Sept. 13, 1932. F. L. FOX 1,876,657

IMPACT INDICATING APPARATUS

Filed Aug. 12, 1929 2 Sheets-Sheet 1

Fig. 1.

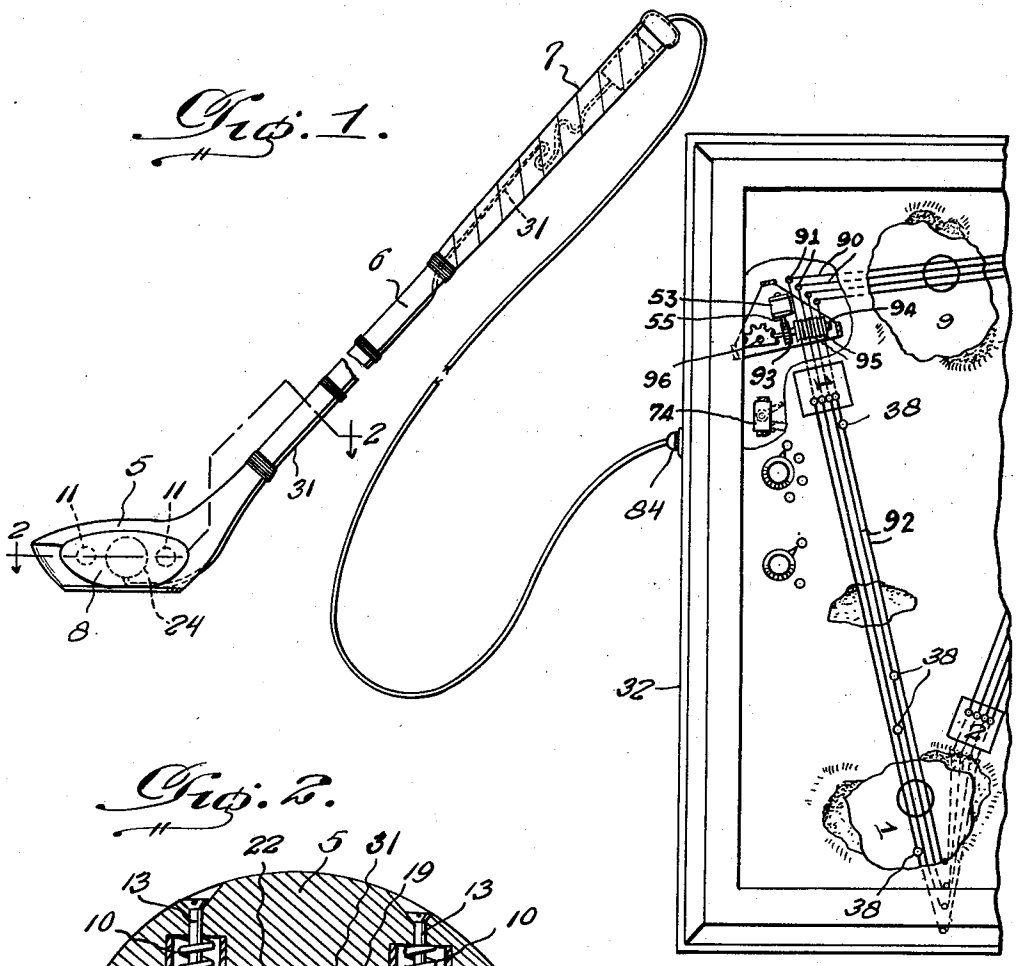


Fig. 2.

