parts throughout the various views, the reference numeral 10 generally designates an aircraft having a suitable outer skin through which the antenna mast 12 comprising the present invention extends, the mast 12

being adapted to aid in the supporting of an aerial or antenna wire 14 in spaced relationship from the skin of the plane 10.

The antenna mast 12 includes a lower portion 16 of slightly reduced cross-sectional area which is adapted to extend through an aperture, as at 18, in the skin of the airplane 10. Where the lower portion 16 of the mast 12 joins the rest of the mast, there is of course formed a shoulder 20 which lies flush with the skin of the aircraft 10. The mast 12 is of suitable configuration and shape as to be of minimum frontal area, thereby being of a reduced drag. The mast 12 further has an outer portion 22 which is internally threaded, as at 24, for reception of a resilient washer 26 and an externally threaded trailing airfoil 28. The trailing airfoil 28 has an aperture 30 therethrough through which the antenna wire 14 extends, the antenna wire also extending through an aperture 32 in the mast 12.

An insert 34 is lockingly secured in the lower portion 16 of the mast 12 by means of an insert nut 36. These members may be optionally integrally molded with the mast 12 and form a recess which is internally threaded for reception of an externally threaded chuck barrel 38. A depression 40 is also formed in the lower portion 16.

The chuck barrel 38 has a bore 42 through which the antenna wire 14 extends and is further provided with a suitable opening 44 within which a thrust bearing 46 is seated. A chuck 48 is suitably positioned in the opening 44 and has an externally threaded portion 50 of reduced cross-section which is adapted to have threadedly secured thereon a corona shield 52. Recesses 54 are formed in the lower portion 50 for reception of a wrench which may be used to secure the chuck 48 in position. The chuck 48 is provided with a tapered hole 56 therein through which the ends 58 of the antenna wire 42 extend, the insulation on the end 58 of the antenna wire having been removed so that the wedge-shaped chuck jaw 60 is in electrical contact therewith and holds the end 58 in electrical contact with the electrically conductive chuck 48.

It is noted that the wedge-shaped chuck jaw 60 has a concavity 62 therein for reception of the end 58 of the antenna wire 14 and is adapted to be wedgingly held in place by the corona shield 52, since the platform 64 of the corona shield formed by the internally threaded recess therein will abut against the lower portion of the chuck jaw 60 to urge it wedgingly into the tapered hole 56 in the chuck 48. It is to be noted that the corona shield 52 is constructed from a conductive material and has an aperture 66 therethrough into which the non-insulated end 68 of an antenna lead is insertable. A set-screw or other suitable fastener 72 is used to lockingly hold the antenna lead 68 to the corona shield 50. It is to be noted that no sharp edges are formed on the corona shield 52 so as to reduce possibility of corona loss and attenuation of the signal.

By use of the structure, it is quite apparent that no splice between the antenna lead 68 and the antenna wire 14 is necessary, since the antenna lead is in electrical connection with the antenna wire 14 through the conductive corona shield 52 and chuck 48. Further, it is to be noted that the general lines of the assembly, including the corona shield 52 and the chuck 48, are offset from the antenna wire 14 tapered to the wedge shape of the chuck jaw 60 and the tapered opening 56, thereby preventing the antenna wire 14 from twisting when the chuck barrel 38 of the corona shield 52 is tightened.

In the manufacture of this antenna, the core of some alloy of a suitable low melting point is utilized. Wood's

metal or solder may be utilized for the core and is cast or otherwise formed to the desired shape. This core is then positioned in the mold with adapters to hold it in its specific place. The core is coated with a suitable releasing agent such as silicon grease when low molecular weight polyster resins are utilized for the construction of the mast **12**. A filler such as fiberglass or the like can be placed in the mold and the mix is then poured into the mold. After the casting has been removed from the mold with the core still embedded therein, the casting may be in the coil of a suitable heating unit which will then raise the temperature of the core above the melting point of the core, thereby melting the core out from the casting while setting permanently the casting as a suitable thermosetting which can be utilized.

By utilizing the meltable cores, comparatively complicated single piece castings can be achieved.

Hence, a mast having a small frontal surface, yet means for properly supporting the antenna wire, can be achieved.

In the assembly of this antenna mast, after the chuck barrel **38** has been threadedly secured in position, the antenna wire **14** can be threadedly secured therethrough. Then, after the thrust bearing **46** has been positioned together with the chuck **48**, the chuck jaw **60** can be wedgingly secured by means of rotation of the corona shield **52**. Then, the chuck barrel **38** can be rotated to a suitable position where the antenna wire **14** will be properly taut.

From the foregoing, the construction and operation of the device will be readily understood and further explanation is believed to be unnecessary. However, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction shown and described, and accordingly all suitable modifications and equivalents may be resorted to, falling within the scope of the appended claims.

