Dec. 4, 1934. J. D. WALLACE ET AL 1,983,329

MECHANICAL FIGURE FOR EXEMPLIFYING THE GOLF SWING

Filed Sept. 3, 1932 3 Sheets-Sheet 1

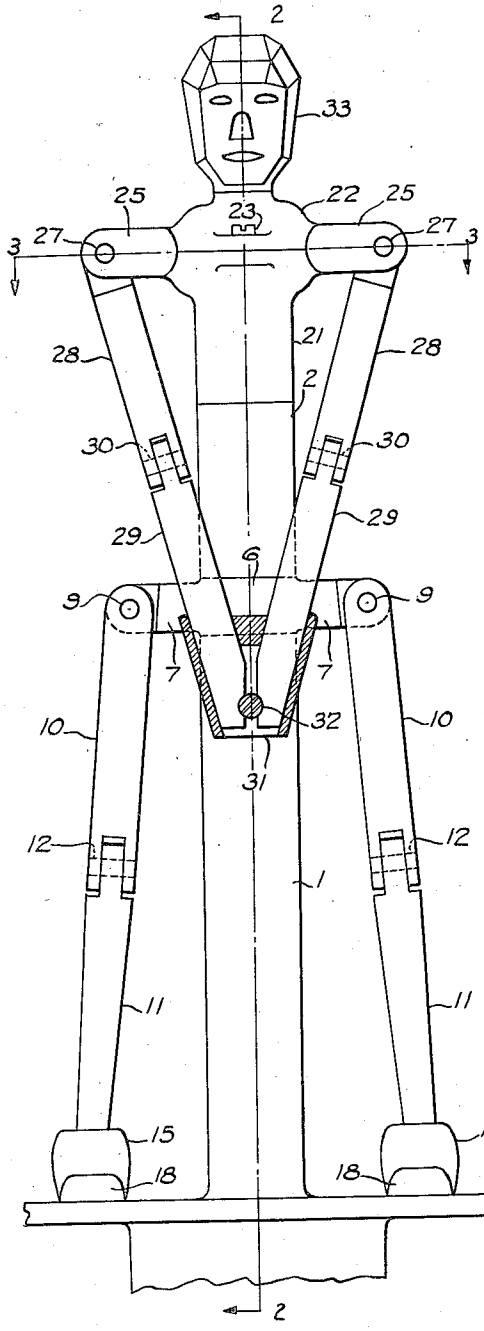


FIG. 1

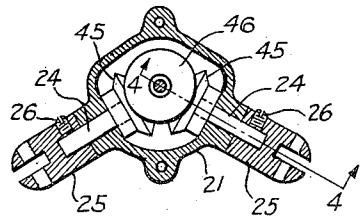


FIG. 3.

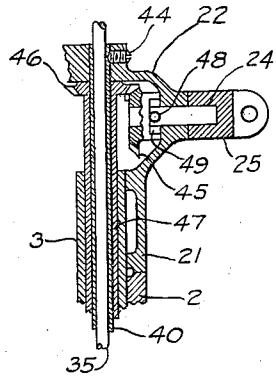


FIG. 4.

FIG. 14.

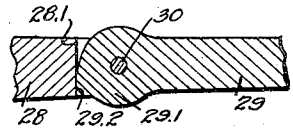
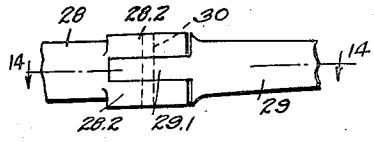


FIG. 13.



Witness,
H. C. Anderson,

INVENTORS,
John D. Wallace, & Clifford H. Landis,
BY
Fisher, Clapp, Soans & Pond,
ATTORNEYS