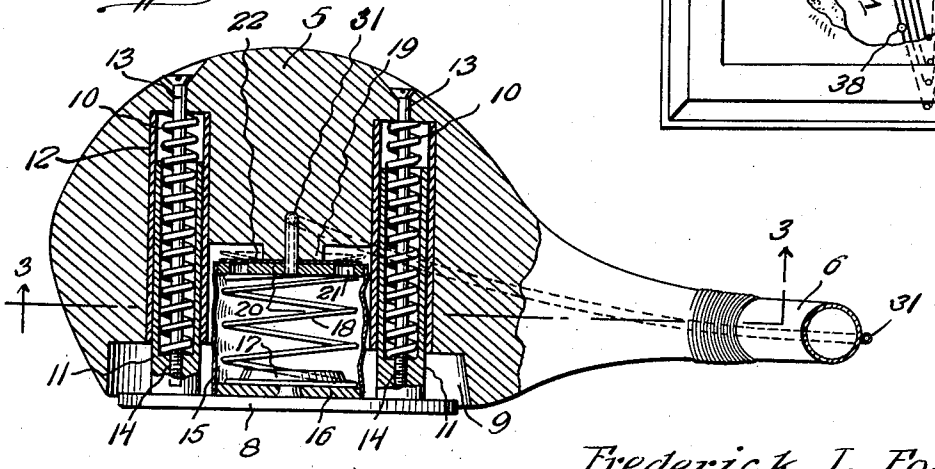
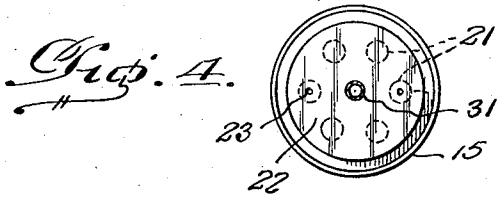


Fig. 4.



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Filed Aug. 12, 1929 2 Sheets-Sheet 2

Fig. 3.

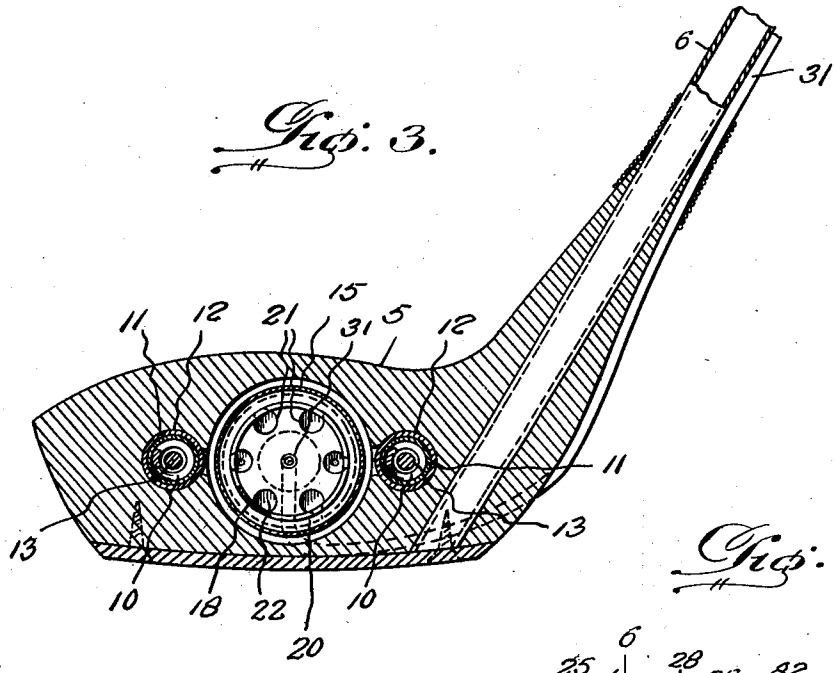


Fig. 5.

