

April 22, 1969

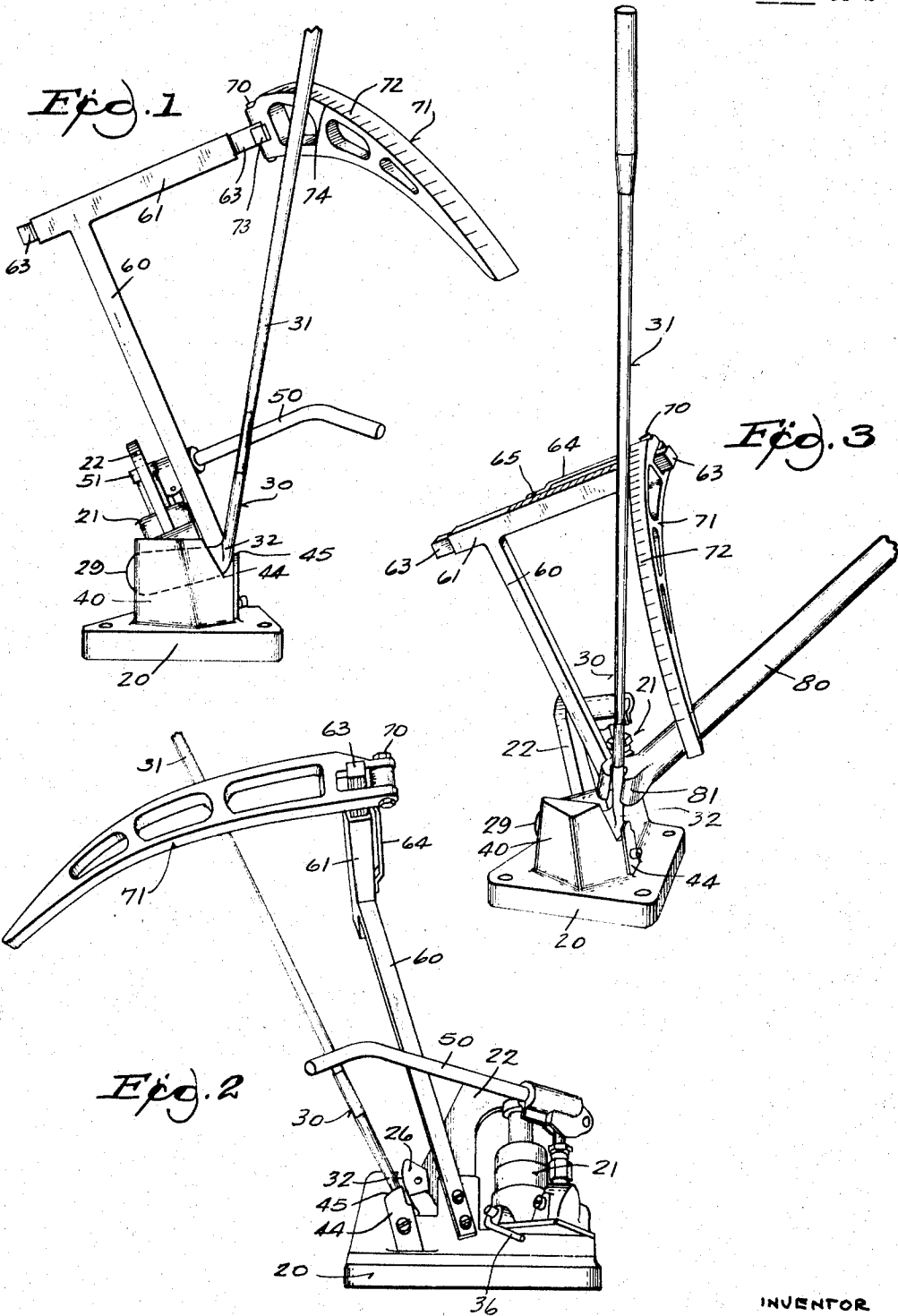
R. D. SUNDSTROM

3,439,429

GOLF CLUB INDICATOR AND STRAIGHTENING MACHINE

Original Filed June 29, 1965

Sheet 1 of 2



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Sheet 2 of 2

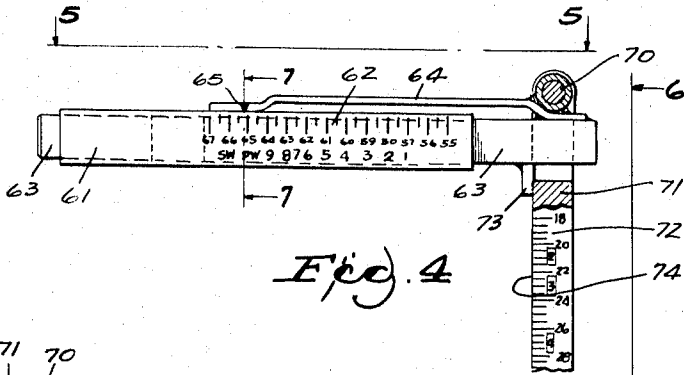


Fig. 4

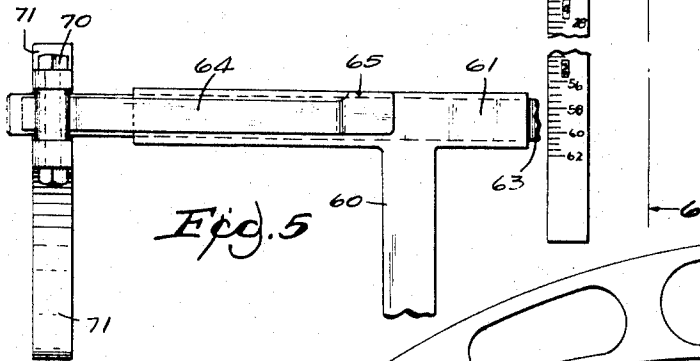


Fig. 5

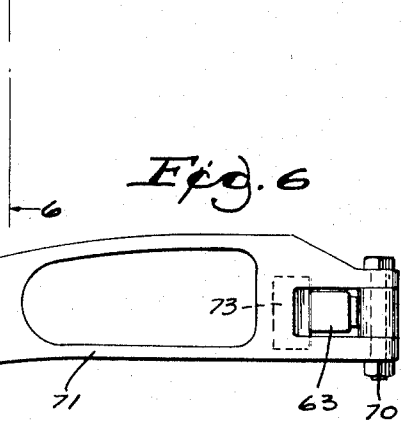


Fig. 6

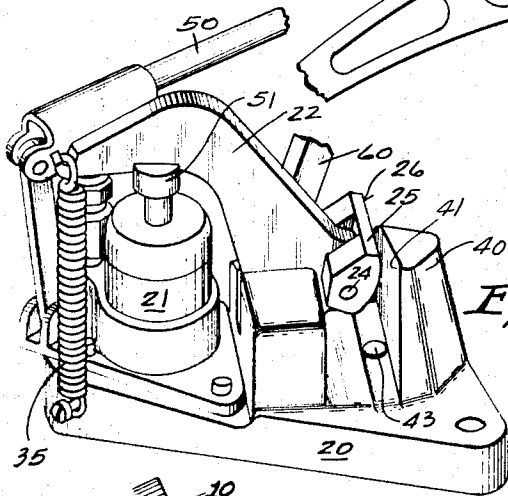


Fig. 8

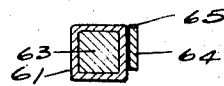


Fig. 7

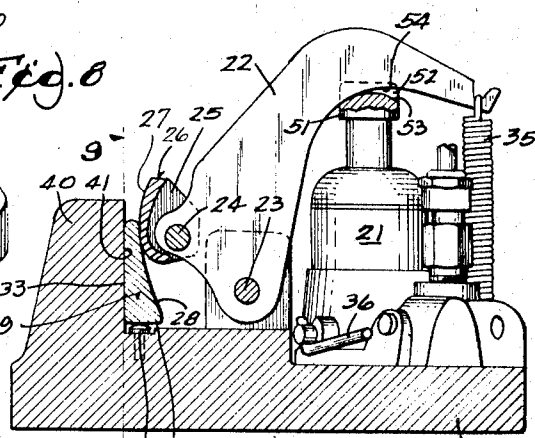


Fig. 10

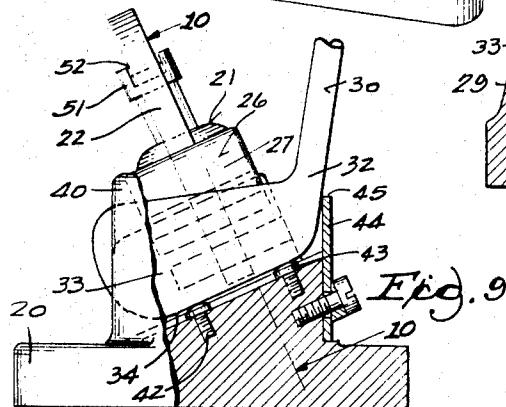


Fig. 9

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GOLF CLUB INDICATOR AND STRAIGHTENING MACHINE

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 Continuation of application Ser. No. 468,027, June 29, 1965. This application Oct. 16, 1967, Ser. No. 675,715
 Int. Cl. G01b 5/00

U.S. Cl. 33—174

22 Claims

ABSTRACT OF THE DISCLOSURE

A hydraulic clamping device secures the head of a golf club against a reference plane engaging the striking face of the club head, two reference points engaging the sole of the club and one reference point engaging the hosel of the club at a point closely adjacent to the sole to leave the hosel free for corrective bending. A bracket extending upwardly from the clamp carries a fixed scale and a relatively movable indicator carrying a second scale angularly related to the first. The path of movement of the indicator and second scale are such as to carry the second scale into contact with the club shaft, the point of engagement indicating a reading on the second scale, and the indicator indicating a reading on the first scale.