Dec. 4, 1934. J. D. WALLACE ET AL 1,983,329

MECHANICAL FIGURE FOR EXEMPLIFYING THE GOLF SWING

Filed Sept. 3, 1932 3 Sheets-Sheet 2

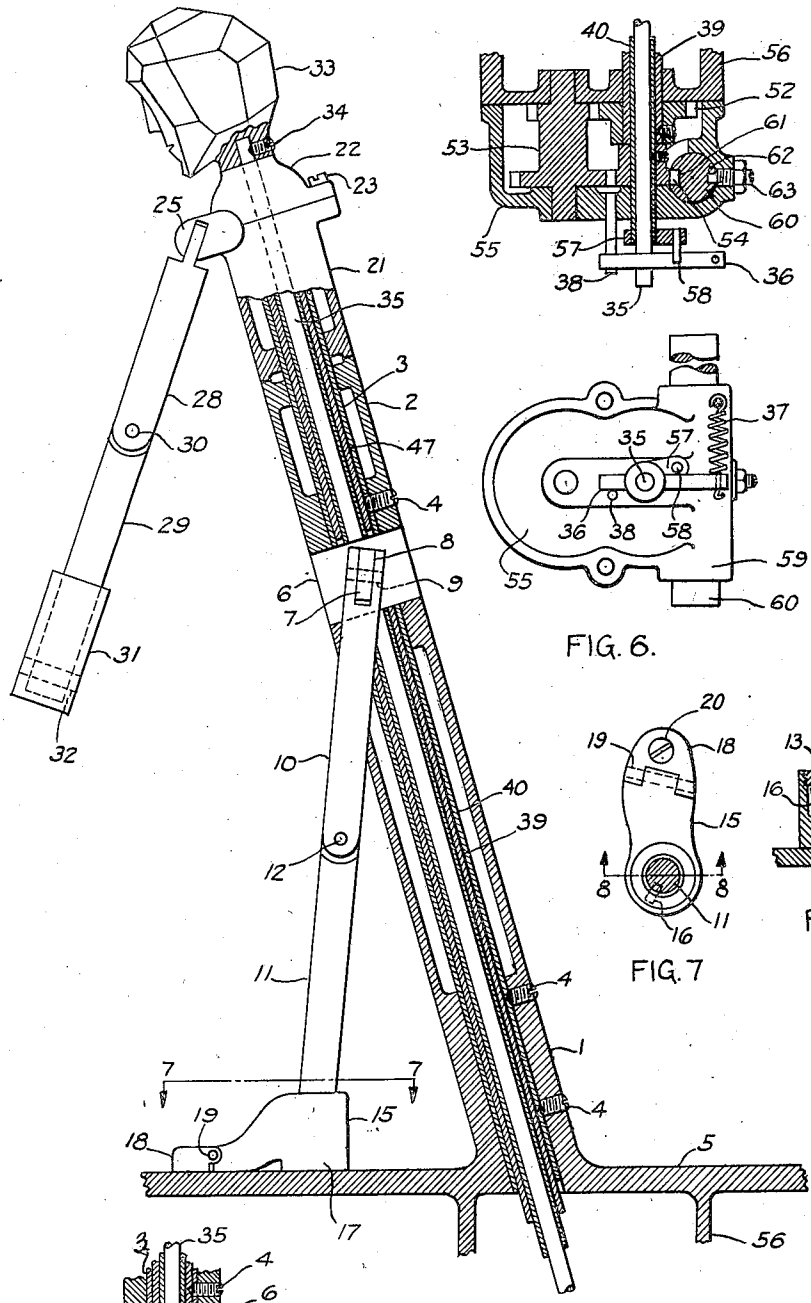


FIG. 2.

FIG. 5.

FIG. 6.

FIG. 7

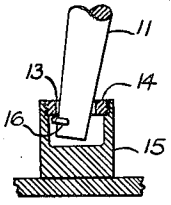


FIG. 8.

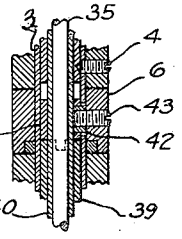


FIG. 9.

Witness,
Kenneth E. Anderson,

INVENTORS,
John D. Wallace, & Clifford H. Landis,
BY
Fisher, Clapp, Soans, & Pond,
ATTORNEYS

Dec. 4, 1934. J. D. WALLACE ET AL 1,983,329

MECHANICAL FIGURE FOR EXEMPLIFYING THE GOLF SWING

Filed Sept. 3, 1932 3 Sheets-Sheet 3

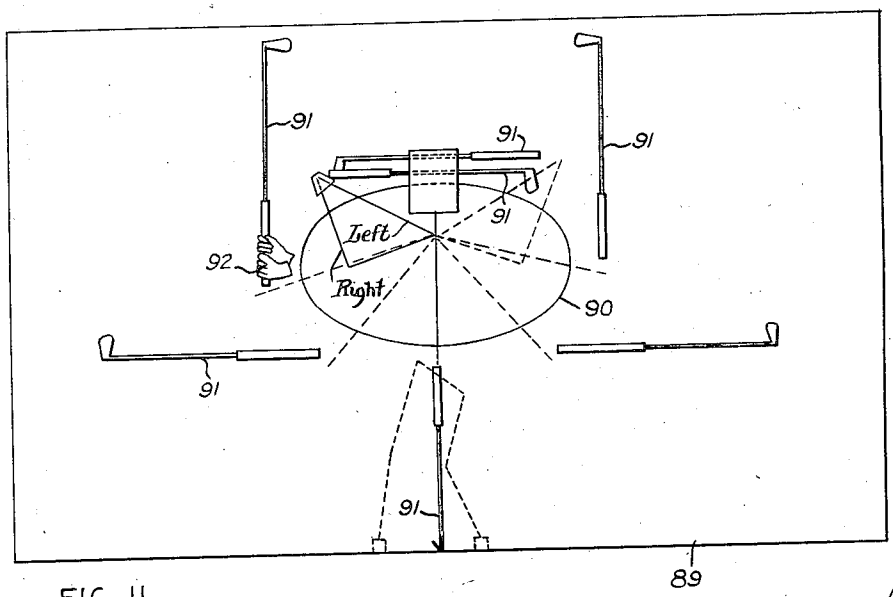


FIG. 11.

