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ANTENNA GUY FITTING

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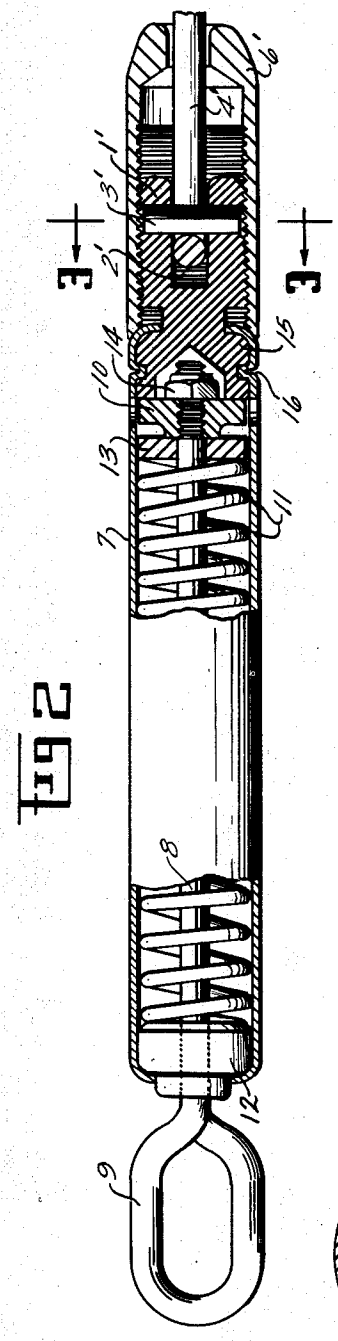

Fig 2

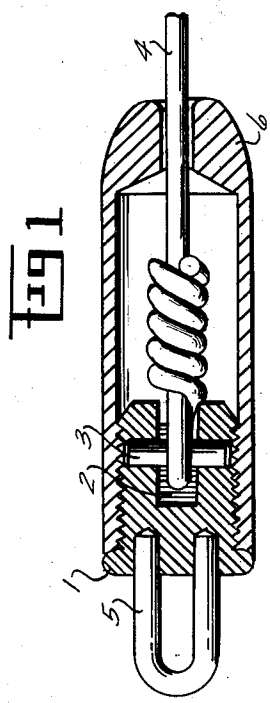

Fig 1

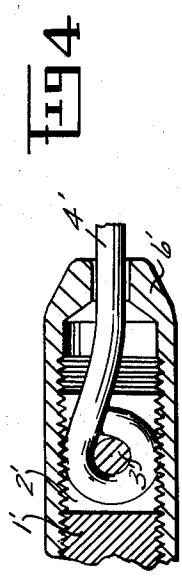

Fig 4

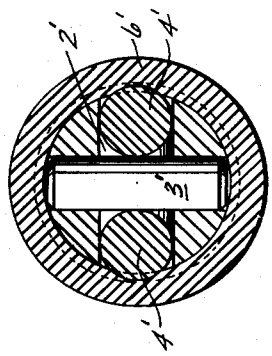

Fig 3

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ANTENNA GUY FITTING

Robert Katz, Yellow Springs, Ohio

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The invention described herein may be manufactured and used by or for Government for governmental purposes, without the payment to me of any royalty thereon.

The invention to be hereinafter described relates to coupling devices for the attaching of fixed wire antenna to aircraft.

Heretofore, it has been the general practice to make connections between the fixed wire antenna and aircraft by wrapping the antenna wire about a thimble or like device, as in making a splice.

This practice resulted in a number of sharp points and rough surfaces whose susceptibility to corona discharge is well known. This corona discharge resulted in severe radio interference, thus making flight in bad weather extremely difficult or dangerous due to interruption of radio navigation and communication services.

The present invention is designed to overcome the above and other objections and to provide a simple, compact, efficient, durable and readily manufactured coupling for the purposes stated and which may be mounted where necessity demands without the use of tools.

In order to more clearly disclose the construction, operation and use of the invention reference should be had to the accompanying drawings forming part of the present application.

Throughout the several figures of the drawings like reference characters designate the same parts in the different views.

In the drawings:

Fig. 1 is a longitudinal section of a non-resilient coupling embodying the invention for securing one end of a fixed wire antenna;

Fig. 2 is a side elevation with parts broken away and in section of a resilient coupling that also embodies the invention and that may be separate or may serve to secure the end of the fixed wire antenna that is remote from the end secured from the coupling shown in Fig. 1 of which it is a modification;

Fig. 3 is an enlarged transverse section taken along the line 3—3 of Fig. 2; and

Fig. 4 is a fragmentary longitudinal section of the right hand end of the device shown in Fig. 2 rotated through an angle of 90°.

