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SINUOUS LOOP CONDUCTOR

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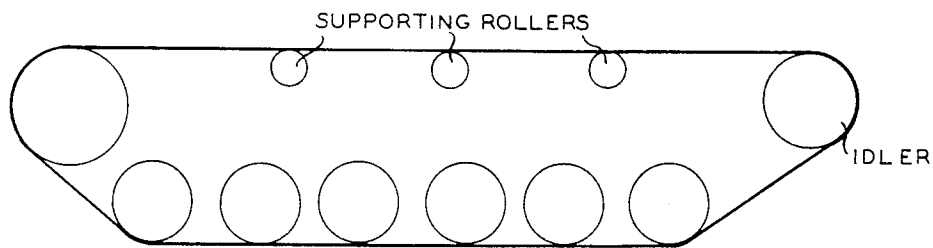


FIG. 4

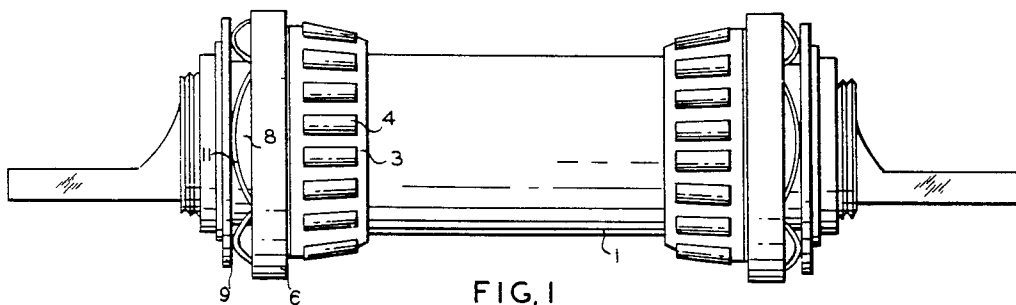


FIG. 1

FIG. 2

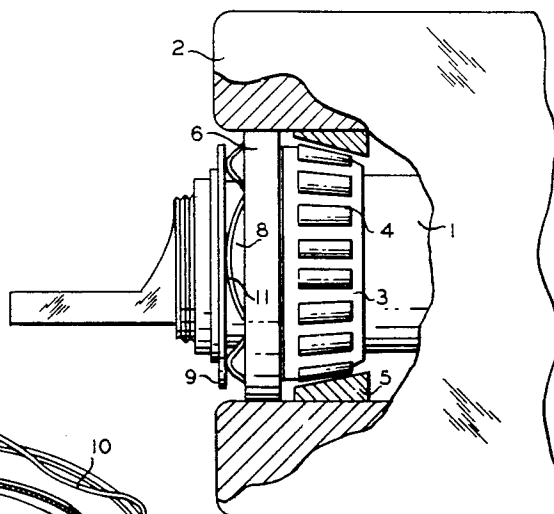
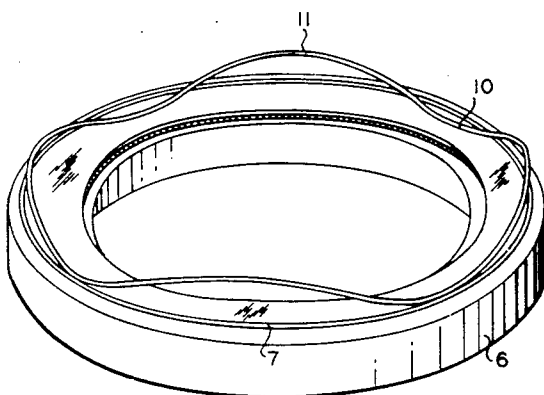


FIG. 3

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SINUOUS LOOP CONDUCTOR

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2 Claims. (Cl. 173—324)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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

The invention to be hereinafter described relates to arc preventing conductors for radio frequency noise suppression.

Arcing is one of the most frequent and widespread noise sources of radio frequency interruption, as is well known.

In motorized military equipment such as tanks, half-tracks and other mobile vehicles traveling on continuous treads of the caterpillar type and using rubber, as is frequently the case, static electricity is continually being generated by the tread. Much of this has a continuous conducting path and flows off through the body. However, there are certain moving parts where charges, being constantly built up, do not have a continuous path to the body and, therefore, accumulate until arcing results, bridging the discontinuity. For instance, as the tread reaches the idler the static of the tread flows to the idler, and after the tread passes the idler static subsequently generated flows to the first supporting roller in the path of the tread, as the tread reaches it. Where there are several supporting rollers, the static generated between successive rollers will be given up by the tread to the respective succeeding supporting roller. Because of frequent arcing at these points many experiments and long extensive tests have been conducted under a very wide range of operating conditions to obtain all possible information on the trouble and to find a solution to it. It has been clearly established that the insulating film of lubricant essential between the shaft and hub at such points by discontinuing the conducting path compels the arcing. Wherever electrical charge passes to the hub of such an idler the invention of this application may be applied.

Several suggestions have been offered to meet the above conditions, but without success. In one proposed and tried arrangement, the grease retaining ring has been provided with a band or continuous strip of conducting neoprene in continuous wiping contact with the shaft or axle. Carried by the roller or idler hub, it rotates about the axle. It was found to be stiff and to have a seriously damaging abrading action. It has been found too objectionable on that account. It has also been proposed to use a conducting lubricant. But the difficulty in that proposal has been to maintain the necessary lubrication efficiency while at the same time incorporating sufficient conducting material such as graphite, for

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instance. So far, to applicant's knowledge, no way has been found to produce a satisfactory conducting lubricant.

The main objects of the present invention are to avoid the above and other objections and provide a simple, compact and efficient conductor of the character described which may be readily and quickly produced in quantity from material readily obtainable and which can be accurately installed at any time or place without the need of experts, specialists or skilled labor.