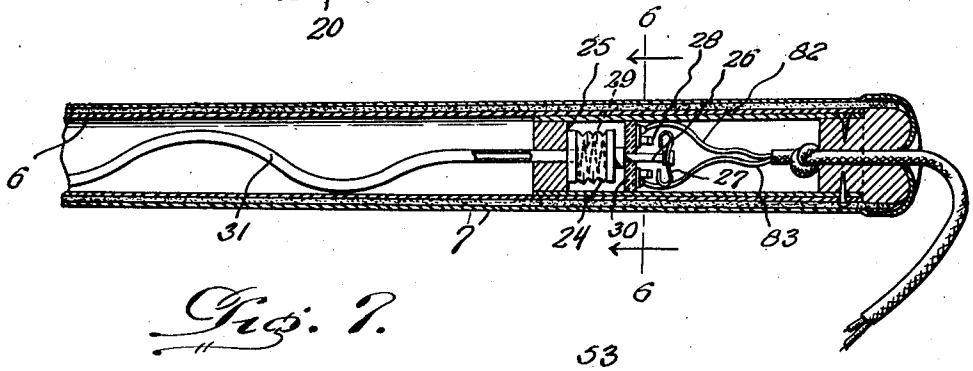
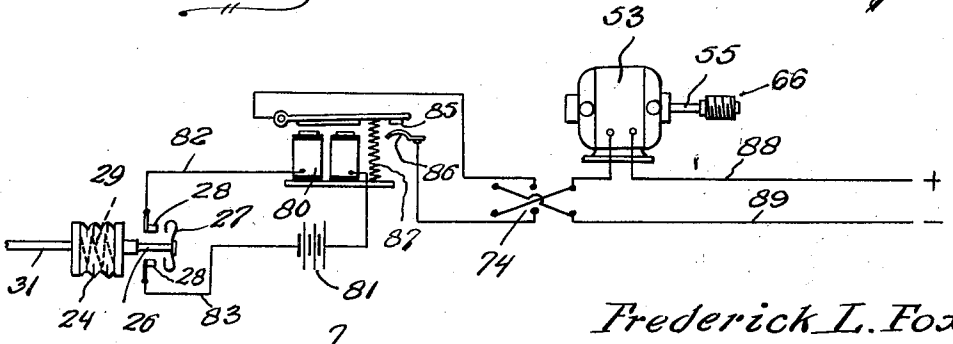


Fig. 7.



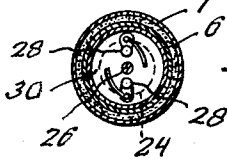


Fig. 6.

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UNITED STATES PATENT OFFICE

FREDERICK L. FOX, OF WASHINGTON, DISTRICT OF COLUMBIA

IMPACT INDICATING APPARATUS

Application filed August 12, 1929. Serial No. 385,440.

This invention relates to apparatus for indicating the power of a blow or impact manually imparted to an impact element by means of a club, such as the power of a blow dealt a golf ball by means of a golf club.

As disclosed in the pending application for U. S. Letters Patent of Frederick L. Fox and Frank C. Gibson, Serial No. 322,885, filed November 30, 1928, upon golf game, it is the usual practice to employ a captive golf ball adapted to be struck by means of a conventional golf club, and means operatively connected with the captive golf ball for indicating the power of the blow dealt said ball, the indicating element being moved a distance substantially proportional to the power of said blow. It is a well known fact that the "follow through" or the travel of a golf club with a golf ball immediately after initial contact of said club with said ball is a material factor in gaining distance when driving a golf ball toward a putting green in playing the actual game of golf. However, where the golf game embodies a captive golf ball, this factor has no effect on the indicating means because the ball travels in a path entirely different from that of the club and moves out of contact with the latter almost as soon as the ball is struck. As the aim is invariably to produce a golf game which follows as closely as possible the actual conditions met with in playing the actual game of golf, this has been found to be a serious objection to golf games heretofore proposed or devised, the indication obtained being only approximate or substantially proportional to the power and accuracy of the blow.

It is accordingly the primary object of the present invention to provide an indicating apparatus of the above kind, in which the club has a yieldable contact face operatively connected with the means for indicating the power of the blow manually dealt an impact element or ball by means of said club, thereby enabling use of a non-captive impact element or ball and securing the effect of the "follow through" factor in the indication of the power and accuracy of said blow by said indicating means. Moreover, this improvement adapts the game for being played out-of-doors as well as indoors, thereby enhancing the simulation of the actual game of golf and increasing the interest which a game of this kind may hold for golf enthusiasts. Obviously, when a non-captive ball is used indoors, a suitable "back-stop" or catching net may be provided to safely stop the flight of the ball a suitable distance from the point where the ball is teed and struck.

A further object is to provide a club with time-controlled means for controlling the operation of an indicator, whereby the movement of the indicator will be proportional to the power of the blow manually dealt an impact element by means of said club.

Still another object is to provide a club with a yieldable impact face and time-controlled means operatively associated with such face for controlling the operation of an indicator, and wherein the construction is simple and durable, efficient in operation, and otherwise well adapted for the intended use and purpose.

