MALTBY DESIGN

THE GOLFWORKS®

ASSEMBLY AND OPERATING INSTRUCTIONS FOR:

The Golf Club And Economy Loft and Lie Machine

code: GAM

GAM03/02

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The Golf Club Machine and Economy Loft and Lie Machine

The Golf Club Machine and Economy Loft and Lie Machine are precision made machines designed to measure the loft and lie of right or left handed woods, irons and putters and alter the loft and lie of all right and left handed irons and putters. Each machine is individually manufactured in The GolfWorks® machine shop. Each Golf Club Machine is registered and identified with its own engraved serial number. These machines represent the finest quality and accuracy available in a loft and lie machine today.

Parts Check List

The Golf Club Machine is shipped in one large carton. This large carton contains the steel machine base and a smaller carton which holds the machine head and other necessary equipment. Unpack your machine carefully and check to see that the following items are enclosed.

Golf Club Machine

____ 1 Golf Club Machine Stand
____ 1 Club Holding V-Block and Arm Assembly
____ 1 Bending Unit
____ 1 Bending Bar
____ 1 Golf Club Protractor
____ 2 Hex Key Wrenches (1-small, 1-large)
____ 2 Custom Fitting Pads
____ 4 Base Leveling Feet
____ 4 5/16"-16 socket Head Cap Screws
____ 1 1/4" x 1 1/2" Cap Head Screw with Lock Nut
____ 1 Operation Manual
____ 1 Repair In Pictures Manual

Economy Loft and Lie Machine

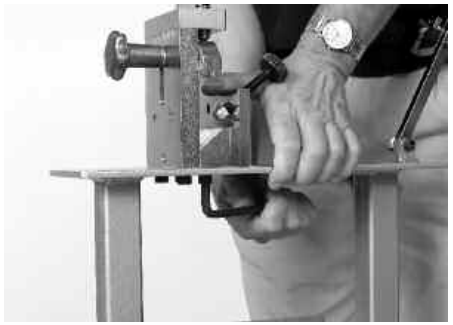
____ 1 Brass Hosel Protector
____ 1 1/4" Hex Key Wrench
____ 4 3/8" x 3 1/2" bolts
____ 4 Nuts and Washers
____ 1 Golf Club Protractor
____ 2 Custom Fitting Pads
____ 1 Operation Manual
____ 1 Bending Bar
____ 1 Repair In Pictures Manual

ASSEMBLY INSTRUCTIONS

Your machine can be operated as a portable or bolted permanently to the floor (GAM or, EAM if stand included) or workbench (EAM). Be sure to take time to consider its best location in your shop. **NOTE:** If you have purchased the Economy Loft and Lie Machine, disregard steps 1-3. The Economy Loft and Lie Machine is ready for work as soon as you find a convenient location in your shop. Follow the instructions in Step 4 regarding the leveling of your Economy Loft and Lie Machine. If you purchased the Machine Stand assemble the two together with the 4 -3/8 bolts and again proceed to Step 4.

STEP 1 With the 5/16" x 1 1/2" cap head screw and special locking nut provided, assemble the Club Holding V-Block and Arm to the small steel block that is welded to the top of the base plate. Use an open end wrench (not provided) along with the small Hex Key Wrench to snug up the Holding Arm tight enough so it will only move when you wish to move it.

STEP 2 Assemble the main Bending Unit to the base with four 3/8" socket head cap screws provided. Tighten all hex screws securely using the large Hex Key Wrench provided. Bolt the Bending Unit onto the base as shown to save needless walking around the machine while bending and measuring right handed irons and putter.



STEP 3 Screw the four leveling feet into the base as far as they will go.

STEP 4 Move the Golf Club Machine to its proper location in your shop and prepare to level the machine.

A. Place a level on the machine base Parallel to the face progression lines and adjust the Leveling Legs up or down as needed until the level reads 0°. The Economy Loft and Lie Machine will require the use of shims (old scorecards work well) between the bench top and machine base to alter the plane of the base.

B. Change position of level so it is PERPENDICULAR to face progression lines and adjust Leveling Legs up or down as needed until the level reads 0°. Again, use shims when leveling the Economy Loft and Lie Machine. When both readings are 0° your machine is accurately leveled and ready to operate.