Referring to the drawings in detail, and more particularly to Fig. 1, the nonresilient coupling comprises a threaded block or plug 1 of approximately cylindrical form and provided with a diametrical slot 2 which is straddled by a pin 3 about which one end of an antenna wire 4 is wrapped and then suitably spliced as by being

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wound back upon itself as shown. This block is also provided with a link or staple 5 for connection in well known manner to an antenna mast or other fitting on an airplane. Over the slotted end of the block 1 is slipped or threaded a cap or thimble 6 which completely conceals, streamlines and electrically shields the block and splice and is provided with an opening through which the antenna wire or the like freely extends. This opening is provided with a smoothly rounded surface whose resistance to corona discharge is well known. The antenna wire passes through the thimble opening at a point substantially beyond the splice connection, thereby restricting the vibration amplitude of the wire at the splice and minimizing the likelihood of fatigue failure of the wire at this point. Such failures have been commonly experienced in the past.

The nonresilient coupling described above may be used with any type of wire including large diameter bare wires. Heretofore, in the case of such large diameter wires, they have been spliced, resulting in relatively large and cumbersome devices or requiring special tools or apparatus. In the present instance, even when such large diameter wires are used it is possible to maintain the same small, compact form and, at the same time, minimize the use of tools.

A modified procedure in applying the invention to large diameter bare wires is as follows: The cap 6 is slipped over the wire in such manner that it may receive the block 1, when assembled. The wire is inserted under the pin 3 in the block, diametrically of the block and through the slot 2 so that its free end extends only very slightly beyond the circumference of the block. The wire is then bent until a complete tight fitting loop or eye is formed about the pin 3 or 3' with the tip of the wire 4' abutting or adjacent the side thereof and with a sufficient reverse bend applied to the wire so that it extends away from the coupling in alignment with the axis thereof when a cap 6' is threaded tightly upon the plug 1'. The wire 4' and plug slot 2' preferably are so dimensioned that, when assembled, the pin 3' and two thicknesses of the wire 4' are collectively approximately the pitch diameter of the inner threads in the cap 6', as indicated in Fig. 4 of the drawing. With this arrangement, the threads bite into the wire sufficiently to anchor it around the pin 3' with an attached strength that approaches the tensile strength of the wire 4'.

The large diameter wire 4' is formed into a

loop or eye around the pin 3' in the slot 2' of the block 1', as shown in Figs. 2, 3 and 4 of the drawings. The wire loop fits snugly against and is closely engaged by the inner wall of the thimble or cap 6' and is pressed closely against the pin 3, as shown in Figs. 3 and 4, with the threads of the cap 6' so biting into the wire 4' as to resist the opening or spreading of the loop and possible pulling out of the wire. It has been found that, upon a selection of the size of the slot 2' such that the wire fits snugly therein, the diameter of the pin 3' and the inside diameter of the cap 6' so that the bent wire is restrained thereby as described, substantially the full strength of the wire may be developed, whereby failure of the wire may be caused before it is possible to draw the looped end of the wire 4' from about the pin 3'.

The holding power of the fitting is, as described, enhanced by screw threads in or otherwise roughening, the inner surface of the cap 6' where it engages the loop of wire 4', or similarly roughening the pin 3' or the walls of the slot 2'. By actual test, it has been found that by such roughening, the hold of the fitting may develop as much as 90% of the normal full tensile strength of the respective wire.

These fittings may be used with or without a cushioning, or shock or strain absorbing means. However, in many instances such a cushioning means will be found of real advantage and value. A preferred arrangement is shown in Fig. 2.

In this arrangement, an elongated tubular cylinder 7 has an opening through its left hand end adapted to slidably receive the shank 8 of a link 9. The inner end of link shaft 8 carries a head 10, loosely fitting within the hollow cylinder 7 and secured upon the link shank 8 by a nut that threads upon the link shank, or the like. Between the head 10 and the left hand end of the cylinder 7 is disposed a coiled compression spring 11.

The spring 11 is maintained under compression between a plug 12 disposed within and retained by the spun down left hand end of the cylinder 7, and within which plug 12 the link shaft 8 is free to slide axially of the cylinder 7, and a washer 13 supported by the head 10 and nut 14 that thread on the right hand end of the link shaft 8.

The thimble 6' in Fig. 2 is removably secured to the cylinder 7 in any desired manner, as by being threaded upon a modified block or plug 1' shown, that is analogous to the plug 1 shown in Fig. 1.

