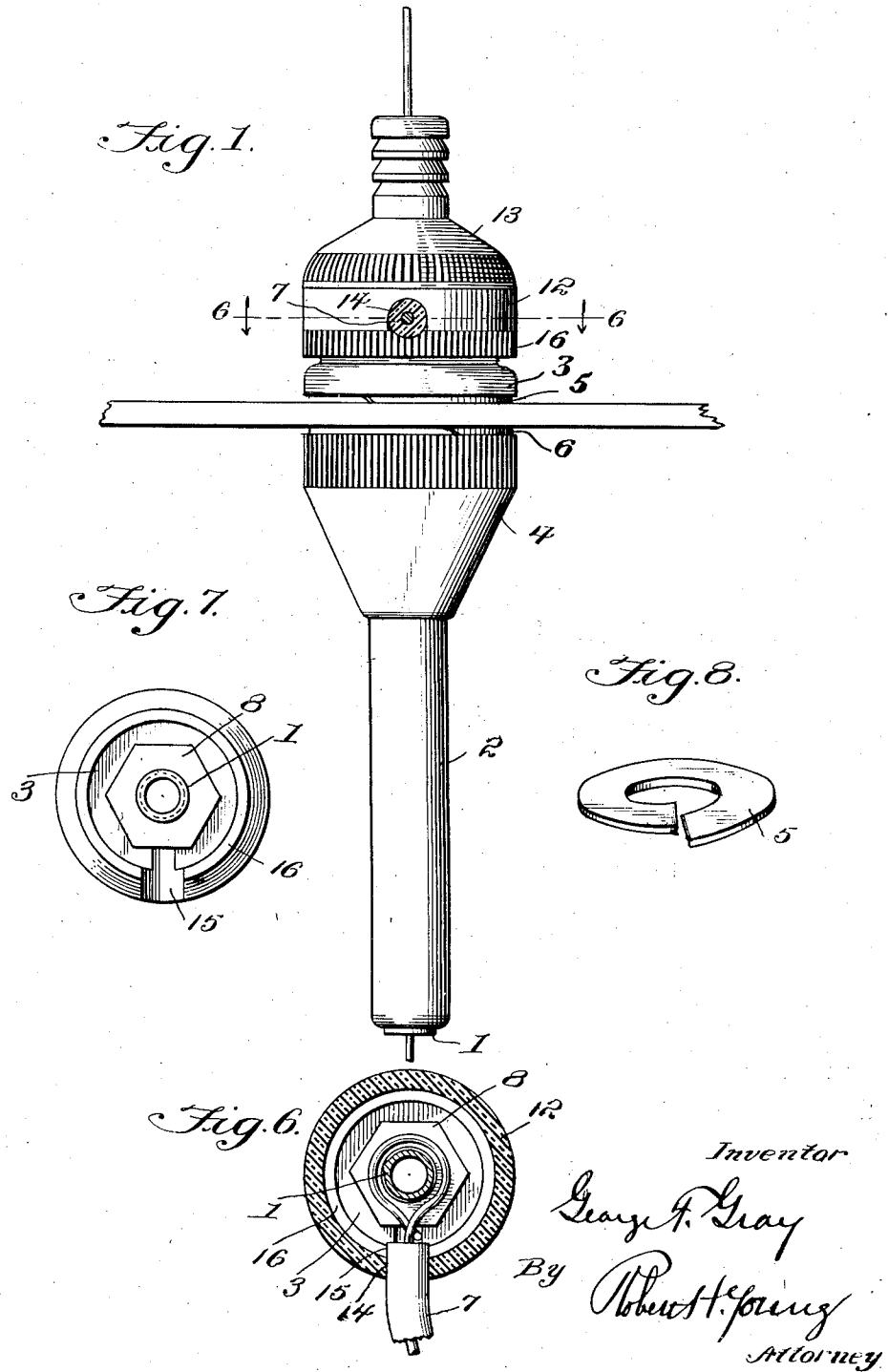


G. F. GRAY.
 FAIRLEAD.
 APPLICATION FILED APR. 22, 1919.

1,346,539.