This application is a continuation of application Ser. No. 468,027, filed June 29, 1965, now abandoned.

The invention consists of novel golf club positioning means including a clamp operated by a jack, and accurately related positioning points including a face complementary to the golf club striking face, two points below the head of the club, and one point engageable with the hosel of the club. This combination locates the club very precisely when the clamp is closed.

The invention also consists of a pair of scales so located and constructed that a single simple operation produces accurate readings of the angle between the shaft and the head of the club in two planes; the lie and the loft of the club.

The invention further consists in the construction of a machine which is both sensitive and strong, and in which the loft scale is free to swing, so that a club may be adjusted while mounted in my device, without damage to either the club or the instrument.

In this application, the portion of a golf club intended to contact a ball is generally referred to as the face, or striking face. The outer end of the head is the toe, and the inner end is the heel. The handle is sometimes called a shaft, and the hosel joins the shaft to the head at the heel. The protrusion at the rear of the head is the flange, and the bottom of the head is sometimes called the sole. Loft is the angle between the striking face and the shaft in a vertical plane which passes through the ball and includes its ideal flight path. The rearward inclination of the striking face, taking a vertical face as 0°, controls the height of the flight path. Lie is the angle between the sole and the shaft, in a vertical plane through the sole. The lie of a club controls the shape of the triangle between the golfer's hands, his feet, and the club head, at the moment of impact with the sole parallel to the ground and at right angles to the flight path of the ball.

The lie and loft ideally are kept at values specified by the maker. They may be adjusted by a golf professional in specific cases to compensate for the physique of a particular golfer, or to compensate for a style of swing which leads to consistent errors in the flight path of the ball. (The latter correction is considered less desirable than a correction of the player's style, but is necessary at times.)

Since the shaft does not lie in either plane in which lie and loft are measured, but is at a resultant angle made up of both, the angle measured is the projection of the shaft in the plane of measurement. The adjustment of either lie or loft has an effect on the other. My device is the only device known to me which is capable of measuring both simultaneously in a simple way, at the same time holding the club rigidly enough for correction, and having scales so located and mounted that they not only do not interfere with the bending of the hosel, but guide and measure it.