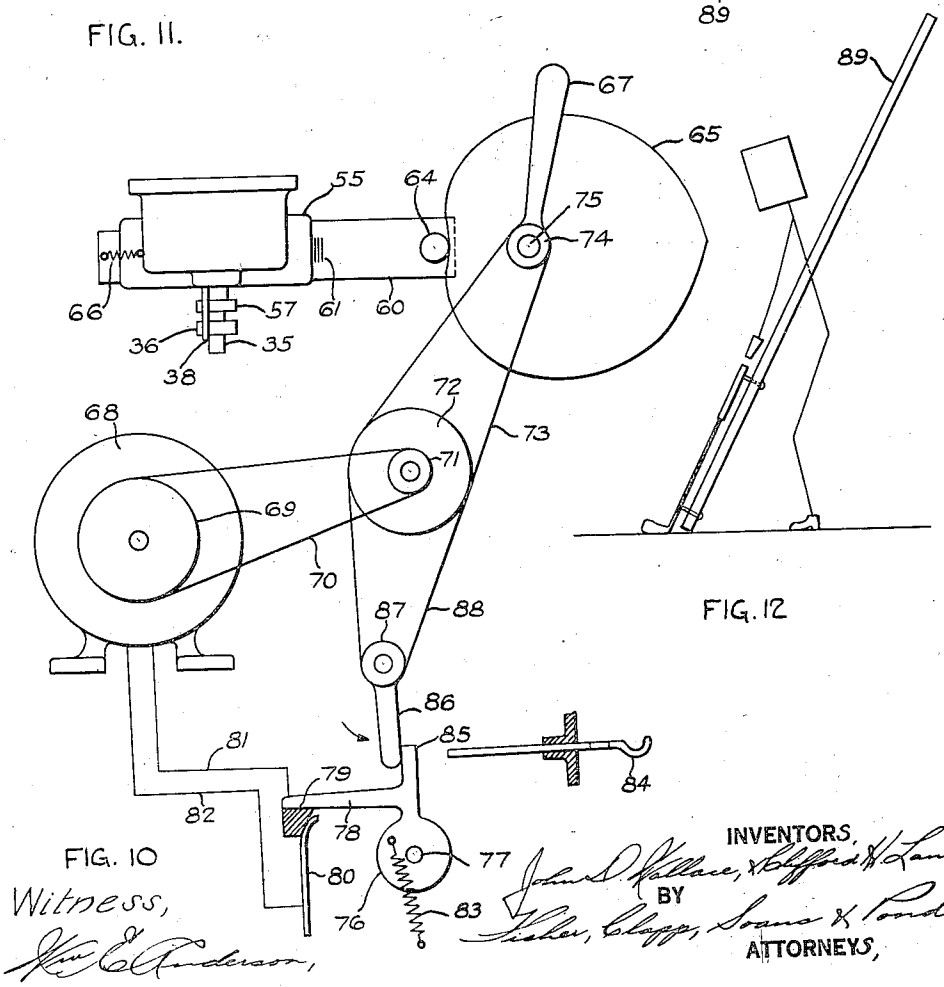


FIG. 10

FIG. 12

Witness,

INVENTORS,

BY

ATTORNEYS,

Patented Dec. 4, 1934 1,983,329

UNITED STATES PATENT OFFICE

1,983,329

MECHANICAL FIGURE FOR EXEMPLIFYING THE GOLF SWING

John D. Wallace and Clifford H. Landis, Chicago, Ill., assignors to J. D. Wallace & Co., Chicago, Ill., a corporation of Illinois

Application September 3, 1932, Serial No. 631,702

22 Claims. (Cl. 35—16)

This invention relates to a mechanical figure, mannequin, skeleton or robot, for teaching the game of golf.

To thoroughly understand this invention, it should be borne in mind that the golf swing is divided into three components, i. e., the back swing, down swing (which is substantially the reverse of the back swing) and the follow through, (which is substantially symmetrical with the back swing). A golf swing is effected by three active or driving members, i. e., the shoulders, left arm, and right arm. In the back swing, the shoulders rotate around the spine as an axis and in a plane perpendicular to the spine, and move from the starting or addressing position, parallel to the line of play, clockwise approximately 90° to a position approximately perpendicular to the line of play. Simultaneously, the left arm swings clockwise around the shoulders as an axis, taking the hand from a position midway between the knee and the hip to a height approximately level with the eyes. In the down swing, the shoulders and also the left arm return to their starting positions. In the follow through, the shoulders continue their rotation from a position parallel to the line of play, counterclockwise to a position approximately perpendicular to the line of play. Simultaneously, the right arm swings counterclockwise around the shoulders as an axis, taking the hand from a position midway between the hip and knee to a height approximately level with the eyes.