Patented July 13, 1920.
 2 SHEETS—SHEET 1.



Inventor

George F. Gray

By

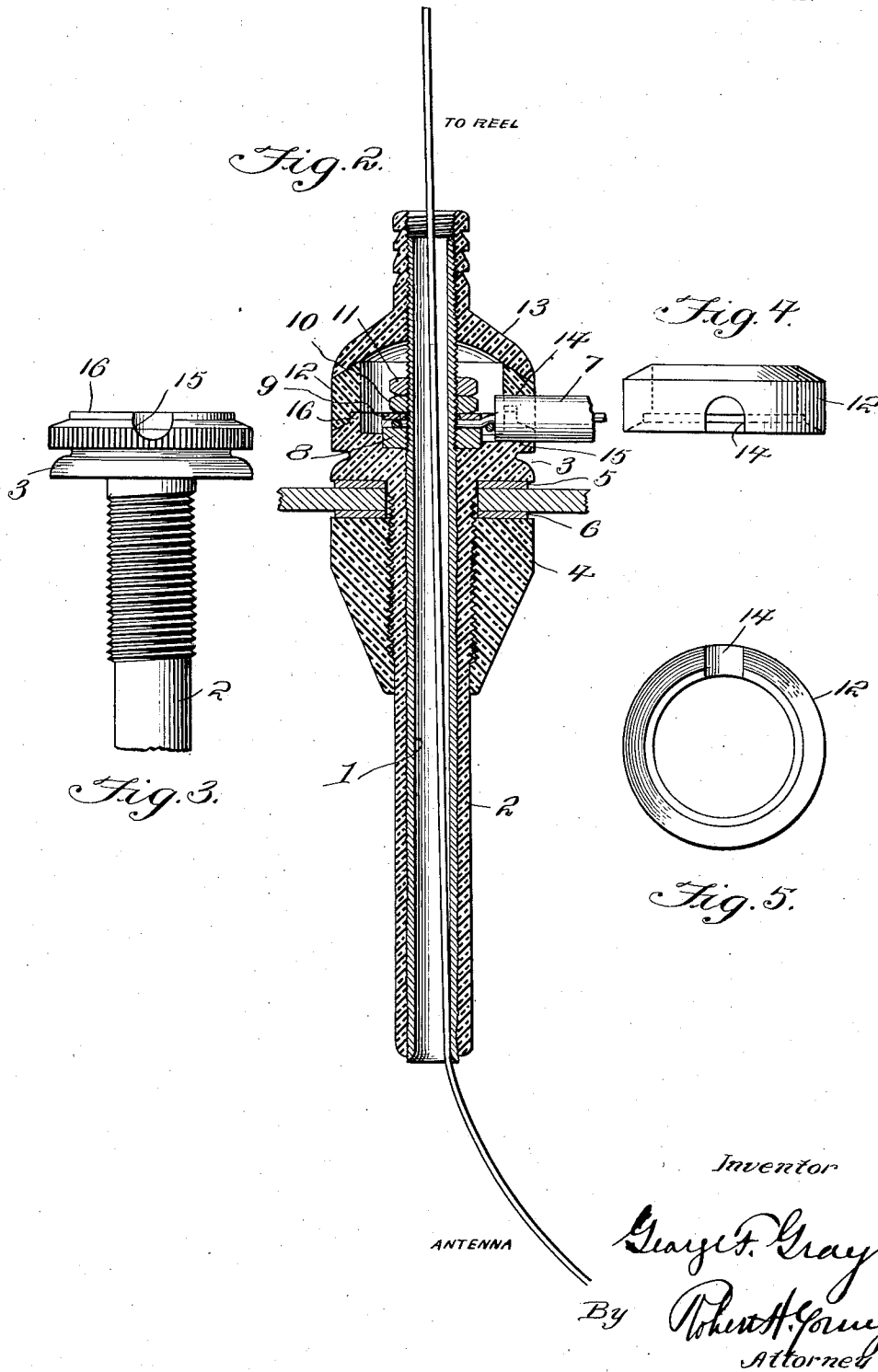
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GEORGE FRANCIS GRAY, OF PITTSBURGH, PENNSYLVANIA.