It is important that clubs be kept within manufacturers' specifications, or within corrected specifications established by a pro, in order to play a consistent game. New clubs frequently do not meet either standard. Used clubs may suffer sudden or progressive changes. My machine is simple and relatively inexpensive, and can be operated quickly right at the course by the golf professional, who thus may greatly improve his services to golfers.

In the drawings:

FIG. 1 is an end elevational view of my device showing a golf club mounted therein.

FIG. 2 is a side elevational view.

FIG. 3 is a perspective view showing the handle of the jack removed and the bending tool in working position.

FIG. 4 is a plan view of the scales on the upper portion of my device.

FIG. 5 is a view on line 5—5 of FIG. 4.

FIG. 6 is a view on line 6—6 of FIG. 4.

FIG. 7 is a cross-sectional view on line 7—7 of FIG. 4.

FIG. 8 is a perspective view of the lower portion of my device showing the details of the jack.

FIG. 9 is a cross-sectional view on line 9—9 of FIG. 10.

FIG. 10 is a cross-sectional view on line 10—10 of FIG. 9.

As shown in the drawings, my device is designed to measure the loft and lie of a golf club, for instance club 30, and to hold it and provide guide means for correcting its geometry. The club comprises a head 29 having a rear surface 28, a striking face 33, and a sole 34. Hosel 32 attaches shaft or handle 31 to head 29.

My device is provided with a base 20 upon which is mounted a hydraulic jack 21, and a bell crank 22 pivoted to the base at 23 and carrying a pivot 24 which extends through the ends 25 of shoe 26. The shoe 26 is provided with a curved face 27 which engages the rear surface 28 of the head 29 of golf club 30. The jack 21 is operated by means of handle 50 to raise cam head 51 which is slotted at 52 to provide a curved cam surface 53 which contacts curved edge 54 of bell crank 22 to rotate the bell crank counter-clockwise (as seen in FIG. 10) about pivot 23. Thus shoe 26 is driven to the left and downwardly with respect to club head 29 as seen in FIG. 10, and face 27 comes into firm engagement with the flanged rear surface 28 of club head 29.

As best shown in FIGS. 1 and 9, all of these parts are desirably tilted with respect to the horizontal plane, in order to allow shaft 31 of the golf club 30 to assume a more vertical position and to make the entire device more compact and better balanced. In addition, this provides gravity bias for the free-swinging loft scale, which is convenient though not essential.

The base 20 is further provided with an abutment 40 having a face 41 against which face 33 of the head 29 of the golf club 30 is clamped while my device is in use. This face provides an accurate positioning plate to serve as one reference against which to measure and adjust the angular relationship existing between the shaft 31 and striking face 33 of golf club 30.

Two additional positioning points are provided by screws 42, whose heads 43 establish a base line parallel

to face 41, and to the base of jack 21, and substantially at right angles to the plane of bell crank 22. The sole 34 of club head 29 rests upon screw heads 43 while my device is in use. The last reference point is established by hosel plate 44 which is provided with a curved edge 45 which contacts hosel 32 of the club when my device is in use.

When a club 30 is placed in my device, the golf ball striking face 33 of head 29 is first placed against face 41 of abutment 40, so that sole 34 of club head 29 rests upon screw heads 43. Then both face contact and bottom contact are maintained while the club is moved so that the edge 45 of hosel plate 44 just firmly touches hosel 32 of the club. Maintaining the club in that position, the jack handle 50 is pumped to drive shoe 26 against club head 29, firmly clamping head 29 against reference plane 41, reference points 43 and reference point 45. The positioning of club head 29 is thus both extremely accurate and extremely firm, sufficiently firm so that the hosel 32 of the club may be bent while the club is in my device, to correct or readjust the angular relationship between the striking face 33 and the shaft 31 of the club 30.