STEP 5

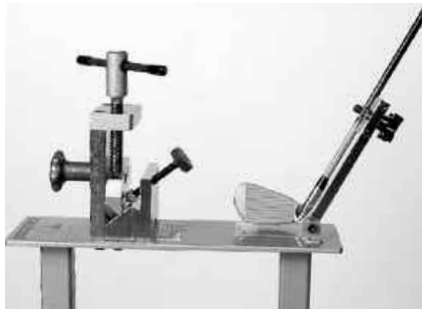
Place Bending Bar and Hex Key Wrenches and Brass Hosel Protectors (Economy Machine only) in the the tool trays of your Golf Club Bending Machine (not applicable with the Economy Machine). Also, place one of the Custom Fitting Pads on the machine by removing the backing paper from the adhesive and pressing into place.

NOTE: IF you plan to keep your Golf Club Machine in a permanent place in your shop we strongly recommend bolting the machine to the floor using concrete anchors or similar bolting hardware, depending on the composition of your shop floor. Four 1/2" diameter holes are found on the base of your machine for this purpose.

MEASURING ACTUAL LOFT AND LIE

Each machine is very easy to use and operate. With very little practice you will become proficient in its use and able to produce very accurate results in your loft and lie alterations.

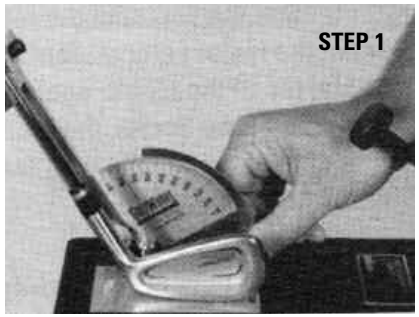
STEP 1 Place the shaft on the club in the V-Block of the Measuring Arm and lightly tighten the knob so the shaft will not wobble in the block yet still be able to lower or raise it. Lower the club head to the base and position it so that the sole of the club head is touching the base at the point just below the center of the face. Learn to do this visually by sighting the center of the face, looking down to the sole just below this point, and finally lowering the head so that this point of the sole contacts the machine base.



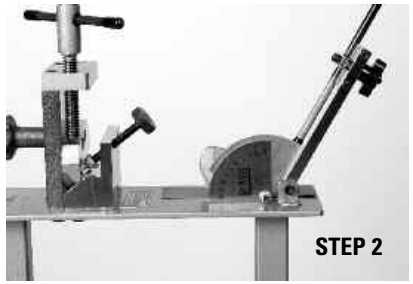
Note correct positioning of both a wood and an iron. In the beginning you can use two pieces of paper to double check yourself in the proper placement of the head.

Position the clubhead as described above. When you feel you have the club in the proper sole position, slip one of the pieces of paper in from under the toe of the club and the other piece of paper in from under the heel until they just stop on their own. The point halfway between the two pieces of paper is where the sole of the clubhead is touching the base of the machine. If this point is not the exact center of the face, readjust the club until correct using the two slips of paper once again as your guide.

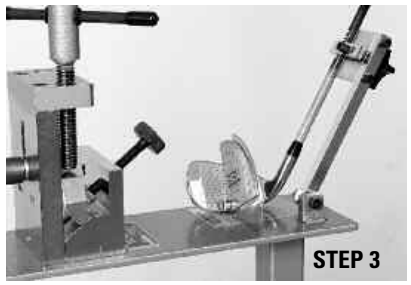
STEP 2 Place the Golf Club Protractor on the base, loosen the thumb screw and adjust so that it rest against the measuring arm. Tighten the thumb screw. The lie angle is read on the bottom scale, reading from right to left. Record this specification on the Fitting Sheet.



STEP 3 Once positioned, be sure the leading edge of the iron head is parallel to the lines of the face progression sticker. This completes the proper placement of the club and is the first necessary step for accurate loft measurement.



STEP 4 Leave the club in the same position (leading edge parallel to the lines) and place the Golf Club Protractor perpendicular to the face of the club. Loosen the thumb screw and adjust the gauge flat against the face of the club. Tighten the thumb screw. The loft angle is read from the top scale, reading from left to right. Record this specification.



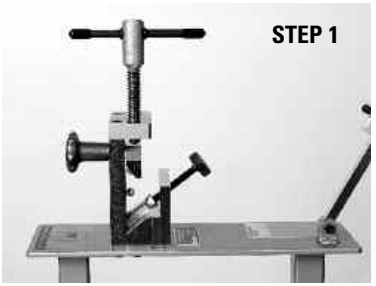
Example : The loft reading with the Golf Club Protractor against the face of the sample 5 iron is 28°. Read on the top scale going from left to right.