In addition to the three active or driving members, there are certain passive or driven members, namely the head, hips, legs, feet, the right arm in the back swing and the left arm in the follow through. In the back swing, the head moves approximately 20° clockwise around the spine as an axis, while the right arm, flexing at the elbow, is carried up by the left arm around the shoulder as an axis. The hips rotate approximately 45° clockwise, the right leg straightens, the left leg flexes at the knee, and the left heel rises from the ground.

In the down swing, all of these passive or driven members return to the starting position. In the follow through, the head moves 70° counterclockwise, around the spine as an axis, while the left arm flexes at the elbow and is carried up by the right arm around the shoulders as an axis. The hips rotate approximately 45° counterclockwise around the spine as an axis and in a plane perpendicular to the spine, the left leg straightens, the right leg flexes at the knee, and the right heel rises from the ground.

All of these combined movements cause the hands to generate an ellipse in an oblique plane, and this generated curve is the resultant of the component curve produced by rotating the shoulders and the superimposed component curve produced by the vertical movement of the arms.

In actual practice, the golf swing as effected by the human body is exceedingly rapid. It has been determined that, at the instant when the ball is struck, the head of a club in the hands of a professional sometimes travels one hundred and twenty-five miles per hour. The great momentum caused by such a fast swing causes certain portions of the body, as for instance the hips and shoulders, to have limited lateral movements in addition to the movements hereinbefore described. These extra movements of the fast swing, however, do not enter in, theoretically, to the so-called perfect golf swing. In the perfect golf swing, we should consider only those movements which are effected when the body moves very slowly.

In teaching the game of golf, consideration should be given only to those movements which effect a slow swing. The lateral movements will be effected unconsciously in actual practice, due to the momentum of the body and, therefore, they should be disregarded in giving instructions.

A few mechanical figures for teaching golf have been marketed and also patented, but they have not been successful mainly because they have been extremely intricate. With such prior devices, an attempt was made to demonstrate the fast stroke and, therefore, a lateral movement was imparted to the hips and shoulders of the robot. A fast moving figure is not satisfactory for instruction purposes because, when the swing is completed in a few seconds, it is impossible for any one to observe the various positions assumed by the active and passive driving members.

The main objects of this invention are to provide an improved mechanical figure adapted to reproduce a golf swing as nearly perfect as possible for instructive purposes; to provide a device of this kind adapted to reproduce the slow swing so as to make it possible for an individual to observe and readily analyze its fundamental movements with a view to imitating its mechanical perfections; to provide improved operating mechanism for moving the various active and passive members; to provide a mechanical figure of this kind in which the entire operating mechanism is concealed so as not to detract from the appearance of the figure; to provide improved means for displaying golf clubs or representations of

golf clubs in definite fixed positions in an oblique plane adjacent the figure for demonstrating the correct position assumed by the club at each of various points in a perfect swing; to provide club display means of this kind which is also adapted to indicate the elliptical path traversed by the hands in effecting a perfect swing; and to provide a device of this kind which is adapted to be operated by the observer either with or without coin-controlled means.

An illustrative embodiment of this invention is shown in the accompanying drawings, wherein:—

Figure 1 is a front elevation of the robot, the hand member being shown in section.

Figure 2 is a longitudinal section taken on the line 2—2 of Fig. 1, and showing the head, left arm, shoulders, hips and left leg in elevation.

Figure 3 is a horizontal section through the shoulders, taken on the line 3—3 of Fig. 1.

Figure 4 is a vertical section on the left shoulder and the adjacent portion of the spine, taken on the line 4—4 of Fig. 3.

Figure 5 is a vertical section of the gear box which is located at the lower extremity of the body.

Figure 6 is a bottom plan of the gear box.

Figure 7 is a horizontal section of the left leg, taken on the line 7—7 of Fig. 2.

Figure 8 is a fragmentary section, taken on the line 8—8 of Fig. 7.

Figure 9 is a fragmentary vertical section of the spine, at the hips.

Figure 10 is a diagrammatic view of the actuating mechanism.

Figure 11 is a front elevation of the oblique display panel and a skeletonized representation of the robot; various positions of the arms being illustrated in dotted outline.

Figure 12 is a side elevation of the same.

Figure 13 is an enlarged detail in elevation of the elbow joint.

Figure 14 is a section taken on the line 14—14 of Fig. 13.