Having accurately and firmly clamped the club head in a known position with respect to the base, and particularly with respect to plane 41, it now becomes possible to use the shaft 31 as a pointer to indicate the lie and the loft of the golf club 30, these being the two angular relationships which it is desired to measure.

In order to measure the lie and the loft, base 20 is provided with an upright 60 which for convenience is desirably generally parallel to the tilted axis of movement of jack cam head 51. (See FIG. 1.) As shown in FIG. 2, upright 60 is also tilted out of the vertical plane at right angles to bell crank 22 in order to limit the size of the arc supporting the loft scale to that necessary to carry only the useful range of loft angle indicia. At right angles to upright 60 is a sleeve 61, which carries a lie scale 62. Mounted telescopically in sleeve 61 is a slide 63 provided with an indicator carrier 64 attached to the end of 63. Carrier 64 extends along sleeve 61. The end of the indicator carrier 64 lies close to or touching sleeve 61 and is provided with a notch or other pointer 65 to indicate a reading on lie scale 62.

Slide 63 is provided at its end with a hinge 70 which swingably supports loft indicator arc 71, which carries loft scale 72. A stop 73 is provided for loft indicator arc 71.

After the club head 29 has been clamped as described above, the shaft 31 extends as shown in FIGS. 1, 2 and 3. The slide 63 is pulled out of sleeve 61 until loft indicator arc 71 is out of contact with shaft 31. As shown in FIGS. 1, 2 and 3, due to the angular relationships present in my device, loft indicator arc 71 is gravity biased against stop 73. The slide 63 is then returned to the left as shown in FIG. 4 until indicator arc 71 just barely touches shaft 31, without leaving stop 73. In that position, the point of contact between shaft 31 and scale 72 indicates the loft of the club on loft scale 72. At the same time, pointer or mark 65 indicates the lie on scale 62.

The actual physical quantity which is measured by the lie scale 62 is the distance from the hosel plate to a plane parallel to upright 60 which includes the stop 73 and the edge of the indicator scale 72, the distance being measured along sleeve 61, which is parallel to the line established by screw heads 43. The distance pointer mark 65 moves along scale 62 and bears a fixed relationship to the angle between the sole or bottom surface 34 of the club head 29 and the axis of shaft 31, because the height of sleeve 61 and its relationships to the reference points on the base plate are fixed, and the plane of stop 73 and the edge of indicator arc 71 is fixed as long as the indicator arc is resting against the stop. This lie angle is indicated on the scale 62 in degrees, and the scale is also desirably provided with markings which indicate which clubs conventionally have a lie corresponding to

the different angles. The lie scale may desirably read from approximately 55° to approximately 70°.

The loft scale 72 on indicator arc 71 is a portion of a degree circle in which 0° would indicate the club face 33 is parallel to shaft 31 of club 30. The center of the circle is on an axis at right angles to the plane of the degree circle and which passes through the point where the hosel plate 44 touches hosel 32. The loft scale desirably reads from about 14° to about 70° and also includes markings indicating which clubs conventionally have a particular degree of loft.

For straightening the club, or adjusting it to suit a particular golfer, applicant provides a wrench 80. The wrench has a head 81 which has a C-shaped configuration, opening to the side to receive the hosel 32 of golf club 30. When the handle of wrench 80 is moved either up or down, lower edge of C-shaped head 81 bears upon the hosel 32 very close to hosel plate 44, and provides a fulcrum there. The upper margin of head 81 of wrench 80 bears on the hosel of the club at a point near the commencement of the shaft, due to the thickness of wrench head 81. Because of the great ratio between this thickness and the length of the handle of wrench 80, great leverage is applied to bend the hosel easily with a minimum of effort. Thus the operator has maximum control and can readily use the lie and loft scales as a guide to accurate corrections in the geometry of the club.

Upon completion of work upon a particular golf club 30, the jack 21 may be released from its raised position whereupon spring 35 which is attached to base plate 20 and to bell crank 22 will retract shoe 26 from contact with the rear face 28 of the head 29 of golf club 30. On the particular form of jack 21 shown in the drawings, release is accomplished by turning valve release handle 36, releasing hydraulic pressure in the conventional ram which elevates cam head 51.

