受験番号：22IPM005

問 1

[0002]　Golf clubs (hereinafter referred to as clubs) are most required of attaining large flying distances and high resistances to bending.　Although such characteristics are important for the clubs, golfers are greatly interested in selecting clubs suitable for them.　Clubs have been manufactured to date in consideration of static characteristics such as the length of club shafts (hereinafter referred to as shafts), balance, club weight, and shaft hardness, and golfers have no choice but to determine or guess such characteristic values based on their experiences or select only by intuition.

[0003]　On the other hand, based on the fact that a golf swing is a dynamic behavior, selection of clubs in consideration of dynamic characteristics of clubs, that is, eigen frequency (that refers to a primary binding eigen frequency), has attracted attention. The eigen frequency depends on flexural rigidity of a shaft, shaft weight, shaft length, and weight of a club head (hereinafter referred to as a head), which is summarized as follows.　Specifically, a shaft warps and recovers in a down swing, and the head speed is supposed to be at maximum when the shaft recovers to be straight.　Thus, if the club hits a ball at this point of time, the maximum flying distance in this swing can be obtained.　(As long as the face of the head is appropriately oriented), such swing behavior is supposed to be affected by the eigen frequency of the golf club.　In the case of using a club having an eigen frequency lower than an optimum eigen frequency, the club hits the ball before the maximum head speed.　On the other hand, in the case of using a club having an eigen frequency higher than the optimum eigen frequency, the club hits the ball after the maximum head speed.　In either case, the ball is expected to fly in an insufficient distance to an insufficient direction.

問 2

[0025]　As illustrated in FIG. 3, when the flange 10 of the cage 7 is pressed against a side surface of the outer race 2, a frictional force is generated on the contact surface to serve as a rotational resistance of the cage 7.　When the frictional force then exceeds an elastic force of the elastic body 11, relative rotation of the inner race 1 and the cage 7 occurs, and the roller 6 is engaged with the cylinder surface 3 and the cam surface 5 so that rotation of the inner race 1 is transferred to the outer race 2 through the roller 6. The relative rotation of the inner race 1 and the cage 7 elastically deforms the elastic body 11.

[0026] While a rotational torque is being transferred from the inner race 1 to the outer race 2, when an axial load applied to the flange 10 is canceled, the elastic body 11 elastically recovers to cause the cage 7 to rotate toward a neutral position. This rotation cancels the engagement of the roller 6 with the cylinder surface 3 and the cam surface 5 so that idle rotation of the inner race 1 occurs. Since the elastic body 11 is interposed between the inner race 1 and the cage 7, the roller 6 revolves together with the cage 7.

[0027] At this time, the roller 6 is biased by the elastic piece 9 toward the inner periphery of the outer race 2 so that movement of the roller 6 in a radially inward direction of the cage 7 is reduced or prevented. Accordingly, while the inner race 1 rotates at a low speed, the roller 6 behaves stably, and a small drag torque is applied to the cage 7. Thus, the roller 6 is not erroneously engaged with the cylinder surface 3 and the cam surface 5.

[0028] In addition, since the elastic piece 9 reduces or prevents movement of the roller 6 in a radial direction of the cage 7, the roller 6 does not repeatedly collide with the cylinder surface 3 and the cam surface 5, and vibrations due to collision of the roller 6 hardly occur. As a result, a two-way roller clutch with excellent vibration characteristics can be obtained.

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1. An electromagnetic bearing (10) for an axial member (11) including a rotation shaft (12) and having a distal region extending outward from the rotation shaft (12), the electromagnetic bearing (10) comprising:

a magnetic iron-based member (14) including a coil (15) and a pair of projections (20, 21) and extending over the distal region of the axial member (11), the pair of projections (20, 21) having opposed surfaces opposed to the axial member (11), the opposed surfaces defining a magnetic flux control gap at each axial end in the rotation of the axial member (11), the coil (15) being configured to generate an electromagnetic control magnetic flux passage (22) through the magnetic flux control gap so that the axial member (11) is positioned in an axial direction with respect to the magnetic iron-based member (14); and

a pair of annular permanent magnets (16, 17) mounted on the magnetic iron-based member (14), having opposed surfaces opposed to the axial member (11), and defining a pair of magnetic gaps at locations radially separated from the magnetic flux control gap, the pair of annular permanent magnets (16, 17) being configured to generate, through the pair of magnetic gaps, bias magnetic flux paths (18, 19) parallel to the electromagnetic control magnetic flux passage (22) and each different from the electromagnetic control magnetic flux passage (22) in a portion longer than a half of a length thereof.