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 plan view of a supporting roller bearing assembly with connecting arms, the hub and roller being omitted, with invention applied;

Fig. 2 is a fragmentary end view through the hub and bearing at one end, broken away, with the invention applied;

Fig. 3 is a perspective view, enlarged, of a grease retainer ring, with invention applied; and

Fig. 4 is a diagrammatic view showing the relative position of the support rolls of a tank caterpillar tread.

The brackets extended from the tank body for bolting to the connecting arms on the ends of the supporting rollers are all well known, as are the various constructions and arrangements of the same for tanks and similar equipment as made by different corporations. It is believed that no useful purpose would be served by further descriptions or illustrations along that line since it forms no part of the present invention.

In the present instance, the invention has been shown as applied to a supporting roller of a tank caterpillar tread. It will be obvious that either the construction of the invention or its full equivalent may be equally well applied in many other arrangements where there are bearing assemblies in which there is a hub and a shaft within the hub, with rotation of one relatively to the other, where roller anti-friction elements are interposed.

Referring to the drawings in detail 1 is the shaft or axle of a supporting roller of a tank caterpillar tread, 2 the hub, 3 a roller bearing cage disposed on the shaft in usual and well known manner and carrying a set of roller bearings 4 which ride on the outer race or bearing surface 5 secured in usual and well known man-

ner in the hub 1. A grease retaining ring 6 of usual and well known construction is securely seated in hub 2 a short distance inwardly of the outer end. Ordinarily it is a press fit and its location is close to but not actually contacting cage 3. This grease retainer is provided with the usual well known yielding spring pressed felt band which is in continuous wiping contact with a sleeve 8 on shaft 1 as will later appear. Retainer 6 is provided with a collar or axially extending peripheral or circumferential wall or flange 7 around its outer diameter. In assembled relation, the flange is on the opposite side relatively to the bearing cage 3 and, therefore, directed toward the outer end of the hub 2. Since flange 7 operates primarily to retain the wire 10, hereinafter described, it need be only of sufficient height for that purpose. Threaded upon the outer end of shaft 1 to travel longitudinally thereof for adjustment of the roller bearing, in usual and well known manner, is a sleeve 8 provided with an outer radial flange, disc, or plate 9. In assembled relation, the sleeve is concentric with the shaft, roller bearing and grease retaining ring and has snug but free sliding fit through the grease retaining ring. As the sleeve is turned up on the shaft it engages the bearing cage and carries the bearings in it against the race 5 thereby taking up any wear. It is the usual well known roller bearing adjusting means.

Flange 9 is of only very slightly less diameter than the bore in hub 2 or the outer diameter of the grease retainer 6, as will be clear on reference to Fig. 2. In assembled relation, flange 9 is appreciably spaced axially or longitudinally from the grease retainer ring 6. As previously stated, the ring 6 is press fitted into hub 2, and the flange 9 is threaded onto shaft 1. As is well understood, there is, at all times, a considerable quantity of grease or lubricant between 6 and 9, and their respective surfaces are continually coated with an insulating lubricant layer or film. To prevent arcing at this point, the film must be penetrated and kept continuously penetrated by a conductor. The present invention accomplishes this result by a resilient, small diameter wire such as a piano wire 10 in the general approximate outline of a circle having the approximate outside diameter of the inside diameter of flange 9. Throughout its circumference, this resilient or spring wire is convolute or formed with gradual bends extending longitudinally of the assembled unit and alternately in opposite longitudinal directions. The convolutions 11 are of such dimensions that when assembled between flange 9 and grease retainer 6, the convolute wire will exert appreciable pressure on both the flange 9 and the retainer 6. This pressure will be exerted at or along very short narrow lines little more than points, i. e., only where the peak or high point of each convolution engages the face of the flange or the face of the grease retainer ring. The small diameter of the wire, its resilience, its pressure and the extremely small area of contact assure penetration of the lubricant film by it at all times. In addition, the number of convolutions or contact points maintains a conducting contact at all times between shaft 1 and hub 2.

Many exhaustive tests under actual working conditions clearly establish the fact that the invention is very highly efficient in maintaining arc preventing electrical contact or continuity.

While, in describing the invention, reference has been made to tanks and half-tracks it is to be clearly understood that applicant has not made such reference with any thought or intention of, in any degree, limiting the invention to any such uses. There are many other uses both in vehicles and in many other types of machinery, far too numerous to mention here, in which this invention may be used. Wherever there are two concentrically disposed members with relative rotation therebetween, with roller bearings therebetween and means for adjusting those roller bearings in a similar manner to that herein disclosed, this invention may be used.

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 several 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 wherein only one preferred form has been illustrated purely by way of example and with no thought or intent to, in any degree, limit the invention thereby.

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

1. In combination two concentrically disposed members one revoluble relatively to the other, a grease retaining ring carried by one member, a flange carried by the other member and axially spaced from said ring, a wire conducting ring concentric with said two members and interposed between said retaining ring and said flange under compression and constantly in electrical conducting contact with both said ring and said flange, and means carried by said retaining ring and engaging and maintaining said conducting ring in operative position between said retaining ring and said flange.

2. In combination two concentrically disposed members one revoluble relatively to the other, a grease retaining member carried by one member, a flange carried by the other member and axially spaced from said retaining member, a wire conducting ring concentric with said two members and interposed between said retaining ring and said flange under compression, said conducting ring being provided with a plurality of alternately oppositely axially directed convolutions simultaneously constantly maintaining electrical contact through a plurality of points on both said retaining ring and said flange and an axially directed peripheral flange carried by said grease retainer and confining the aforesaid wire conducting ring in operative position.

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