Apparatus for retrieving a golf ball, wherein a line is attached to the ball and a reel automatically rewinds the line to return the ball after the ball has been driven. The motor is connected with the reel through a clutch that allows the line to be unwound from the reel with a selected tension and to be rewound by the motor.
GOLF BALL RETREIVING APPARATUS

BACKGROUND OF THE INVENTION

This invention relates to amusement devices and more particularly, to apparatus for practicing golf.

In the game of golf, it is important to be able to swing the golf club in a manner that will drive the golf ball at the desired distance and direction. Most golfers find it necessary to spend time regularly in practicing their golf swing in order to maintain their proficiency. There are golf driving ranges where golfers can rent a bucket full of golf balls and drive these balls into the field or range provided. It may be inconvenient to travel to such golf driving ranges for practice and another disadvantage is that other golfers practicing nearby at the golf driving range may distract the golfer’s attention.

Another method of practicing is to collect a bag of golf balls and take them to an open field where they can be driven from one end to the other. This method is very time consuming because it is necessary to walk to the opposite end of the field and to pick up the golf balls when the bag is empty. Also, it may be just as inconvenient to travel to the open field as it is to travel to a golf driving range.

SUMMARY OF THE INVENTION

In view of the disadvantages of conventional golf practicing methods, it is an object of this invention to provide a convenient method and device for use in practicing golf.

Another object of this invention is to provide apparatus which will allow the golfer to practice golf in areas of limited size.

Another object of this invention is to provide apparatus for practicing golf which requires only a single ball and eliminates the problems of retrieving the golf ball.

These objects are accomplished in accordance with a preferred embodiment of the invention by apparatus for retrieving the golf ball. The apparatus includes a head with a spool on which a light line is wound. The end of the line is attached to a golf ball and when the ball is struck by a golf club, the motion of the ball pulls the line from the spool. An adjustable brake is applied to the spool to control the tension in the line and thereby reduce the distance that the ball travels. An electric motor is connected with a spool winding mechanism that includes a clutch that is energized by operation of the motor to wind the line on the spool. In one embodiment, the clutch is operated by axial displacement of the armature of the motor, and in another embodiment, the clutch is operated by centrifugal force due to the rotation of the reel.

DETAILED DESCRIPTION OF THE DRAWINGS

These preferred embodiments are illustrated in the accompanying drawings in which:

FIG. 1 is a perspective view, partially schematic, of the golf ball retrieving apparatus of this invention;

FIG. 2 is a longitudinal cross sectional view of the apparatus along the line 2—2 in FIG. 1;

FIG. 3 is a cross sectional view of the apparatus along the line 3—3 in FIG. 2;

FIG. 4 is a perspective detail view of the spool bearing;

FIG. 5 is a cross sectional view of a modified form of the motor shaft bearing;

FIG. 6 is a longitudinal cross sectional view of an other embodiment of the golf ball retrieving apparatus; FIG. 7 is a cross sectional view of the apparatus along the line 7—7 in FIG. 6; and FIG. 8 is a cross sectional view as in FIG. 7, but showing a modified form of the apparatus.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring to FIG. 1, the golf ball retrieving apparatus of this invention includes a carrying case 2 with a hinged top. The electric motor 4 and the reel mechanism 6 are mounted in the bottom of the case 2. An electrical switch 8 is also mounted in the case 2. In FIG. 1, a battery 10 for operating the motor 4 is shown schematically and may include a separate battery unit, or a battery unit incorporated in the case 2. Also, the motor may be driven by any other suitable source of electric power, if desired. A line 12 extends from the reel mechanism 6 and is secured to the golf ball 14, which is positioned on a golf tee to be driven in the direction of the arrow in FIG. 1.

The motor 4 is mounted on a pair of brackets 16 secured to the bottom of the case 2, as shown in FIG. 2. The motor 4 includes a housing 20 in which a field winding 22 is mounted. An armature 24, which includes an armature shaft 26, is journaled in suitable bearings 28 in the housing 20. Fan blades 30 are also mounted on the shaft 26.

As shown in FIG. 2, the armature 24 is offset toward the right as viewed in FIG. 2 when the motor is deenergized. When the motor is energized, the magnetic flux between the field winding 22 and the armature 24 urge the armature to move toward the left until the armature is positioned approximately mid-way of the length of the field windings 22. This position is illustrated schematically by arrows 32 which are aligned when the motor is energized. Motors of this type are available commercially.

The end of the shaft 26 has a counterbore 34 to receive a compression spring 36. A cap 38 is secured to the housing 20 and the interior of the cap 38 forms a seat for a ball 40. The end of the spring 36 bears against the ball 40 and since the ball rotates with the shaft 26, torsional stresses on the spring 36 are reduced. The spring 36 continuously urges the shaft 26 toward the right as viewed in FIG. 2, but allows longitudinal displacement of the shaft 26 relative to the bearings 28 when the motor 4 is energized.