In the construction herein shown, the improved robot comprises a body or trunk having a pair of fixed hollow members 1 and 2 which are rigidly secured together by means of a centrally located tube 3, which represents the spine and which is secured to the body members 1 and 2 by screws 4. The body is preferably inclined approximately fifteen degrees from the vertical, so as to assume the approximate position assumed by a player in actual practice.

The lower body member 1 is preferably integrally formed on a platform 5 representing the ground and forming a part of a suitable supporting structure or housing, not shown.

The body members 1 and 2 are spaced apart vertically so as to leave an intermediate space for a rotatable hip member 6 which is journaled on the spine shaft 3, as clearly shown in Fig. 9. Projecting laterally from the hip 6, is a pair of brackets 7, having their outer extremities reduced so as to fit into sockets 8 in the upper ends of the legs which are hinged to these brackets by pins 9.

Each of the legs comprises a thigh section 10, which is bifurcated at its lower end to receive the reduced upper end of a lower leg section 11. The two leg sections are hinged together by a pin 12, so as to permit the legs to flex at the knee.

The lower ends of the leg sections 11 extend through apertures 13 in caps 14 of feet 15. Mounted on the leg sections 11, are pins 16 adapted to engage the caps 14 for lifting the heels 17 of the feet when the legs are moved to certain positions, as hereinafter described. The forward ends of the feet are hinged to toe sections 18 by means of pins 19. These toe sections are firmly secured to the ground member 5 by screws 20, so that the toes are unaffected by any movement of the legs.

Rotatably mounted on the upper end of the spine tube 3, is a shoulder member comprising a chest section 21 and a collar section 22 secured together by screws 23.

Journaled in the shoulder member, is a pair of stub shafts 24, the outer ends of which support a pair of brackets 25, rigidly secured thereto by screws 26. The outer extremities of these brackets 25 are bifurcated to receive the upper ends of a pair of arms which are hinged thereto by pins 27.

Each of the arms comprises an upper section 28 and a lower section 29 hinged together by a pin 30, so as to permit the arms to flex at the elbows. Each of the upper arm sections 28 is bifurcated at the elbow to form a shoulder 28.1 and a pair of bearing portions 28.2, and each of the arm sections 29 is provided with a tenon 29.1 located between the bearing portions 28.2. In order to secure the lower arm sections against dropping beyond the position shown in Fig. 2, the tenons 29.1 have projections 29.2 forming stops for engagement with the shoulders 28.1 of the upper arm sections. The lower ends of the arms are seated in a frusto-conical member 31 which is intended to represent the hands of the player. This hand member may be secured to the arms by a pin 32, as shown in Fig. 1.

The robot herein shown also includes a head 33 which is rotatably seated on top of the collar section 22. This head is secured by a screw 34 to the upper extremity of a rod 35 which extends downwardly through the body of the robot. Fixed on this rod adjacent the lower end thereof, is an arm 36 which is connected at one end to a spring 37 which normally holds the opposite end in engagement with a pin 38, thereby holding the head 33 in the straight forward position shown in Figs. 1 and 2, when the arms and legs are in the starting or addressing position. During the back swing, the head is turned slightly to the right by the improved operating mechanism, hereinafter described.

The improved operating mechanism includes a pair of nested tubular shafts 39 and 40 rotatably mounted within the body for driving the hips and shoulders, respectively. These two shafts are slowly rotated at respectively different speeds, first in one direction and then in the opposite direction, by any suitable mechanism.

The hip shaft 39 terminates at the hip, as shown in Fig. 9. Secured to the upper extremity of this hip shaft, is a bushing 41, to which is secured a threaded nut 42 for the attachment of a screw 43 which secures the hip member 6 to the shaft 39, so as to oscillate the hips through the action of the shaft 39.

The shaft 40 is substantially coextensive with the body and is secured to the collar member 22 by a screw 44, whereby oscillation of the shaft 40 causes an oscillation of the shoulders.

During the back stroke, it is necessary to lift the arms while the shoulders are rotating to the right. This is accomplished by the gearing shown in Figs. 3 and 4. Mounted on the inner ends of the stub shafts 24, is a pair of bevel gears 45 which mesh with a stationary bevel gear 46 formed on the upper end of a sleeve 47 which is

mounted within the spine tube 3. This sleeve 47 is in axial alinement with the hip shaft 39 but it terminates above the hip member 6, as shown in Fig. 2. The sleeve 47 is secured against rotation by the screw 4 which passes through the spine shaft 3.

With this system of gearing, when the shoulder is rotated under the action of the shaft 40, the bevel gears 45 will roll around the stationary bevel gear 46 so as to impart a rotary movement to the shoulder brackets 25, thereby raising and lowering the arms. If the bevel gears 45 were rigidly secured to the shafts 24, then the slightest rotation of the shoulders would impart a vertical movement to the hands. This is undesirable, because such action would move the hands out of their true plane. For this reason, the bevel gears 45 are driven by pins 48 which engage slots 49 in the bevel gears. These pin and slot connections permit the shoulders to move a predetermined distance before the brackets 25 effect any lifting of the hands.