When a golf club 30 has been correctly clamped and measured as set out above, the club may be adjusted to compensate for differences between the club as measured and the manufacturer's standards, or to suit the club for use by an individual having particular needs or preferences different from the standard for the particular club. In making a lie correction, the wrench 80 is applied to the hosel 32 so that the wrench handle swings in a plane parallel to the plane of 61 or the plane in which lie is measured. The fact that the loft indicator arc is pivoted at 70 permits it to swing aside when the hosel is bent in the direction which moves the shaft 31 of the club to the right as seen in FIG. 4. In the case of a correction in this direction, the slide 63 must then be pulled out until the indicator arc again rests on stop 73 and the shaft 31 just touches edge 74 of the indicator arc, at which time the lie and loft scale will again correctly indicate the lie and loft of the club as corrected.

If a loft correction is to be made, the wrench 80 is applied to hosel 32 in such a manner that the handle of the wrench swings in a plane parallel to the indicator arc 71 while the arc is against stop 73. Only by bending the hosel in a plane parallel to one or the other of scales 62 and 72 will it be possible to make an adjustment in the lie without affecting the loft, or to make an adjustment in the loft without affecting the lie. Any other direction of operation of the wrench will produce a compound correction. Because of the springiness of the material of which club 30 is made, it is not possible simply to bend the hosel 32 until the shaft reaches the desired point on the lie or loft scale. There will always be some spring back when the wrench is released, and consequently any bending that is done must go past the point of the desired final adjustment. The degree of spring back varies with the make of club and the material from which the club is made, but by making the correction in increments, the correct value can be obtained very readily. So far as I am aware no other device in existence can provide accurate repeatable measurements of the lie and loft of a golf

club, regardless of the maker, and at the same time hold the club sufficiently firmly so that corrections may be made while the club remains in the measuring device to permit exactly controllable corrections.

An experienced operator can also make complex corrections, such as fanning or hooding a set of clubs while the club is clamped in my device, by first changing the loft and the lie about the same amount in the same direction, then resetting the scales to the original values and bending the hosel with wrench 80 in a direction at 45° to both scales until the original lie and loft reading is restored. This changes the relationship of face 33 to shaft 31 in a plane at an angle to the planes in which lie and loft are measured and should not be done except when specifically recommended by an expert.

In the hands of a golf professional, my device greatly improves the effectiveness of the professional golf instruction provided to clients, since the pro can be sure that the clubs used by the client are each set to the standard for that club as determined by the pro or by the manufacturer, or that the particular club is corrected as recommended by the pro to compensate for known characteristics of the client. Should any club become maladjusted, it may readily be corrected.

At the same time, the angles of the various parts to the base plate 20 are so chosen that they not only measure the loft and lie of the golf club 30 accurately, but in addition the parts are so disposed as to take the minimum of space consistent with easy readability of the scale. I prefer that the jack 21 be tilted 25 degrees from the horizontal and that the rest of the device be tilted correspondingly.

I claim:

1. In a golf club measuring device comprising closable and releasable clamping means for holding the head of a golf club in fixed position, and measuring means for determining the alignment of the shaft of a club respecting the head of the club, the improvement comprising reference means for guiding an operator in positioning the head of the club in a predetermined position with respect to said measuring means prior to closing said clamping means, said reference means including an abutment means for engaging at least one point on the hosel of a golf club adjacent the head of said club.

2. In a golf club measuring device comprising closable and releasable clamping means for holding the head of a golf club in fixed position, and measuring means for determining the alignment of the shaft of a club respecting the head of the club, the improvement comprising reference means for guiding an operator in positioning the head of the club in a predetermined position with respect to said measuring means prior to closing said clamping means, said reference means including an abutment means for engaging at least one point on the hosel of a golf club adjacent the head of said club, said reference means including additional reference abutments sufficient to cooperate with said first abutment to predetermine the position of a said club head when said club head operatively engages all of said reference abutments.