Other objects will appear as the nature of the invention is better understood, and the same consists in the novel form, combination and arrangement of parts hereinafter more fully described, shown in the accompanying drawings, and claimed.

In the drawings:

Figure 1 is an elevational view, partly broken away, of a golf club embodying the present invention and operatively associated with an indicating means, a fragment of the indicating means being shown in plan.

Figure 2 is an enlarged fragmentary section through the head of the golf club, taken substantially on line 2—2 of Figure 1.

Figure 3 is a vertical section of the golf club head taken substantially on the plane of line 3—3 of Figure 2.

Figure 4 is an inner end view of the bellows-type suction pump employed in the head of the golf club shown in Figures 1 to 3 inclusive.

Figure 5 is an enlarged longitudinal section of the hand-grip end of the shaft of the club shown in Figure 1, disclosing the motor

controlling switch and the suction motor for operating the same.

Figure 6 is a transverse section on line 6—6 of Figure 5; and

Figure 7 is a wiring diagram showing an indicator operating motor and the controlling switch of Figure 5 in the circuit of said motor.

Referring more in detail to the drawings, 5 indicates the head, and 6 the staff of a conventional golf club, the staff being hollow and terminating at its upper end in a hand-grip 7. In accordance with this invention, the head 5 has a yieldable impact face in the form of a face plate 8 movable into a recess 9 formed in the front side of said head, and normally projected slightly outwardly of said recess by means of springs 10. Hollow studs 11 are rigid with and project rearwardly from the face plate 8 and slidably fit in bushings 12 fitted in sockets formed in the head 5, whereby the face plate is guided in its movements. The opposite ends of the springs 10 abut the bottoms of the sockets in the hollow studs 11 and the bottoms of the sockets in the head 5, and said springs fit in the studs 11 so as to be substantially enclosed thereby, thus providing an efficient, durable and compact construction. To further aid in guiding the face plate, and to properly limit the projection of the face plate, bolts 13 are attached to the studs 11 and extend axially through the latter and the springs 10, as well as through the back of the head 5. The heads of the bolts 13 normally engage the back of the head 5, thus limiting the expansion of the springs 10 and the projection of face plate 8 thereby. Moreover, the bolts 13 have threaded connection at 14 with the studs 11 so that by turning said bolts the normal tension of the springs may be adjusted to properly synchronize the inward movement of face plate 8 from a blow of given power with the time-controlled means and indicating means employed in conjunction with the club, as will later be described. Arranged within the countersunk central portion of the recess 9 is a bellows-type suction pump 15 having a closed outer end 16 which normally engages the inner side of the face plate 8 and carries a weighted disk 17. The collapsible body of the pump 15 is normally expanded by means of an internal spring 18, and the head 5 has a projection 19 centrally of the countersunk portion of recess 9 which is engaged by the central portion of the inner end wall 20 of said pump. The margin of the wall 20 is thus spaced from the bottom of the recess in the head 5, and such margin has ports 21 normally closed by the margin of a circular flap valve or flexible disk 22 centrally secured to the outer or rear face of the wall 20. It is thus apparent that when the body of pump 15 is collapsed, the air will be forced freely therefrom through the ports 21 and out past plate 8 to the atmosphere, but passage of air through ports 21 into the body of pump 15 will not be freely permitted as the margin of the disk 22 will be drawn by suction to close such ports when said body tends to return to expanded condition under the influence of spring 18. The portions of disk 22 coincident with the ports 21 have restricted apertures 23, however, thus slowly admitting air into the body of pump 15 and permitting its slow timed return to expanded condition, the time interval depending on the degree or extent to which said body has been collapsed, or partly collapsed. When the plate 8 strikes the golf ball, it may be allowed limited inward movement by employing relatively strong springs at 10, but the momentum of weight 17 will cause its continued movement to materially collapse the body of pump 15 after inward movement of plate 8 has ceased.