FAIR-LEAD.

1,346,539.

Specification of Letters Patent.

Patented July 13, 1920.

Application filed April 22, 1919. Serial No. 291,985.

To all whom it may concern:

Be it known that I, GEORGE F. GRAY, citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Fair-Leads, of which the following is a specification.

This invention relates to fairleads for electrical conductors and has for its particular object the provision of a fairlead adapted to serve as an insulating bushing in the floor of an airplane fuselage through which the trailing antenna of the radio set passes.

In radio apparatus of the type used on airplanes, a drum or reel is usually provided in the fuselage on which the antenna wire is wound when not in use, and from which it is unwound and suspended from the airplane through the fuselage floor during flight when the apparatus is in operation. This necessitates the provision of an insulating bushing at the point where the antenna passes through the floor, through which the antenna may be let out or drawn in as the necessity requires.

A further object is to provide a device of the type described which is also intended to serve as the point of electrical connection between the radio apparatus and the antenna without in any manner interfering with the operation of either. It is particularly intended in the designing of the device, to make provision whereby a heavily insulated wire, leading from the radio set to the fairlead, may be used, and to maintain the insulation of this wire without a break near the fairlead. The fairlead as designed is easily assembled on the airplane, it being only necessary to bore a round hole in the floor of the airplane fuselage. The parts of the fairlead themselves are readily joined together by hand.

The invention will be more fully described hereinafter with reference to the accompanying drawings in which like numerals indicate the same parts throughout the several views, of which—

Figure 1 is a rear elevation of the fairlead showing the same as it appears when mounted in the floor of the fuselage,

Fig. 2, a vertical, transverse section taken through the fairlead as it appears in Fig. 1, showing more clearly the manner in which the several parts thereof are arranged; also the position of the antenna wire with relation to the fairlead when the airplane is in

flight, and the manner in which the high voltage cable from the radio apparatus is attached to the fairlead,

Fig. 3, an elevational view of the main insulating member of the fairlead with the lower part thereof broken away,

Fig. 4, an elevational view of the clamping ring which coöperates with the upper part of the main insulating member of the fairlead to clamp the high voltage cable in place,

Fig. 5, a view from the under side of said clamping ring,

Fig. 6, a horizontal section taken on the line 6—6 of Fig. 1,

Fig. 7, a plan view looking down on the top of the main insulating member, and

Fig. 8, a perspective of the type of washer used between the fuselage floor and the parts of the fairlead which clamp on the same.

In the drawings, 1 represents a metal tube, preferably made of drawn steel. The antenna wire passes through this tube and due to the trailing or sweeping position which the antenna assumes when the airplane is in motion, makes electrical connection with tube 1 at the lower end thereof, as shown in Fig. 2. Tube 1 is held in place in and is insulated from the floor through which it passes by insulating member 2. Member 2 which is made of some non-conducting material, such as bakelite, is formed integral with tube 1 by molding the insulating member about the lower portion of the tube as shown, the outer surface of this portion of the tube being roughened for this purpose.

Insulating member 2 is provided with an enlarged portion 3 at the upper end thereof which serves to retain the fairlead in place in the opening in the fuselage floor provided for the same. This opening need be only large enough to allow the lower portion of member 2 to pass therethrough. Another insulating member 4 is removably mounted on the reduced portion of member 2 where the same projects on the underside of the floor. This member is interiorly screw-threaded and when mounted on member 2 coöperates with threads formed on the exterior thereof for this purpose. When the lower reduced portion of member 2 is passed through the opening in the floor and member 4 mounted thereon and screwed up from the under side of the floor, member 4 and the enlarged portion 3 of insulating member 2 serve to clamp the fuselage floor

about the opening therethrough, thus securing the several parts of the fairlead rigidly in place. Washers 5 and 6 are also provided between the lower face of the enlarged portion 3 of member 2 and the floor and between the upper face of member 4 and the floor, respectively.