3. The device of claim 2 wherein said additional reference abutments include an abutment having a plane surface positioned for surface contact with the face of a said club head and two abutments positioned for at least point contact with different parts of the sole of a said club head.

4. In a golf club clamping device comprising means defining a reference plane adapted to receive the striking face of the head of a golf club in contact therewith, said plane having an end located to permit the hosel of a club having a face in contact with said plane to project past the reference plane, and means defining a pair of reference points in a line spaced slightly from one margin of said plane and adapted to contact the sole of the head of a golf club when said golf club is in face contact with said means defining said plane, a clamping member adapted to secure the head of a golf club rigidly with its striking

face against said reference plane and the sole against said means defining said pair of reference points, the improvement comprising means defining a third reference point, said means being spaced from but adjacent to said end of said reference plane and positioned to engage the hosel of a golf club in face contact with said reference plane, said clamping member being adapted to secure the hosel against said means defining said third reference point, and indicator means bearing at least one indicator scale and so positioned with respect to said reference points and said reference plane as to measure the alignment of the shaft with respect to the striking face of a golf club clamped in the clamping device, said indicator means being so related to said means defining said reference plane and said means defining said reference points as to measure both the lie and the loft of the shaft of said club with reference to the head of a said club by a single adjustment of said indicator means.

5. The device of claim 4 in which said indicator means comprises both lie and loft scales.

6. The device of claim 4 in which said clamping member comprises a shoe pivoted to a bell crank and adapted to engage the rear surface of a club head and hold the club in contact with all of said means defining said reference points and said reference plane.

7. A golf club measuring device comprising a lie scale, a loft scale angularly related to said lie scale, a movable part bearing an indicator which is movable along one said scale and secured to the other said scale, clamping means which positively secure a golf club with its head in a fixed orientation determined solely by the contours of the club, a part of said clamping means comprising means to fixedly locate a contour of the shaft, said club when clamped having its shaft extending into the angle between said scales, said indicator means comprising means for moving said scale secured thereto and said part bearing said indicator to bring said scale secured thereto into contact with the shaft of a golf club secured in the device, the movement of said part bearing said indicator being adapted to indicate on the fixed scale the displacement of the movable scale, the point of contact between the movable scale and said club being an indication of a reading on said movable scale.

8. A golf club measuring device comprising a lie scale, a loft scale angularly related to said lie scale, a movable part bearing an indicator which is movable along one said scale and secured to the other said scale, clamping means for securing a golf club with its head in a fixed orientation and its shaft extending into the angle between said scales, said indicator means comprising means for moving said scale secured thereto and said part bearing said indicator to bring said scale secured thereto into contact with the shaft of a golf club secured in the device, the movement of said part bearing said indicator being adapted to indicate on the fixed scale the displacement of the movable scale, the point of contact between the movable scale and said club being an indication of a reading on said movable scale, the movable scale being pivotally mounted with respect to said movable part, a stop limiting pivotal movement of said scale against said stop, whereby to establish the correct angular relation between said scales.

9. The device of claim 8 in which the loft scale is the movable scale.

10. The device of claim 8 in which the biasing means comprises arranging the pivot of the movable scale at an angle to the vertical so that it is gravity biased against the stop.

11. The device of claim 8 in which the clamping means and the scales are all substantially inclined from the horizontal so that said scales substantially overlies said clamping means.

12. The device of claim 8 in which the pivot of the movable scale is normal to said scale, the clamping means and the scales all being substantially inclined from the

horizontal so that the inclination of said pivot supplies the bias of said movable scale against said stop.

13. The device of claim 8 in which the lie scale is a straight scale marked in degrees and including indicia for various golf clubs indicating the standard lie angle for each said club.

14. The device of claim 8 in which the loft scale is a portion of a degree circle marked in degrees and including indicia for various types of golf clubs indicating the standard loft angle for each said club.