Arranged in the hand-grip portion 7 of the staff 6 is a bellows-type suction motor 24 whose collapsible body is somewhat smaller than that of pump 15. One end of the body of the motor 24 is rigidly mounted at 25 in the portion 7, while the other end thereof is movable and has a stem 26 which carries a bridge piece 27 of electrical conducting material. The bridge piece 27 is adapted to engage and bridge a pair of spaced electrical contacts 28 when the body of motor 24 is collapsed, the piece 27 being normally disengaged from the contacts 28 when the said body is normally expanded by an internal spring, indicated by dotted lines at 29. The piece 27 and contacts 28 form a motor control switch as will later become apparent, and the contacts 28 are carried by a suitable support 30 of insulating material. The support 30 is fixed in the hand-grip portion 7 below the piece 27, and the stem 26 slidably extends therethrough. A suction tube 31 connects the interior of the body of motor 24 with the interior of the body of pump 15, said tube being extended from motor 24 through the staff 6 and into the head 5 where it enters the center of wall 20.

By way of example, the device above described has been shown for use in controlling the operation of the indicating means forming part of the invention disclosed in the pending application hereinbefore mentioned. Only such portion of said means is disclosed herein as is deemed necessary to an understanding of the general purpose and operation of the present invention. The game board indicated at 25 in said pending application is herein indicated at 32, while the indicators of said board are shown at 38, and the operating motor for said indicators is shown at 53 in Figures 1 and 7. The reversing switch for motor 53 is shown at 74, while the motor shaft 55 is shown as provided with a worm 66 forming part of the operative

connection between the indicators 38 and the motor 53 as clearly shown and described in the pending application hereinbefore mentioned. A plurality of endless flexible members or cables 90 pass around idler pulleys 91 beneath the top of the game board 32 as shown in Figure 1. Slots 92 are provided in the top of the board in registry with different portions of the respective cables to correspond with the arrangement of fairways between successive holes in the regular game of golf. The indicators 38 are movable along and guided in the slots 92, being provided with depending members projecting through said slots and detachably engaging the cables 90, to be moved by the latter. The worm 66 meshes with a worm gear 93 secured on a driven shaft 94 which carries a plurality of pulleys 95, means being provided as generally indicated at 96 to manually selectively clutch said pulleys 95 to said driven shaft 94, so that the desired cable 90 and its associated indicator 38 may be moved by the motor 53 when the circuit of the latter is closed. The cables 90, of course, pass around the pulleys 95 to be driven by the latter. Generally stated, the apparatus shown herein is the same as in said pending application, except that the present switch 27, 28, which corresponds to switch 151, 152 of the said pending application, is operatively associated with the face plate 8 of the golf club, instead of with a captive golf ball. As shown in Figure 7, the switch 27, 28 controls the operation of motor 53 which actuates the indicators 38. This is preferably done by including the contacts 28 in a normally open circuit with a relay 80 and a source of low-voltage current 81, such as a dry-cell battery. The wires 82 and 83 are preferably embodied in an attachment cord adapted to be detachably plugged into the game board 32 at 84 for connection by proper wiring in the game board from an attachment plug receptacle of the board to one terminal of relay 80 and one terminal of battery 81. The relay 80 controls the high voltage circuit of motor 53 by closing contacts 85 and 86 of the latter circuit when the coils of relay 80 are energized by causing piece 27 to bridge contacts 28, the spring 87 opening contacts 85 and 86 when said coils are de-energized by disengagement of piece 27 from contacts 28. In this way, the high voltage current is safely kept distant from the golf club, an obvious advantage. The high voltage line wires of the motor circuit are indicated at 88 and 89.