USING THE BENDING UNIT AND THE BENDING BAR

Your Bending Unit comes set up for bending right hand irons and putters. If you are beginning with a left hand club see the Appendix Section of this Operating Manual for instructions for changing the Bending Unit to accept left hand irons and putters.

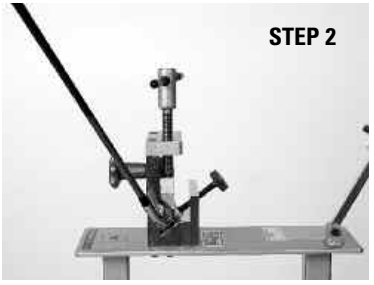
STEP 1 Unscrew the large Double Handle Clamping Screw to the UP position. Loosen the Steel Mushroom Knob and slide the Hold Down UP to allow for entrance of the iron.

STEP 2 Place the iron head into the Bending Unit toe first with the face flat against the major vertical steel piece. Be sure the toe of the club is against the Brass Acorn Head Stop Screw, the face flat to the inside of the Unit and the sole resting in the V of the sole wedge.

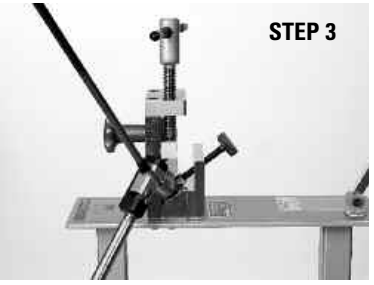


STEP 3 Lower the Hold Down onto the top line of the iron head, keeping the Hold Down flat against the inside of the Unit. Be sure the Brass Plugs found on the underside of the Hold Down are in contact with the top line of the head. When contact is made, secure the Hold Down by tightening the Mushroom Knob. DO NOT overtighten the Mushroom Knob; finger tight is all that is required.

***NOTE** : Only 2 of the 3 brass plugs are intended to be in contact with the top line of the iron during the clamping procedure.*

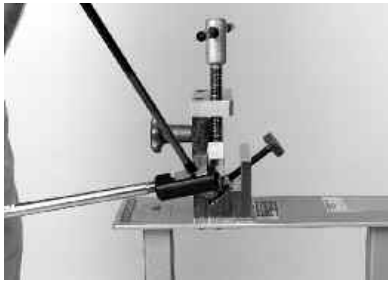


STEP 4 Screw the large Double Handle Clamping Screw down to contact the Hold Down and securely lock the iron head in the Bending Unit. Usually 1/2 turn of the Clamping Screw past snug is sufficient. The head is now secure and ready for bending.



STEP 5 Tighten the back hold-down clamp. Place the Bending Bar the hosel by turning the handle to open up the screw, and then tighten snug in a position low on the hosel. Be sure to allow enough room between the side of the bending unit and the hosel to be able to use the Bending Bar. The Economy Loft and Lie Machine's Bending Bar simply requires you to place the hook around the hosel over the Brass Hosel Protector.

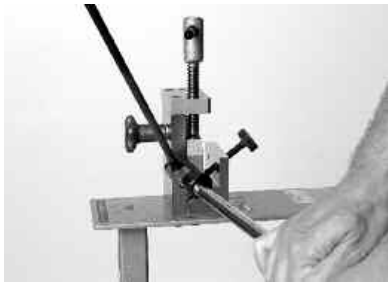
STEP 6- ALTERING LOFT



Swing Bending Bar into position as shown so that the bar is in line with the side of the machine and therefore perpendicular to the face of the club.

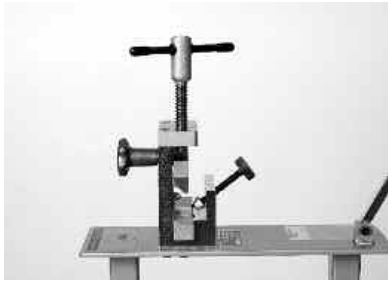
Grasp the bar handle as shown and lift straight up to DECREASE loft (Thus strengthening the loft) or push down with the bar to INCREASE the loft (and thus weaken the loft).

STEP 7 - ALTERING LIE



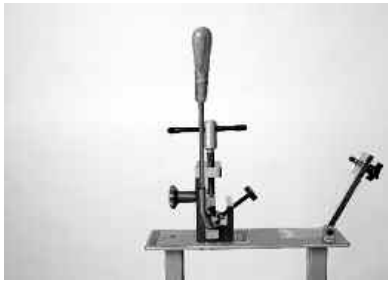
Swing the Bending Bar into position so that the bar is in line with the back of the iron hosel. Note as you place each of the different lofted irons into your machine that the position of the bar will always stay in line with the back of the hosel, but will slightly change with regard to its position relative to the side of the machine.

