

Nov. 25, 1958

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2,861,755

TORQUE-COIL FORM FOR PERMANENT MAGNET GYRO

Filed May 5, 1954

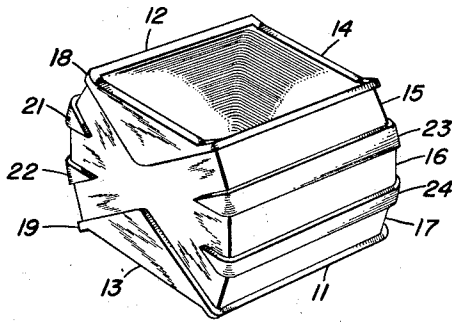


FIG. 1

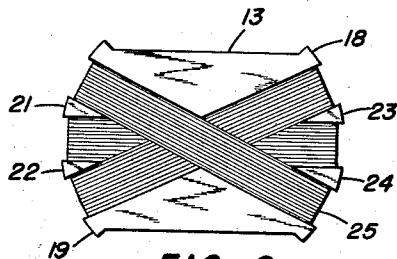


FIG. 2

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## TORQUE-COIL FORM FOR PERMANENT MAGNET GYRO

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Application May 5, 1954, Serial No. 427,895

1 Claim. (Cl. 242-118)

The present invention relates to a torque-coil form and more particularly to a torque-coil form for a permanent-magnet gyro in which a permanent-magnet, moving coil movement is used to balance gyro precessional torques about the gyro gimbal axis.

Prior to the present invention, the torque-coil form generally used was shaped like that portion of a right circular cylinder lying between two planes parallel to each other and to the axis of the cylinder and spaced a distance less than the radius of the cylinder from the axis. The surfaces of the form which carried the winding were evenly varnished to insulate the winding from the form and the required number of turns were wound upon the form in such a way that the active sides of the turns became elements of a right circular cylinder. The heretofore known form was unsatisfactory because of the difficulty in insulating the winding from the form, it being impossible to use fish paper because of the shape of the form and because of the difficulty in applying an even coat of varnish to the form. In addition, successive turns of the winding were of different length because the inactive sides were circular chords of varying length, thus creating a tendency of those turns about the center portion of the form to slip to positions occupied by the shorter turns. The present invention avoids the disadvantages of the prior known forms by providing diametrically opposed flat bearing surfaces for the turns of the winding to be wound upon.

An object of the present invention is the provision of a torque-coil form for permanent-magnet gyros wherein flat sheets of insulating material can be used to insulate the winding from the form.

Another object of the present invention is the provision of a torque-coil form which permits the turns of the winding to be wound on diametrically opposed flat surfaces.

A further object is the provision of a torque-coil form which ensures that all turns of the winding are of equal length.

Other objects and many of the attendant advantages of this invention will be readily appreciated as the same becomes better understood by reference to the following detailed description when considered in connection with the accompanying drawing wherein:

Fig. 1 is a perspective view of a torque-coil form according to the present invention, and

Fig. 2 is an elevation view of one end of the torque-coil form showing the winding in position.

Referring more particularly to the drawing, the torque-coil form shown in Fig. 1 is a hollow modified right cylindrical member consisting of oppositely disposed arcuate side surfaces 11 and 12 joined only at their ends by the end surfaces 13 and 14. Like the prior known forms, the form of Fig. 1 is that portion of a right circular cylinder lying between two planes parallel to each other and to the cylinder axis and spaced a distance less than the radius from the axis of the cylinder. Spaced about the exterior of the form are a plurality of flat bottom peripheral grooves 15, 16 and 17 traversing the length of each of the sides 11 and 12 and extending across each of the ends 13 and 14 through the geometrical centers thereof. The grooves are separated from each other

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over the lengths of the arcuate sides by the interior lands 21, 22, 23, and 24. The exterior lands 18 and 19 extend entirely around the edges of the form and define the outer edges of grooves 15 and 17. The various lands are straight throughout the lengths of the arcuate surfaces, but taper as shown in Fig. 1 at each end surface. The interior lands each taper to a point at each end, while the exterior lands each taper to an increased width at each end to define but a single groove at the center thereof.

Fig. 2 shows the winding 25 in place on the form of Fig. 1 and illustrates the manner in which the interior and exterior lands are tapered. The winding is insulated from the coil form by means of three strips of fish paper or similar insulating material placed in the bottom of the grooves, the turns of the winding are then wound over the insulating material. The winding is wound in three bands of turns, one band in each of the grooves. The center band is wound first by beginning at either end and proceeding around the form in groove 16. The last turn of the center band is led into one of the other grooves by laying it against one of the exterior lands adjacent the center of one end surface and continuing the winding in one of the outer grooves. The last turn of the second band is then laid against the other exterior land and led into the remaining groove where the turns of the third band are then wound. Thus a continuous winding of three bands is accomplished.

The turns of the winding are easily wound upon and insulated from the coil form of the present invention. The flat bottom grooves permit the turns to be wound upon flat surfaces so there is no tendency of the turns to slip from one position to another. In addition, the lands between the grooves hold the turns in position and provide definite guides for winding of the turns on the form.

Obviously many modifications and variations of the present invention are possible in the light of the above teachings. It is therefore to be understood that within the scope of the appended claim, the invention may be practiced otherwise than as specifically described.

What I claim is:

A coil form comprising: a modified portion of a right circular cylindrical shell, said portion having arcuate surfaces whose radial limits are defined by two planes which are spaced a distance less than the cylinder radius on opposite sides from and parallel to the cylinder axis; two parallel end surfaces having straight sides determined by said two parallel planes, said end surfaces being arranged orthogonally to the cylinder axis; exterior lands extending entirely around the edges of said portion, said lands being straight throughout the lengths of the arcuate surfaces but tapering to a point on the end surfaces; interior lands on said arcuate surfaces having first portions with sides parallel to the cylinder axis and second portions on said end surfaces which are tapered, whereby the exterior and interior lands define a single groove at the centers of said end surfaces; and equi-sized diametrically opposed pairs of flat bottomed grooves equal in width to that of said single groove, all of said grooves having a common juncture in said single groove.

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