A winding mechanism 42 is mounted on the end of the motor housing 20 and includes a mounting plate 44. A bearing block 46 is secured on the mounting plate 44, and the shaft 46 extends through a central bore in the mounting block 46. A line guide 48 is in the form of a disc with a circumferential flange 49 is secured on the end of the shaft 26 by a threaded nut 50. A rotary spool 52 is supported on the exterior of the bearing block 46 for rotation.

A brake is provided in the winding mechanism 42 and includes a brake shoe 54 which is inserted in a radial slot 56 in the bearing block 46, as shown in FIGS. 2 and 4. The block 46 also has a longitudinal passage 58 through which a brake lever 60 extends. The brake lever 60 also extends through the mounting plate 44 and is pivoted on an edge 62 of the opening through which the lever extends. An adjustment screw 64 is threaded into the tubular spacer 66 and the end of the screw 64 is received in a hole provided in the lever
which guides the lower end of the screw. A compression spring 68 is mounted coaxially on the lower end of the screw 64 and is compressed between a shoulder on the screw and the surface of the lever 60, as shown in FIG. 4. When the screw 64 is advanced, it compresses the spring 68 and urges the brake shoe 54 radially outward relative to the body 46, thereby increasing the braking torque on the spool 52.

Winding the line 12 on the spool 52 is accomplished by a retractive pin 70 as shown in FIG. 3. Extension and retraction of the pin 70 is controlled by a cam 72 at the outer end of the bearing block 46 and an intermediate cam 74 which is positioned between the end face and the block 46 and the cam 72.

A cam follower 76 is mounted for longitudinal movement in a bracket 78 which is mounted on the disc 48. The pin 70 is mounted in one end of the follower 76 and the opposite end of the follower bears against the cam surface 72 when the pin 70 is retracted. A spring 80 continuously urges the follower 76 downwardly, as viewed in FIG. 3.

In order for the end of the follower 76 to bear on the intermediate cam surface 74, it is necessary to displace the lower end of the cam follower toward the left, as viewed in FIG. 2. This occurs when the motor is energized, since the shaft 26 moves toward the left, as viewed in FIG. 2. At the same time, the shaft rotates, causing the follower to ride along the cam surface 72 until it reaches the cylindrical cam surface 74. As the follower 76 moves outwardly, it displaces the pin 70 through a hole 82 until it projects above the surface of the flange 49 on the disc 48 a sufficient distance to engage the line 12. When the motor is de-energized, the shaft returns to the position shown in FIG. 2, thereby displacing the lower end of the follower 76 into engagement with the outer cam surface 72, and allowing the pin 70 to retract.

A cover 84 is mounted over the spool and disc. The cover includes a frusto-conical end portion 86 with a central opening 88. The line 12 passes through the opening 88 and over the flange on the disc 48 and is wound on the spool 52.

As shown in FIG. 2, the line 12 also passes through a hole 90 formed in the switch lever 92 of the electrical switch 8. When the golf ball is hit, sufficient tension is applied in the line 12 to swing the switch lever from the full line position to the dotted line position, thereby energizing the motor 4. Of course, the switch lever 92 may be operated manually by providing sufficient spring force on the lever 92 to resist displacement from one position to the other, and in that case, the hole 92 merely serves as a guide for the line 12.

In operation, the case 2 is positioned as shown in FIG. 1, with the golf ball 14 mounted on the tee and the switch is in the "off" position. The tension screw 64 is adjusted to apply the desired braking action to the spool 52. As soon as the golf ball has been driven in the direction of the arrow in FIG. 1, the line 12 is pulled from the spool 52 and through the opening 88. When the ball comes to rest, the operator manually displaces the switch lever 92 to the "on" position, thereby energizing the motor 4. As soon as the shaft 26 begins to rotate, the follower 76 displaces the pin 70 outwardly. As the disc 48 rotates, the pin 70 picks up the line 12 and winds it on the stationary spool 52. Winding continues until the ball returns and engages the lever 92 to displace it from the dotted line position to the full line position shown in FIG. 2. Preferably, the speed of the shaft 26 is about 750 revolutions per minute, although it may be operated in the range of between 500 and 1,000 revolutions per minute.

A modified form of the apparatus of FIG. 2 illustrated in FIG. 5. In FIG. 5, the shaft 26 is journaled in bearings 28. A tubular extension 27 is secured to the housing 20 and is internally threaded at its outer end to receive a threaded plug 29. A compression spring 36' abuts against the plug 29. The opposite end of the spring supports a bearing cup 31 and a ball 40' serves as a thrust bearing for the shaft 26. By turning the plug 29, the axial force on the shaft 26 can be adjusted.