Grasp the Bending Bar with both hands as shown and lift up towards and in line with the shaft of the club and the back of the hosel to make the LIE MORE UPRIGHT. To make the LIE FLATTER, push directly away from the shaft and back of the hosel. Note that the direction of the bend is not in a vertical plane (as was the case in loft bending) but is in line with the back of the hosel as it is held in the Bending Unit. See Appendix for an alternative method of lining up the Bending Bar properly with the hosel for bending lie. See lie bending examples below:



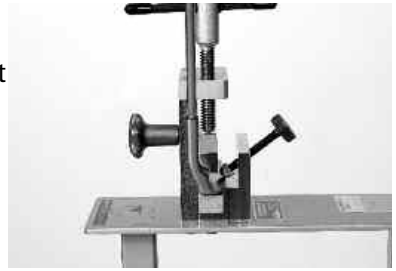
BENDING A PUTTER IN THE GOLF CLUB MACHINE AND ECONOMY LOFT AND LIE MACHINE

The bending machines are also designed to accept right and left hand putters for alteration of loft and/or lie. Read and follow these instructions for the proper way to use the machines for altering putters. Insert Putter Leveling Block as pictured.



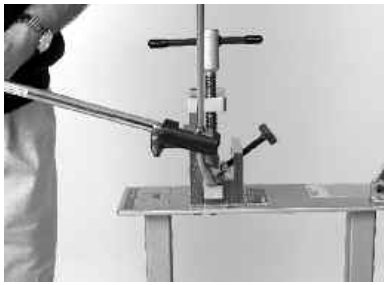
STEP 1 Place the head of the putter into the Bending Unit toe first with the SOLE OF THE PUTTER FLAT AGAINST THE PUTTER LEVELING BLOCK. This means that the face of the putter will not be flat against the inside of the machine, as is the case with all iron clubs.

STEP 2 Depending upon the blade length of the putter, you may have to remove the Brass Toe Stop Nut to allow the head to slide all the way into the Bending Unit. Be sure to allow enough room between the side of the Bending Unit and the hosel to be able to use the Bending Bar.



STEP 3 Slide the Hold Down to contact the top line of the putter and finger tighten the Steel Mushroom Knob. Rotate the Double Handled Clamping Screw down to contact the Hold Down and turn snug to lock the putter into the Bending Unit.

STEP 4 Use the bending Bar and the Brass Hosel Protector as before to perform the actual bending of the hosel. See photo below for proper clamping position of putters.



NOTE: To prevent marking the putter head due to various head shapes, a piece of brass shim stock or light cardboard placed between the hold down clamp and head is suggested.

APPENDIX

A. CONVERTING THE GOLF CLUB MACHINE AND ECONOMY LOFT AND LIE MACHINE TO ALTER LEFT-HAND PUTTERS AND IRONS

1. Place the large Double Handle Clamping Screw in the opposite threaded hole on the top of the Bending Unit.
2. Unscrew the Steel Mushroom Knob and place the Pinned Shoulder Bolt to the opposite hole. **BE SURE THE 1/8" DIAMETER PIN STAYS IN THE CHANNEL BETWEEN THE TWO HOLES.** Replace the washer and the Steel Mushroom Knob.
3. Remove the Brass Acorn Nut and place it in the outside hole on the opposite side. Tighten only finger tight.

The club may now be placed in the Bending Unit as before with the toe of the club entering from the opposite side of the machine. No change is necessary in the Measuring Unit and Arm to read left hand irons and putters.

B. MEASURING SOLE ANGLE

Understanding sole angle and its relationship with the loft of an iron is of vital importance to fully understanding proper loft alteration. Sole angle may be defined as the angle of the sole (from leading edge to trailing edge) to the ground when the shaft is perpendicular to the ground and face is square to the target. The following illustration shows the effect of changing loft on the sole angle.

Of these three sole conditions, square, bounce or scoop, the first two are considered acceptable and playable in an iron. Scoop is the condition to guard against as it is considered a definite detriment to the proper movement of the sole through turf during impact. Always remember that when you bend loft stronger (decrease the loft) you might be creating a scoop sole on the club. Therefore, learn to recognize sole angle before bending in order to make the proper fitting recommendations to your customers.