In use, a conventional free golf ball is suitably teed and then struck a blow by means of the club disclosed herein, an attempt being made by the player to gauge the power of the blow according to the character of shot being made or the distance at which it is desired to send the ball or to correspondingly move the operative indicator 38. When the face plate 8 strikes the ball, said plate will yield in accordance with the power and accuracy with which the blow is struck, and the body of pump 15 will be correspondingly collapsed or partly collapsed. When the said body collapses, the air is driven therefrom through ports 21, and then the body tends to return to expanded condition under the action of spring 18. However, as the air can only return slowly into said body through the apertures 23, said body expands slowly, the time required for complete expansion depending upon the power of the blow and the extent to which the body was collapsed. While the body of pump 15 slowly expands, a suction is maintained in tube 31, thereby collapsing the body of motor 24 and maintaining it collapsed until the body of pump 15 fully expands and further air enters through apertures 23 to relieve the suction in tube 31. While the body of motor 24 is held collapsed, the contacts 28 will be bridged by the piece 27, and motor 53 will be placed into and maintained in operation to move the operative indicator 38 for a distance corresponding to the power and accuracy of the blow dealt the ball by the club, the motor 53 being thrown out of operation as soon as the suction is relieved in tube 31 and the body of motor 24 is expanded by spring 29 to disengage the bridge piece 27 from the contacts 28.

It is thus apparent that I have provided a device which is simple, durable, and efficient in operation, and which enables the use of a free ball so that the "follow-through" is utilized as a factor in indicating the power and accuracy of blows dealt the ball by the club.

It is to be noted, however, that the specific nature and construction of the indicating means may be widely varied, the means of the above mentioned application being simply illustrated by way of example. Moreover, the time-controlled means associated with the club is susceptible of numerous modifications and changes in details of construction without departing from the spirit and scope of the invention as claimed.

What I claim as new is:

1. In an impact indicating aparatus, a club provided with a movable impact element, means for indicating the power of a blow dealt said element, and time-controlled means for controlling the operation of said indicating means.

2. In an impact indicating apparatus, an indicator, a club provided with a yieldable impact face, and time-controlled means operatively associated with said face for controlling the operation of said indicator.

3. The combination with an indicator, and actuating means therefor, of a club provided with a yieldable impact face, and time-controlled means operatively associated with

such face for controlling the operation of said actuating means.

4. The combination with means for indicating the power of a blow dealt an impact element, of a club for striking said element having a yieldable impact face, and means including a fluid-pressure device operatively connecting said impact face with said indicating means.

5. The combination with an indicator, operating means for said indicator, and a motor for driving said operating means, of a club having a yieldable impact face, and time-controlled means associated with said impact face for controlling the operation of said motor.

6. The combination with an indicator, operating means for said indicator, and a motor for driving said operating means, of a club having a yieldable impact face, and time-controlled means associated with said impact face for controlling the operation of said motor, said time-controlled means embodying a spring-expanded bellows-type suction pump arranged to be collapsed by movement of said impact face when striking an impact element, said pump having valve means for permitting free discharge of air therefrom when collapsed and for restricting the passage of air into the same to cause slow timed expansion of the same, a bellows-type spring-expanded suction motor carried by the club and communicating with said pump to be collapsed while said pump slowly expands, and a switch for controlling the indicator driving motor arranged to be opened by the suction motor when expanded and closed thereby when collapsed.

7. In an impact indicating apparatus, a club having a yieldable impact face, a motor control element, time-controlled means carried by said club and operatively associated with said impact face, and means operatively connecting said time-controlled means with said motor control element.

8. In an impact indicating apparatus, a club having a yieldable impact face, a motor control element, and time-controlled means carried by said club operatively connecting said impact face with said motor control element, said time-controlled means embodying a suction motor for actuating said control element and a suction pump for operating said suction motor operatively associated with said impact face.

9. In an impact indicating apparatus, a club having a yieldable impact face, a motor control element, and time-controlled means carried by said club operatively connecting said impact face with said motor control element, said time-controlled means embodying a suction motor for actuating said control element and a suction pump for operating said suction motor operatively associated with said impact face, said club embodying a head and a staff, said suction motor and control element being mounted in said staff, said suction pump being mounted in said head behind said impact face, and a suction tube connecting said suction motor with said suction pump.

10. In an impact indicating apparatus, a club having a movable impact face, spring means yieldingly resisting movement of said impact face, a motor control element, and time-controlled means carried by said club operatively connecting said impact face with said motor control element, and means for adjusting the normal tension of said spring means.

11. The combination with means including an actuated member for indicating the power of a blow dealt an impact element, of a club for striking said element having a yieldable impact face, and fluid-pressure means operatively connecting said impact face with said actuated member.

In testimony whereof I affix my signature.

FREDERICK L. FOX.