★★★ ＜第22回知的財産翻訳検定試験【第12回和文英訳】＞ ★★★
≪１級課題-機械工学-≫

【問 1】

[0002]

It is most important for a golf club (hereinafter, "club") be able to hit a ball straight and far without readily curving. Aside from demanding such characteristics of clubs, a major interest of golfers is to find clubs best suited to themselves. Clubs have conventionally been manufactured taking into consideration static characteristics such as club shaft (hereinafter, "shaft") length, balance, club weight, shaft hardness, and so forth. Golfers have had no choice but to determine or guess these characteristics values based on their own past experience, or to make their selection based purely on intuition.

[0003]

On the other hand, a golf swing involves dynamic behavior. Selecting clubs taking dynamic properties, i.e., the natural frequency (indicating primary flexural natural frequency) of the club into consideration, has gathered some attention. This natural frequency is a quantity governed by the flexing rigidity of the shaft, shaft weight, shaft length, and club head (hereinafter "head") weight, and can be summarized as follows. The shaft is flexed and restored during a downswing, and it is believed that the head speed is greatest at the instant that the shaft reaches its straight state. Thus, the longest carry should be attainable by striking the ball at this point, provided that the face of the head is correctly oriented. It is said that this sort of behavior of the shaft during the swing is related to the natural frequency of the club. If the natural frequency of a club happens to be smaller than an optimal value, the head will reach the impact point before the greatest speed is attained. If the natural frequency of the club happens to be larger, the head will reach the impact point after the greatest speed is attained, and conceivably both distance and direction will suffer.

【問 2】

[0025]

When the flange 10 of the retainer 7 is pressed against the side face of the outer race 2, as illustrated in Fig. 3, frictional force acts on the fact of contact, serving as rotational resistance of the retainer 7. Upon the frictional force exceeding the elastic force of the elastic member 11, the inner race 1 and retainer 7 rotate relative to each other. The roller 6 is engaged with the cylindrical face 3 and cam face 5, thereby transmitting the rotation of the inner race 1 to the outer face 2 through the roller 6. The relative rotation of the inner race 1 and retainer 7 also causes elastic deformation of the elastic member 11.

[0026]

Disengaging the axial load on the flange 10 in the state where the rotational torque is being transmitted from the inner race 1 to the outer race 2 causes the retainer 7 to rotate toward the neutral position, due to the elastic restoring force of the elastic member 11. This rotation of the retainer 7 disengages the roller 6 from the cylindrical face 3 and cam face 5, and the inner race 1 spins free. The elastic member 11 is interposed between the inner race 1 and the retainer 7, so the roller 6 revolves along with the retainer 7.

[0027]

The roller 6 is urged toward the inner periphery of the outer race 2 by the elastic piece 9 at this time, and movement of the retainer 7 in the radial direction is inhibited. Accordingly, the behavior of the roller 6 during low-speed rotation of the inner race 1 is stable, drag torque on the retainer 7 is small, and unintended engagement of the roller 6 with the cylindrical face 3 and cam face 5 can be avoided.

[0028]

Moreover, the elastic piece 9 prevents the retainer 7 from moving in the radial direction, so the roller 6 does not repeatedly collide with the cylindrical face 3 and cam face 5, meaning that there are hardly any vibrations generated from the roller 6 colliding. This provides a two-way roller clutch with excellent vibration characteristics.

【問 3】

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

an annular magnetic ferrous member (14) having a single coil (15) and a pair of protrusions (20, 21), the magnetic ferrous member (14) straddling the distal region of the thrust member (11), the pair of protrusions (20, 21) having opposed surfaces opposed to the thrust member (11) to define magnetic flux control air gaps at both end sides of the thrust member (11) in an axis of the rotation, and the coil (15) generating an electromagnetic control flux path (22) through the magnetic flux control air gaps so as to axially position the thrust member (11) relative to the magnetic ferrous member (14); and

a pair of annular permanent magnets (16, 17) mounted on the magnetic ferrous member (14), the pair of permanent magnets (16, 17) having opposed surfaces opposed to the thrust member (11) to define a pair of magnetic air gaps radially spaced from the magnetic flux control air gaps, the pair of annular permanent magnets (16, 17) generating bias magnetic flux paths (18, 19) through the pair of magnetic air gaps, the bias magnetic flux paths (18, 19) being each parallel to the electromagnetic control flux path (22), and the bias magnetic flux paths (18, 19) being

non-coincident with the electromagnetic control flux path (22) for more than a half of a length of each of the bias magnetic flux paths (18, 19).