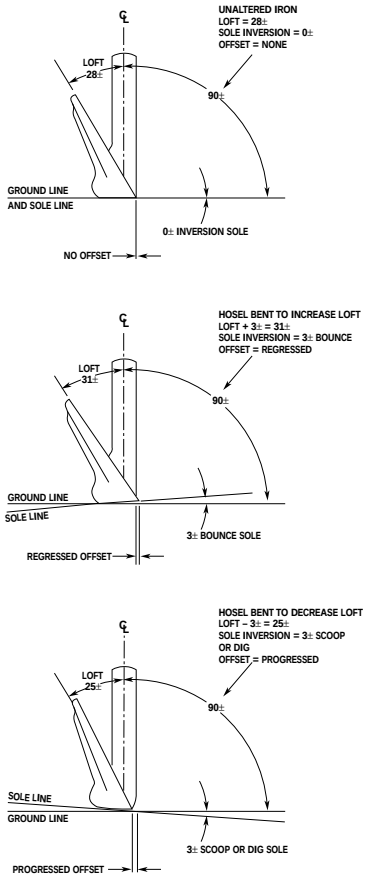


Fig. 36
Effect of altering iron lofts on offset and sole angle.

HOW TO MEASURE SOLE ANGLE

STEP 1 Place the club in the Measuring Unit in the square hit position soled properly with regard to lie and loft. In this position if the trailing edge of the head is touching the base and leading edge above the base the club is said to have a BOUNCE sole. If the leading edge is touching the base and the trailing edge is above the base the club is said to have a SCOOP sole. If both the leading edge and the trailing edges are touching the base or at the same level (this may be when the sole is radiused or cambered) then the club is said to have a SQUARE sole.

STEP 2 To measure the amount of bounce or scoop first take the loft reading while the club is being held in the Measuring Unit in the square hit position.

EXAMPLE A		EXAMPLE B
30°		30°

Next, recognize the general sole angle as either bounce, square or scoop using the method previously described. For the sake of our example, let's say that Example A has a bounce sole with the trailing edge touching the base and that Example B has a scoop sole with the leading edge only touching.

EXAMPLE A		EXAMPLE B
30°	Loft	30°
Bounce	General Sole Angle	Scoop

On Example A, rotate the club more closed until the leading edge just begins to touch the base. At this point measure the loft of the club and record it. On Example B, rotate the club in this case open, until the trailing edge just touches the base and measure the loft in this position.

EXAMPLE A		EXAMPLE B
30°	Loft	30°
Bounce	General Sole Angle	Scoop
27°	Loft after Rotation	33°

Now subtract the loft measurements on both examples from the real or true loft to determine the amount of bounce or scoop.

EXAMPLE A		EXAMPLE B
30°	Loft	30°
Bounce	General Sole Angle	Scoop
27°	Loft after Rotation	33°
30° - 27° = 3° Bounce		30° - 33° = 3° Scoop

The main point of these examples is you should always check the initial sole angle when you are asked to decrease or strengthen the loft of an iron by more than 2°. If the sole angle is square or scoop to begin with, you may render the clubs less playable unless the soles are reground after bending. We recommend pages 147-152 in *Golf Club Design, fitting, Alteration and Repair* .

C. BENDING BRAND NEW IRONS

Often, as a custom club assembler, you will be asked to alter the loft and/or lie of new irons as a condition of sale. This will mean bending brand new irons while trying to avoid marking up the heads from the stresses of the bending procedure. For best results follow these steps when bending new irons.

STEP 1 Place two strips of lead tape on the face of the iron, one of the toe side of the scoring lines and the other on the heel side.

STEP 2 Wrap a strip of lead tape over the top line of the iron, allowing the tape to overlap the front and the back of the top line.

STEP 3 Cover the Sole Block of the Holding Unit with 2 strips of lead tape to cushion the sole of the iron head.

STEP 4 Spiral wrap the hosel of the iron with lead tape for the entire area to be held by the bending bar.

STEP 5 Cover the lead tape hosel with one of the Brass Hosel Protectors

STEP 6 When bending, keep the bar as tight on the hosel as possible to cut down on the chances of leaving a mark on the back of the hosel.

