

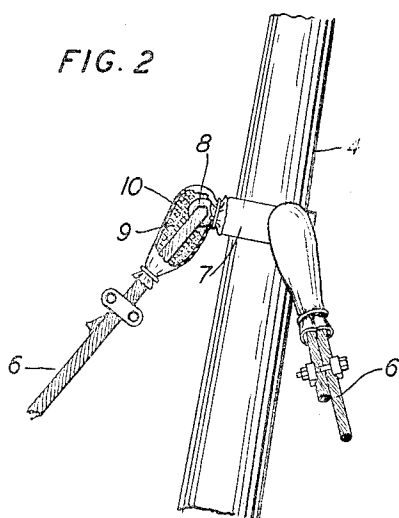
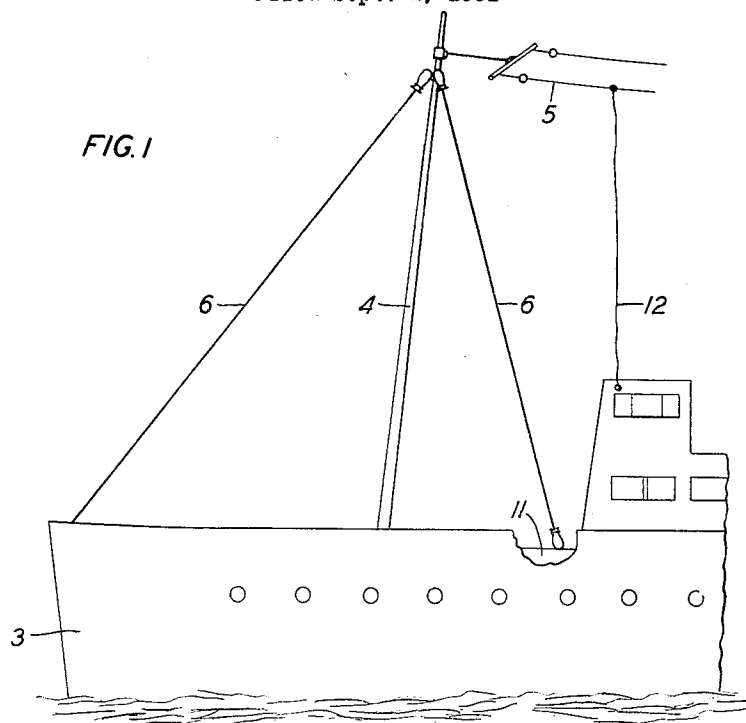
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1,951,918

ELECTRICAL BONDING

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1,951,918

ELECTRICAL BONDING

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4 Claims. (Cl. 250—33)

This invention relates to electrical bonds and particularly to bonds for use on metallic structures in the neighborhood of transmitting or receiving antennae of a radio system.

5 An object is to reduce disturbances set up by the rubbing of flexible joints of metallic structures which are subject to high frequency electromagnetic fields.

When metallic structures having movable mechanical joints are subject to electromagnetic fields there will accumulate on portions of the structure electrical charges which will discharge through the joints. The process of charging and discharging may set up disturbances in the field which may be very objectionable. One situation in which such phenomena have been found to be particularly disturbing is in the case of radio systems on ships.

In such cases several different radio transmitters and receivers with their individual antennae may be concentrated in the very small available space. The metallic stays employed for supporting the superstructure of the ship will become charged when the mechanical strain on them is too low to establish good contact with the connecting eyes. The stays will discharge when the mechanical strain is increased sufficiently to lower the electrical impedance of the joints. Considerable disturbance is produced by this charging and discharging, particularly in the case of stays in the neighborhood of the antennae.