The plug shown in Fig. 2 has its left hand end secured within the right hand end of the cylinder 7 in any desired manner. In the assembly shown, the right hand end of the cylinder 7 is spun over a flange 15 on the left hand end of the plug 1', that is analogous to the flange on the left hand end of the plug 1 shown in Fig. 1. If preferred, the cylinder 7 at its right hand end is indented at depressions 16 down into depressions in the peripheral surface of the left hand end of the plug 1', shown in Fig. 2, to arrest the rotation of the cylinder 7 with respect to the plug 1'. It will be noted that in its assembled form the thimble 6' is turned completely and tightly upon the plug 1', or against the part of the cylinder 7 overlying the plug flange 15, such that their junction is substantially smooth and such that projections from which electrical static discharge or precipitation static takes place may be reduced to a minimum. With the device in operative position for use, any pull or tensile strain tending to separate thimble 6' and link 9 will tend to compress spring 11. Excessive strain, within the limits of the capacity of the coupling, will be cushioned or compensated for by corresponding compression of spring 11.

While screw threads have been disclosed as the connection between block 1 and thimble 6, or the equivalent block 1' and thimble 6', and are considered preferable, it will be understood that various other detachable connections between these parts may be used such, for instance, as bayonet slot, key hole slot, groove and snap ring, etc.

It is thought that the construction, operation and use of the invention will be clear from the preceding detailed description.

Changes may be made in the construction, arrangement and disposition of the various parts of the invention within the scope of the appended claims without departing from the field of the invention and it is meant to include all such within this application in which only a preferred form and two modifications have been disclosed, purely by way of illustration and with no intent to, in any degree, limit the invention thereby.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. An electrical static minimizing coupling, comprising in combination a plug externally threaded at one end and having a transverse slot extending axially of the threaded end of the plug, means to which a wire may be connected extending transversely of the slot in said plug, means to which a wire may be connected disposed at the end of said plug remote from the slotted end thereof, and a hollow cap having an internally threaded open end adapted for engaging the threaded end of said plug and providing a substantially smoothly curved exterior for the coupling.

2. A static electrical discharge minimizing electrical coupling, comprising the combination of a plug threaded externally from one end and slotted axially from the threaded end thereof and having a flange at substantially the axial termination of the threads thereon remote from the slotted end, a wire attaching pin extending across the slot in said plug, a staple extending away from the end of the plug remote from the slotted and threaded end thereof and secured to said plug, and a substantially smooth surfaced internally threaded cap for mounting on said plug and contacting said flange thereon in a substantially projection free junction therewith.

3. A static electrical energy discharge minimizing electrical coupling, comprising in combination a plug threaded externally from one end and slotted thereacross, a pin disposed transversely of the plug slot to receive a turn of wire therearound dimensioned substantially to fill the slot laterally, and an internally threaded hollow cap engaging the threads on said plug and adapted for causing the cap threads to so enter the wire surface as to restrain the wire from motion with respect to said pin.

4. A static electrical energy discharge minimizing electrical coupling, comprising in combination a plug threaded externally from one end and slotted thereacross, a plug flange axially adjacent a groove between the threaded end of the plug and the flange, a pin disposed transversely of the slot in said plug to receive a turn of wire therearound dimensioned substantially to fill the slot laterally, an internally threaded

hollow cap engaging the threads on the plug and the cap threads so entering the surface of the wire as to restrain the wire from motion with respect to said pin and said cap seating against said plug flange axially of the assembly to cover the plug groove and so that the cap edge engages the plug flange in providing a substantially smooth continuous surface external the junction therebetween for minimizing the discharge of static electrical energy therefrom.

5. A static electrical energy discharge minimizing electrical coupling, comprising the combination of a first plug having a slot in one end remote from a depression in its opposite end with a circumferentially disposed groove interposed therebetween, a pin extending transversely of the slot in said first plug, a first plug flange at the edge of the plug groove remote axially from the plug slot, a hollow cylinder attached at one end by overlying said first plug flange and entering the groove in said first plug, an open ended cap for disposition outwardly of said first plug and adjustable axially thereof so that the edge of the open end of the said cap substantially engages said cylinder overlying said first plug flange to impart a substantially smooth external surface to the junction therebetween, a second plug secured in the end of said cylinder remote from the first plug, a link shank slidable axially

of said cylinder through an aperture in said second plug and bearing a link at one end and threaded at its opposite end, a head mounted on the threaded end of said link shank, a nut on the threaded end of said link shank for securing the head thereon, and a compression spring restrained between said second plug and said head within said cylinder for imparting resilience between said pin and said link on said link shank.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
454,486	Lieb	June 23, 1891
686,605	Gravel and Gallagher	Nov. 12, 1901
1,006,950	Keddy	Oct. 24, 1911
1,008,686	Young	Nov. 14, 1911
2,063,718	Berndt	Dec. 8, 1936
2,306,661	Genler	Dec. 29, 1942

FOREIGN PATENTS

Number	Country	Date
354,798	Germany	June 15, 1922