In the embodiment of FIG. 6, a conventional motor 94 in which the motor shaft 96 does not move longitudinally drives the winding mechanism 98. The winding mechanism 98 includes a pair of mounting plates 100 and 102 which are spaced apart and support a rotary shaft 104. The shaft 104 is journaled in a bearing block 106 corresponding to the bearing block 46 in FIG. 2.

The bearing block 106 supports a spool 108 on its outer surface and the bearing block includes a brake shoe 110 which is operated by a brake lever 112. The brake is substantially identical to the brake shown in FIG. 2.

A tension adjusting screw 114 is threaded in a cylindrical spacer member 116 and extends through a sleeve 118 on the mounting plate 102. A spring 120 is compressed between a shoulder on the screw 114 and the lever 112 in the same manner as illustrated in FIG. 4.

The shaft 104 is driven by the motor shaft 96 through speed reduction gears 122 and 124. A disc 126 is secured on the end of the shaft 104 by a nut 128. The disc 126 has a peripheral flange 127 and, as shown in FIG. 7, a pin 130 extends through a hole in the flange. The inner end of the pin 130 is supported for sliding movement in a sleeve 132 secured on the back of the disc 126. A weight 134 is secured on the pin 130 and is movable toward and away from the interior of the flange on the disc 126. A naturally flat leaf spring 136 bears at opposite ends against the peripheral flange 127 and urges the weight 134 toward the position shown in FIG. 7. As the disc 126 rotates, however, the centrifugal force of the weight 134 displaces the weight outwardly, thereby projecting the end of the pin 130 outwardly and into position to engage the line.

In operation, after the line has been pulled from the spool 108, the motor 94 is energized, causing the shaft 104 to rotate relative to the bearing block 106, thereby rotating the disc 126. When the disc has attained sufficient speed, the force of the spring 136 is overcome and the weight 134 displaces the pin outwardly to engage the line and to wind the line on the spool 108. A modified form of the pin projecting device is shown in FIG. 8. In this form, a curved weight 138 is pivotally mounted on the disc 126' by means of a rivet or the like. The pin 130' is displaced outwardly relative to the disc flange as the disc rotates. A tension spring 142 continuously urges the weight 138 toward the position shown in FIG. 8, thereby retracting the pin 130 when the disc 126' stops rotating.

While this invention has been illustrated and described in several embodiments, it is recognized that variations and changes may be made therein without departing from the invention as set forth in the claims.

What is claimed is:

1. A golf ball retrieving device comprising: a winding mechanism having a spool,
motor means having field windings and a rotary shaft and having an armature mounted for rotation on said shaft concentric with said field windings; said winding mechanism including a disc guide secured on said rotary shaft, said winding mechanism also including a line engaging pin, means mounting said pin on said disc guide for longitudinal movement between a retracted position and a projected position relative to said disc guide; and said motor means including displacement means to displace said shaft axially in response to electric current in said field windings, and said pin mounting means including means to displace said pin toward said projected position upon concurrent rotation and axial displacement of said shaft in response to electric current in said field windings.

2. The golf ball retrieving device according to claim 1 wherein said displacement means includes spring means biasing said shaft toward a first axial position and includes means mounting said armature axially offset from said field windings when said shaft is in said first position, and said armature being aligned axially with said field windings when said shaft is displaced axially to a second position in opposition to said spring means.

3. The golf ball retrieving device according to claim 2 including bearing means supporting said spool and said shaft for concentric rotation, said pin mounting means includes cam means fixed relative to said bearing means, said cam means being arranged to displace said pin toward said projected position upon rotation of said disc by said shaft concurrently with axial displacement of said shaft to said second position.

4. The golf ball retrieving device according to claim 3 wherein said cam is divided between an outer portion and an intermediate portion having a cam surface supporting said pin in said retracted position and said intermediate cam having a surface maintaining said pin in a projected position, said pin being displaced from said outer cam to said intermediate cam upon axial displacement of said shaft by operation of said motor.

5. The golf ball retrieving device according to claim 1 wherein said pin displacing means includes a weight on said disc guide, said pin being secured to said weight and movable with said weight, and spring means biasing said weight toward the center of said disc guide.

6. The golf ball retrieving device according to claim 1 including case means, switch means in said case means, and guide means on said switch means for engaging a line that is wound on said spool, said winding mechanism including a substantially frusto-conical cover over said spool, said cover having a central opening through which said line extends, and wherein said guide means is aligned with said cover opening, said switch means being operable to start said motor means and to stop said motor means in response to tension in said line between said opening and said switch means.

7. The golf ball retrieving unit according to claim 6 wherein said case means includes a bottom section and a top section, said motor means and said switch means being mounted in said bottom section, said switch means includes a switch lever movable toward said cover opening to support said winding mechanism and said switch means in alignment with each other, whereby the line is pulled from said rotary spool when a golf ball attached to said line is driven along said aligned direction.