One form of suitable mechanism for actuating the hip shaft 39 and shoulder shaft 40 is illustrated in Figs. 5, 6 and 10. As shown in Fig. 5, the lower end of the hip shaft 39 is provided with a gear 52 meshing with one end of a double gear 53. The other end of the gear 53 meshes with a gear 54 which is fast on the shoulder shaft 40. All of these gears are housed within a casing 55, which is secured to a housing 56 on the lower side of the platform 5.

Fixed on the lower end of the shoulder shaft 40, is an arm 57 carrying a pin 58 which is adapted to engage the arm 36 for rotating the head shaft 35 clockwise against the action of the spring 37 when the shoulders are rotated to the right during the back stroke. This effects the desired partial rotation of the head during the back stroke.

Formed on the casing 55, is a cylindrical bearing part 59 in which is slidably mounted a bar 60 having a rack 61 meshing with the gear 54. On the side opposite the rack 61, the bar 60 has a groove 62 for receiving a screw 63 which is mounted on the bearing member 59 for securing the rack bar against turning.

Mounted on one end of the rack bar, is a projection or preferably a roller 64 which rides on the periphery of a rotary cam 65, and which is held in operative relation with the cam by a spring 66. With this construction, rotation of the cam effects a reciprocation of the rack bar, thereby oscillating the hip shaft 39 and shoulder shaft 40 through the intermediate gears 54, 53, and 52.

The cam 65 may be rotated by hand, as by the handle 67, or by an electric motor 68. The motor 68 is operatively connected to the cam 65 by a pulley 69, belt 70, pulley 71, pulley 72, and a belt 73 connected to a pulley 74 mounted on the cam shaft 75.

If desired, the operating mechanism may be coin-controlled so as to permit an observer to operate the robot at will by the insertion of a small coin.

The coin-controlled mechanism, as shown in Fig. 11, includes a bell crank 76 pivoted at 77 and having one arm 78 provided with a contact 79 adapted to be shifted into and out of engagement with a terminal 80. The contact 79 and terminal 80 are connected to electrical conductors 81 and 82, respectively, which lead to the motor.

Connected to the bell crank, is a spring 83 adapted to hold the contact 79 either open or closed, as will be apparent. The usual coin slide 84 is arranged in position to engage an arm 85 of the bell crank for actuating the switch. After the robot has made a complete swing, the motor is stopped automatically by means of an arm 86 which is adapted to engage the bell crank for opening the switch. This arm 86 is formed on a pulley 87 which is connected to the pulley 72 by a belt 88 for rotating the arm 86 counterclockwise.

If desired, a golf club or miniature club may be attached to the hands of the robot for illustrating the correct positions assumed by a club at all points in the stroke. However, we prefer to use the apparatus illustrated in Figs. 11 and 12. As therein illustrated, the device includes an inclined display panel 89 mounted on the platform 5 and having an elliptical opening 90 through which the body of the robot extends. This panel may be either flat or warped. In actual practice, the club head travels through a path which is located in a warped plane. The border of the elliptical opening 90 is intended to represent the approximate elliptical path traversed by the hands during a golf swing. The oblique panel is transparent so as not to obstruct the observer's view of the hips, legs and feet of the robot.

Applied to the face of the panel, is a plurality of miniature golf clubs 91 which are arranged in various positions to represent the correct position of the club at the addressing position, at the end of the back swing, at the end of the follow through, and at certain intermediate positions. If desired, representations of the clubs may be painted on the panel or applied in any other suitable manner. Representations of hands 92 may also be applied to the panel.

Operation

In operation, to start the device, the cam 65 is rotated, either manually by the handle 67, or by the motor 68. Each rotation of the cam 65 causes the robot to effect a complete golf stroke, including the back swing, down swing, and follow through. At the conclusion of the follow through, the members are returned to addressing position.

During its rotation, the cam 65 slowly pushes the rack bar 60 inwardly, thereby rotating the hip shaft 39 and shoulder shaft 40 through the gears 54, 53, and 52. These gears are so proportioned that the shoulders, connected to the shaft 40, are moved approximately 90° during the time that the hips, connected to the shaft 39, are moved approximately 45°, for effecting the back swing of the robot. During the back swing, the shoulders rotate clockwise, approximately 90° from the addressing position. Through the operation of the beveled gears 45 and 46, the arms are also raised during the back swing, so as to cause the hands to traverse a portion of an elliptical path located in an oblique plane. During this movement, the left arm is held substantially straight, while the right arm is flexed at the elbow, as diagrammatically illustrated in Fig. 11.

Also during the back swing, the hips rotate clockwise, approximately 45°, thereby causing the right leg to straighten, while the left leg flexes at the knee and the left heel rises from the platform.