In order to provide an electrical connection between the radio set and the antenna wire which passes through tube 1, contact already existing between the antenna and the tube as heretofore explained, connecting means adapted to receive a wire 7 from the radio set and thus make electrical connection between the latter and tube 1, are provided on said tube just above the enlarged portion 3 of insulating member 2. This is best shown in Fig. 2, the means mentioned consisting of a nut 8, a washer 9, a binding nut 10, and a locking nut 11, all of which are mounted in the order mentioned on the screw threaded portion of tube 1 which projects above the enlarged portion 3 of member 2. Nut 8 through which the current passes from wire 7 into tube 1, is mounted on tube 1 and screwed down far enough on the screw threaded portion thereof previous to the molding of insulating member 2 on the tube, so that nut 8 is partially embedded in the upper surface of insulating member 2, and thus permanently and immovably attached to tube 1. The exposed end of wire 7 is then twisted about tube 1, as shown in Fig. 6, and positively held in contact with the upper surface of nut 8 by means of washer 9 and binding nut 10. Nut 11 is then screwed down on binding nut 10 and serves to lock the latter in place.

Thus, the electrical current passing through wire 7, passes through nut 8 and tube 1, and thence into the antenna wire.

Wire 7 which extends from the radio set to the fairlead, is of a heavily insulated type and in order to insure that the same will not be inadvertently pulled out of the fairlead and the electrical connection between the radio set and the antenna thereby broken, additional securing means for wire 7 in the form of a clamping ring 12 and cap 13 which latter screws on the upper end of tube 1 and secures ring 12 in place, are provided.

A notch 14 in the lower edge of ring 12 serves to cooperate with a corresponding notch 15 in an annular rib 16, formed on the upper surface of the enlarged portion of member 2, in providing an opening through which insulated wire 7 passes into the fair-

lead and is secured to tube 1. Notch 15 in the annular rib 16 of member 2 should preferably be formed in that member so as to be at right angles with one of the faces of nut 8 as shown in Fig. 7. Wire 7 is secured to tube 1 in such manner that the insulation thereof rests between the faces of notches 14 and 15 when ring 12 is put in place. Hence, when cap 13 is screwed down on clamping ring 12, the latter is forced down tightly on and cooperates with rib 16 to firmly grip the insulation of wire 7 and thus remove any strain from the connection at tube 1. It will also be seen that this arrangement allows the insulation of wire 7 to be maintained without a break outside the fairlead structure.

While the details of construction have been described more or less precisely, it is not intended that the scope of the invention be limited thereto, as changes in form, the proportion of parts, and the substitution of equivalents as circumstances may suggest or render expedient, may be made without departing from the spirit of the invention.

What I claim is:

A fairlead comprising in combination, a tubular, insulating member having an enlarged upper portion, a current-conducting tube fixedly mounted in said insulated member and having a threaded portion projecting above the enlarged portion of said insulating member, a second insulating member removably mounted on the lower portion of said first mentioned insulating member, and adapted to cooperate with the enlarged portion of the latter to clamp the fairlead to its support, a nut mounted on the threaded portion of said current-conducting tube and partially embedded in said first mentioned insulating member, means for maintaining the exposed end of an electrical conductor in contact with said nut, a clamping ring provided with a groove adapted to coincide with a groove in the upper end of said first mentioned, insulating member, said grooves forming an opening through which said electrical conductor passes, and a cap removably mounted on the threaded portion of said current-conducting tube above said clamping ring for forcing the latter in clamping position about the insulation of said electrical conductor.

In testimony whereof I have affixed my signature.

GEORGE F. GRAY.