15. In a golf club clamping device comprising means defining a reference plane adapted to receive the striking face of the head of a golf club in contact therewith, said plane having an end located to permit the hosel of a club having a face in contact with said plane to project past the reference plane, and means defining a pair of reference points in a line spaced slightly from one margin of said plane and adapted to contact the sole of the head of a golf club when said golf club head is in face contact with said means defining said plane, a clamping member adapted to secure the head of a golf club rigidly with its striking face against said reference plane and the sole against said means defining said pair of reference points, the improvement comprising means defining a third reference point, said means being spaced from but adjacent to said end of said reference plane and positioned to engage the hosel of a golf club in face contact with said reference plane, said clamping member being adapted to secure the hosel against said means defining said reference point, a lie scale, a loft scale angularly related to said lie scale, said clamping means being aligned to hold a golf club with its shaft extending into the angle between said scales, a movable part bearing an indicator which is movable along one said scale and secured to the other said scale, said indicator means comprising means for moving said scale secured thereto and said part bearing said indicator to bring said scale secured thereto into contact with the shaft of a golf club secured in the device, the movement of said part bearing said indicator being adapted to indicate on the fixed scale the displacement of the movable scale and said club being an indication of a reading on said movable scale, said scales being so related to said reference plane and said reference points that movement of said movable part is the only movement required to cause indications on both the lie and the loft scale of respective readings accurately measuring the club.

16. A golf club measuring and correcting device comprising in combination, means defining reference surfaces adapted to bear against the head and hosel of a golf club only when the striking face and the lower end of the hosel of said club have a defined position respecting said means, clamp means adapted to secure a golf club in the defined position respecting said reference point means, said clamp means and said reference point means being adapted to leave the hosel of said golf club substantially completely unobstructed, lie and loft measuring means adapted to permit free movement of the shaft of a golf club in all directions while in measuring position, and a correcting tool comprising a generally cylindrical section adapted to receive said hosel and having ends spaced apart a distance less than the length of said hosel, and means for applying torque to said tubular member about an axis defined by the engagement of one said end of said tubular member with said hosel, whereby to con-

trollably correct the lie and loft of said club without removing said club from said measuring device.

17. The device of claim 16 in which said cylinder is open at one side to admit the hosel.

18. The device of claim 16 in which a handle for manual manipulation extends from said cylinder at an acute angle to its axis.

19. The device of claim 16 in which said clamping means and said scales are so related that a single adjustment of said loft measuring means is adapted to cause correct indications to register on both of said scales.

20. A golf club measuring and correcting device comprising in combination, means defining reference surfaces adapted to bear against the head of a golf club only when the striking face and the lower end of the hosel of said club have a defined position respecting said means, clamp means adapted to secure a golf club in the defined position respecting said reference point means, said clamp means and said reference point means being adapted to leave the hosel of said golf club substantially completely unobstructed, lie and loft measuring means adapted to permit free movement of the shaft of a golf club in all directions while in measuring position, and a correcting tool comprising a generally cylindrical section adapted to receive said hosel and having ends spaced apart a distance less than the length of said hosel, and means for applying torque to said tubular member about an axis defined by the engagement of one said end of said tubular member with said hosel, whereby to contrallably correct the lie and loft of said club without removing said club from said measuring device, said lie and loft measuring means further comprising lie and loft scales, a movable part bearing an indicator which is movable along one said scale and secured to the other said scale, said indicator comprising means for moving said scale secured thereto into contact with the shaft of a golf club in the defined position, the movable scale being pivotally mounted with respect to said movable part, a stop limiting pivotal movement of said scale in a direction to decrease the angle between said scales and means biasing said movable scale against said stop, whereby to establish the correct angular relation between said scales.

21. The device of claim 20 in which the biasing means comprises arranging the pivot of the movable scale at an angle to the vertical so that it is gravity biased against the stop.

22. The device of claim 20 in which the pivot of the movable scale is normal to said scale, the clamping means and the scales all being substantially inclined from the horizontal so that the inclination of said pivot supplies the bias of said movable scale against said stop.

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U.S. Cl. X.R.