During the back swing, the pin 58, carried by the shoulder shaft 40, engages the arm 36 for rotating the head shaft 35 so as to rotate the head clockwise, approximately 20°.

In the down swing, all of these parts return to the starting position in a path, the reverse of the back swing.

In the follow through, the shoulders rotate counterclockwise, in continuation of the down swing, thereby lifting the arms through the ac-

tion of the gears 45 and 46 to keep the hands in the oblique plane. During the follow through, the left arm flexes at the elbow while the right arm is substantially straight. The hips rotate approximately 45° counterclockwise, thereby causing the left leg to straighten, while the right leg flexes at the knee and the right heel rises from the platform. Also during the follow through, the head moves about 70° counterclockwise.

In the return stroke, the members are all returned to addressing position.

Although but one specific embodiment of this invention has been herein shown and described, it will be understood that certain details of the construction shown may be altered or omitted without departing from the spirit of the invention as defined by the following claims:

We claim:

1. A robot for exemplifying the golf swing comprising a body having movable arms, means for swinging said arms so as to move their wrist portions in a substantially elliptical path, and a stationary indicator separate from said arms but disposed in substantially an oblique plane for indicating one position assumed by a golf club during its swing, a portion of said indicator representing the club handle being located adjacent said elliptical path but spaced from said path so as not to obstruct the full swing of said wrist portions.

2. A robot for exemplifying the golf swing comprising a body having movable arms, means for swinging said arms so as to move their wrist portions in a substantially elliptical path, and a plurality of stationary indicators located in substantially an oblique plane for indicating different positions assumed by a golf club during a complete swing, the portions of said indicators representing the club handle being located adjacent said elliptical path but spaced from said path so as not to obstruct the full swing of said wrist portions.

3. A robot for exemplifying the golf swing comprising a body having movable arms, means for swinging said arms so as to move their wrist portions through a substantially elliptical path in substantially an oblique plane, and a stationary indicator separate from said robot but disposed substantially in said oblique plane for indicating one position assumed by a golf club during its swing, a portion of said indicator representing the club handle being located adjacent said elliptical path but spaced from said path so as not to obstruct the full swing of said wrist portions.

4. A robot for exemplifying the golf swing comprising a body having movable arms, means for swinging said arms so as to move their wrist portions through a substantially elliptical path in substantially an oblique plane, an oblique display panel mounted adjacent said robot, and a plurality of indicators on said panel for indicating different positions assumed by a golf club during a complete swing, the portions of said indicators representing the club handle being located adjacent said elliptical path but spaced from said path so as not to obstruct the full swing of said wrist portions.

5. A robot for exemplifying the golf swing comprising a body having movable arms, means for swinging said arms so as to move their wrist portions through a substantially elliptical path in substantially an oblique plane, an oblique display panel mounted adjacent said robot, a marker on said panel to represent said elliptical path traversed by said wrist portions, and a plurality of indicators on said panel for indicating different positions assumed by a golf club during a complete swing, the portions of said indicators representing the club handle being located adjacent said elliptical path but spaced from said path so as not to obstruct the full swing of said wrist portions.

6. A robot for exemplifying the golf swing comprising a body having movable arms, means for swinging said arms so as to move their wrist portions through a substantially elliptical path in substantially an oblique plane, an oblique display panel mounted substantially in the plane of said elliptical path and adjacent said robot, and a plurality of indicators on said panel for indicating different positions assumed by a golf club during a complete swing, the portions of said indicators representing the club handle being located adjacent said elliptical path but spaced from said path so as not to obstruct the full swing of said wrist portions.

7. A robot for exemplifying the golf swing comprising a body having movable arms, means for swinging said arms so as to move their wrist portions through a substantially elliptical path in substantially an oblique plane, an oblique transparent display panel mounted adjacent said robot, and a plurality of indicators on said panel for indicating different positions assumed by a golf club during a complete swing, the portions of said indicators representing the club handle being located adjacent said elliptical path but spaced from said path so as not to obstruct the full swing of said wrist portions.

8. A device for exemplifying the golf swing comprising an oblique display panel having an opening with a substantially elliptical rim, a robot comprising a body projecting through said opening and having movable arms, means for swinging said arms so as to move their wrist portions through an elliptical path, and means on said panel for representing a golf club in certain of the various positions assumed by the club during a complete swing, the movement of said wrist portions being unobstructed by said panel.

9. A device for exemplifying the golf swing comprising an oblique display panel having an opening with a substantially elliptical rim, a robot comprising a body having its upper portion projecting through said opening and having movable arms, said panel being transparent to permit the lower portion of said robot to be viewed through said panel, means for swinging said arms so as to move their wrist portions through an elliptical path, and means on said panel for representing a golf club in certain of the various positions assumed by the club during a complete swing, the movement of said wrist portions being unobstructed by said panel.