What is claimed as new is as follows:

1. An antenna mast having a lower portion adapted to extend through the outer skin of an aircraft, said mast having a passageway therethrough, an antenna wire extending through said mast in said passageway, a recess in said lower portion, a chuck barrel threadedly secured in said recess, said barrel having an internally threaded opening and a bore in communication with said opening, a thrust bearing in said opening, a chuck adjustably secured in said opening engaging said thrust bearing, a chuck jaw in said chuck, said antenna wire extending through said thrust bearing and said chuck, and a corona shield threadedly secured on said chuck, urging said chuck jaw in clamping engagement with said antenna wire.

2. An antenna mast having a lower portion adapted to extend through the outer skin of an aircraft, said mast having a passageway therethrough, an antenna wire extending through said mast in said passageway, a recess in said lower portion, a chuck barrel threadedly secured in said recess, said barrel having an internally threaded opening and a bore in communication with said opening, a thrust bearing in said opening, a chuck adjustably secured in said opening engaging said thrust bearing, a chuck jaw in said chuck, said antenna wire extending through said thrust bearing and said chuck, and a corona shield threadedly secured on said chuck, urging said chuck jaw in clamping engagement with said antenna wire, said chuck having a tapered hole therein, said chuck jaw being wedge-shaped.

3. An antenna mast having a lower portion adapted to extend through the outer skin of an aircraft, said mast having a passageway therethrough, an antenna wire extending through said mast in said passageway, a recess in said lower portion, a chuck barrel threadedly secured in said recess, said barrel having an internally threaded opening and a bore in communication with said opening, a thrust bearing in said opening, a chuck adjustably secured in said opening engaging said thrust bearing, a chuck jaw in said chuck, said antenna wire extending through said thrust bearing and said chuck, and a corona shield threadedly secured on said chuck, urging said chuck jaw in clamping engagement with said antenna wire, and a fastener lockingly securing an antenna lead to said corona shield.

4. An antenna mast having a lower portion adapted to extend through the outer skin of an aircraft, said mast having a passageway therethrough, an antenna wire extending through said mast in said passageway, a recess in said lower portion, a chuck barrel threadedly secured in said recess, said barrel having an internally threaded opening and a bore in communication with said opening, a thrust bearing in said opening, a chuck adjustably secured in said opening engaging said thrust bearing, a chuck jaw in said chuck, said antenna wire extending through said thrust bearing and said chuck, and a corona shield threadedly secured on said chuck, urging said chuck jaw in clamping engagement with said antenna wire, said chuck having a tapered hole therein, said chuck jaw being wedge-shaped, and a fastener lockingly securing an antenna lead to said corona shield.

5. An antenna mast having a lower portion adapted to extend through the outer skin of an aircraft, said mast having a passageway therethrough, an antenna wire extending through said mast in said passageway, a recess in said lower portion, a chuck barrel threadedly secured in said recess, said barrel having an internally threaded opening and a bore in communication with said opening, a thrust bearing in said opening, a chuck adjustably secured in said opening engaging said thrust bearing, a chuck jaw in said chuck, said antenna wire extending through said thrust bearing and said chuck, and a corona shield threadedly secured on said chuck, urging said chuck jaw in clamping engagement with said antenna wire, said mast having an internally threaded outer portion, a resilient member in said internally threaded outer portion, and a trailing airfoil threadedly secured to said outer portion holding said resilient member in engagement with said antenna wire.

6. An antenna mast having a lower portion adapted to extend through the outer skin of an aircraft, said mast having a passageway therethrough, an antenna wire extending through said mast in said passageway, a recess in said lower portion, a chuck barrel threadedly secured in said recess, said barrel having an internally threaded opening and a bore in communication with said opening, a thrust bearing in said opening, a chuck adjustably secured in said opening engaging said thrust bearing, a chuck jaw in said chuck, said antenna wire extending through said thrust bearing and said chuck, and a corona shield threadedly secured on said chuck, uring said chuck jaw in clamping engagement with said antenna wire, said chuck having a tapered hole therein, said chuck jaw being wedge-shaped, and a fastener lockingly securing an antenna lead to said corona shield, said mast having an internally threaded outer portion, a resilient member in said internally threaded outer portion, and a trailing airfoil threadedly secured to said outer portion holding said resilient member in engagement with said antenna wire.

7. An antenna mast having a lower portion adapted to extend through the outer skin of an aircraft, said mast having a passageway therethrough, an antenna wire extending through said mast in said passageway, a recess in said lower portion, a chuck barrel threadedly secured in said recess, said barrel having an internally threaded opening and a bore in communication with said opening, a thrust bearing in said opening, a chuck adjustably secured in said opening engaging said thrust bearing, a chuck jaw in said chuck, said antenna wire extending through said thrust bearing and said chuck, and a corona shield threadedly secured on said chuck urging said chuck jaw in clamping engagement with said antenna

wire, and a fastener lockingly securing an antenna lead to said corona shield, said corona shield, said chuck, and said chuck jaw being of an electrically conductive material, said mast being of an electrically insulative material, said antenna wire being electrically connected to said chuck, said antenna lead being electrically connected to said corona shield.

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