Since a considerable degree of flexibility is required to take up the varying strains on the stays it is not feasible to weld the joints between the stays and connecting eyes. Likewise, many of the stays consist of large cables in which the pitch of the individual wires is two feet or more. To effectively bond the joints in such cases, would require the bond to be welded to the cable for at least two feet of its length. Furthermore, in order to be effective the bond must have an impedance at least as low as the lowest impedance of the joint. Since the impedance of the joint, when under severe mechanical strain, is very low this would mean that the bond would have to be of very large cross-section, particularly in the case of very high frequency fields such as are set up when radio communication is being carried on at very short wave lengths.

In accordance with this invention the joints are thoroughly packed with a conducting lubricant which preferably comprises a mixture of vaseline or other grease and powdered graphite,

preferably somewhat in excess of 50% by weight of graphite.

In applying the lubricant the strain is taken off the joint to permit the lubricant to thoroughly permeate all parts thereof. After the joint is lubricated it is wrapped with canvas or similar material and painted to protect the lubricant from the weather.

One method of determining a proper mixture for the lubricant is to smear on a grounded metallic plate a mixture to be tested. An insulated metallic body subject to an electromagnetic field is then passed through the lubricant to the plate. If no appreciable disturbance is observed in a radio receiver, responsive to the electromagnetic field, as the body passes through the lubricant to the plate the mixture will generally be found satisfactory.

The invention may be more readily understood by reference to the following detailed description in connection with the accompanying drawing in which:

Fig. 1 shows the application of the invention to the supporting stays of the radio mast of a ship; and

Fig. 2 shows in detail the joints connecting the stays to the mast of the ship shown in Fig. 1.

Referring to the drawing there is shown a ship 3 provided with a radio mast 4 which supports one end of a radio antenna 5. The mast 4 is braced and supported by means of stays 6 and others, not shown, of wire cable having their upper ends connected to the upper portion of the mast and their lower ends connected to the main frame of the ship.

As shown in detail in Fig. 2, the stays 6 are fastened to the mast by means of a collar 7 surrounding the mast and provided with eyes 8 through which the cable is looped. As shown, these joints are thoroughly packed with a conducting lubricant 9 which preferably comprises a mixture of vaseline or other grease and powdered graphite, preferably somewhat in excess of 15% by weight of graphite. This lubricating and conducting packing 9 is held in place and protected by means of a wrapping 10 of canvas or other suitable material.

The joints between the connecting stay and the main frame of the ship are similarly packed with conducting lubricant as indicated at 11 in Fig. 1.

As described in detail above the effect of this conducting and lubricating packing of the joints is to maintain the electrical resistance of the joints substantially constant irrespective of vari-

ations in the strain and stress on the stays. Thus, even in the presence of a high potential electromagnetic field such as is set up when the radio transmitter connected to the antenna 5 by means of the lead-in wire 12 is operating, there will be no alternative charging and discharging of the stay wires as would otherwise occur due to the variation in the electrical resistance of the joints.

What is claimed is:

1. In combination, a metallic structure of electrically conducting material subject to an electromagnetic field, a movable mechanical joint in said structure, said joint being subject to varying mechanical strains which tend to vary the electrical impedance thereof, and a lubricant of low electrical impedance so packed about said mechanical joint as to stabilize the electrical impedance of said joint.

2. In combination, a metallic structure subject to an electromagnetic field, a movable mechanical joint in such structure subject to vary-

ing mechanical strains tending to vary the electrical impedance of said joint, and a lubricant packing said joint and having such a low electrical impedance as to prevent the accumulation of electrical charges on said structure due to said field.

3. A combination, according to the preceding claim, in which said lubricant comprises grease and at least 50% by weight of graphite.

4. In combination, a metallic structure subject to a high frequency electromagnetic field, a signaling means responsive to said field, a friction joint in said structure, said joint being subject to varying mechanical strains tending to vary the electrical impedance thereof, and a lubricant surrounding and packing said joint and having such a low electrical impedance as to maintain the electrical impedance of said joint substantially uniform.

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25	100
30	105
35	110
40	115
45	120
50	125
55	130
60	135
65	140
70	145
75	150