10. A device for exemplifying the golf swing comprising an oblique display panel having an opening with a substantially elliptical rim, a robot comprising a body projecting through said opening and having movable arms, means for swinging said arms so as to move their wrist portions through an elliptical path substantially coinciding with said rim, and means on said panel for representing a golf club in the positions of quarter-back, half-back, three-quarter-back, full-back, address, quarter-follow through, half-follow through, three-quarter-follow through, and full-follow through.

11. A robot for exemplifying the golf swing

comprising a hollow body having arms and legs movably connected thereto, and mechanism housed within said hollow body for swinging said arms and moving said legs so as to move the wrist portions of said arms through at least half of a complete elliptical arc in an oblique plane.

12. A robot for exemplifying the golf swing comprising a stationary hollow body, a shoulder member rotatably mounted on said body, arms hinged to said shoulder member, and mechanism housed within said body for swinging and simultaneously lifting said arms to cause the wrist portions of said arms to traverse an elliptical path consisting of at least half of a complete ellipse.

13. A robot for exemplifying the golf swing comprising a body having an upper rotatable part, a pair of shoulders journaled on said upper part, arms hinged to said shoulders, mechanism within said body for rotating said upper part alternately in opposite directions for swinging said arms, and means for turning said shoulders relative to said upper part for raising and lowering said arms through arcs of substantially ninety degrees in a vertical plane during their swinging movements.

14. A robot for exemplifying the golf swing comprising a body having an upper rotatable part, a pair of shoulders journaled on said upper part, a pair of arms hinged to said shoulders, a rotatable shaft extending axially through said body and connected to said upper part for reciprocating said upper part to swing said arms, and means in said upper part for turning said shoulders relative to said part so as to raise and lower said arms during their swinging movements through arcs substantially ninety degrees.

15. A robot for exemplifying the golf swing comprising a stationary body having a pair of separate sections spaced apart, a spine shaft connected to said sections, a shoulder member rotatably mounted on said spine shaft, arms hinged to said shoulder member, a rotatable shaft extending through said spine shaft for reciprocating said shoulder member to cause a swinging of said arms, a rotatable hip member located between said body sections, and legs hinged to said hip member.

16. A robot for exemplifying the golf swing comprising a body, a rotatable shoulder member on said body, arms hinged on said shoulder member, a hip member rotatably mounted on said body, legs hinged to said hip member, and a pair of concentric shafts journaled within said body and connected respectively to said shoulder and hip members for moving said arms and legs.

17. A robot for exemplifying the golf swing comprising a body, a rotatable shoulder member on said body, arms hinged on said shoulder member, a hip member rotatably mounted on said body, legs hinged to said hip member, a pair of concentric shafts journaled within said body and connected respectively to said shoulder and hip members for moving said arms and legs, a head rotatable relative to said shoulder member, and a third shaft journaled within said shoulder shaft and connected to said head for turning said head.

18. A robot for exemplifying the golf swing comprising a body, a rotatable shoulder member on said body, arms hinged on said shoulder member, a hip member rotatably mounted on said body, legs hinged to said hip member, a pair of concentric shafts journaled within said body and connected respectively to said shoulder and hip members for moving said arms and legs, gearing below said body for operatively connecting said shafts, means for actuating said gearing, and mechanism for actuating said means.

19. A device of the class described comprising an oblique panel bearing indicators to represent a golf club in various positions assumed during a swing, a robot having a body inclined toward the plane of said panel, arms hinged on said body and having a wrist portion positioned adjacent said plane, and mechanism for swinging and simultaneously raising said arms to cause said wrist portion to traverse a substantially elliptical path adjacent said plane.

20. A robot for exemplifying the golf swing comprising a body having a rotatable shoulder member, arms hinged to said shoulder member, and mechanism for rotating said shoulder member alternately in opposite directions for swinging said arms, the axis of rotation of said shoulder member being fixed.

21. A robot for exemplifying the golf swing comprising a body having a shoulder member and a hip member rotatably mounted thereon, arms hinged to said shoulder member, legs hinged to said hip member, and mechanism for rotating said shoulder and hip members alternately in opposite directions to effect movement of said arms and legs, the axis of rotation of said shoulder and hip members being inclined and fixed.

22. A robot for exemplifying the golf swing comprising a body having movable arms, means for swinging said arms so as to move their wrist portions in a substantially elliptical path, a stationary indicator separate from said arms but disposed in substantially an oblique plane for indicating one position assumed by a golf club during its swing, and means associated with said indicator and located adjacent said elliptical path for indicating the correct position of a golfer's hands, said last mentioned means being spaced from said path so as not to obstruct the full swinging movement of said wrist portions.

JOHN D. WALLACE.
CLIFFORD H. LANDIS.