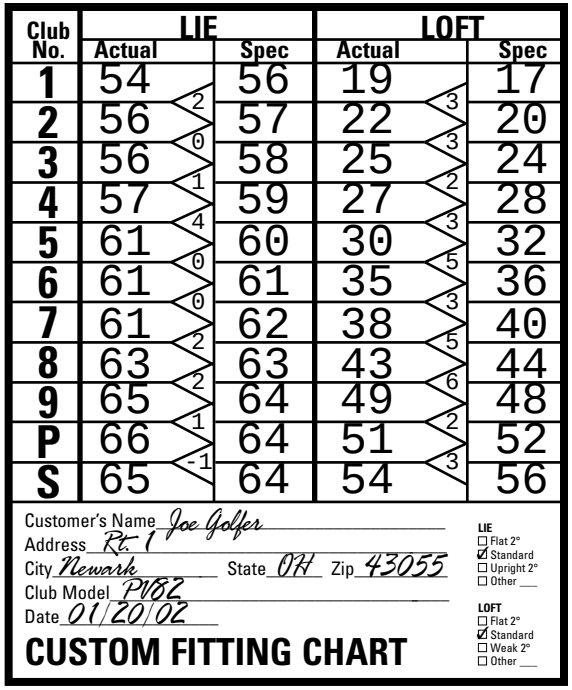
D. THE BRASS HOLD DOWN PLUGS

As they become broken in, the three brass protector plugs found in the Hold Down will tend to shred and leave brass particles on the machine. THIS IS NORMAL. These brass plugs are designed to wear down and thus eliminate damage to the top line of the clubhead during the clamping procedure. It is recommended that when the plugs become very worn, re-beveling with a file will help to restore them to a new workable condition. These brass plugs will last for a long time. However, should replacement become necessary, just send us the Hold Down with your name, address and serial number of the machine and The GolfWorks will replace the plugs free of charge.

E. EXAMPLE FOR USE OF THE CUSTOM FITTING PADS

The purpose of the Custom Fitting Chart is to provide visual reference information to aid in troubleshooting and decision making before bending any iron (s). First, measure all the lofts and lies and record them in both "Actual" columns under Loft & Lie.

Next, in the small triangle space to the right, put the difference in readings between each two successive irons. If the readings increase from the No. 1 iron to the "S" iron, the number in the triangle will be positive numbers.



Club No.	LIE Actual		LIE Spec	LOFT Actual		LOFT Spec
1	54	2	56	19	3	17
2	56	0	57	22	3	20
3	56	1	58	25	2	24
4	57	4	59	27	3	28
5	61	0	60	30	5	32
6	61	0	61	35	3	36
7	61	2	62	38	5	40
8	63	2	63	43	6	44
9	65	1	64	49	2	48
P	66	-1	64	51	3	52
S	65		64	54		56

Customer's Name Joe Golfer
Address Rt. 1
City Newark State OH Zip 43055
Club Model P168
Date 01/20/02

CUSTOM FITTING CHART

LIE: ☐ Flat 2° ☑ Standard ☐ Upright 2° ☐ Other ___
LOFT: ☐ Flat 2° ☑ Standard ☐ Weak 2° ☐ Other ___

However, if the numbers decrease, as is the situation in the example between the "P" & "S", the numbers will be negative or in this case -1°. The numbers in the triangles immediately point up problems such as the case between the lie of the No. 4 and No. 5 irons. Each of these irons is not severely out of factory spec, but they are out of spec tolerance on opposite sides of the spec thus making this too much of a difference and not acceptable. This same situation exists between the No.8 and No.9 iron regarding lofts. Last, write in the desired or factory specs and decide how much to bend each club.

Note: *Besides the situation mentioned above, there are additional problems with this set requiring that every club be altered in the example.*

F. BENDING INVESTMENT CAST STAINLESS STEEL IRONS

1. Too many repairmen turn away from bending investment cast stainless steel clubs because they lack knowledge and experience. Investment cast clubs have been made with many varieties of stainless steel, some of which are very soft and bendable. Most cast clubs may be bent as much as 3° in any direction, but for safety it is recommended to restrict bending to a 2° change.

2. The secret to beginning proper stainless steel bending is to learn the "feel" of the metal in each head. Learning the "feel" of stainless steel is best achieved by alternately placing two irons in your machine, one a harder cast stainless head and the other one a forged carbon steel variety. Apply equal pressure to both clubs with the Bending Bar taking care to note the differences in their resistance to your bending pressure. The harder cast stainless steel head will feel "tight" or very springy when compared to the feel under bending pressure of the carbon steel head. Because experience is the best teacher in determining whether a head is cast stainless or forged carbon steel, we recommend practice with your machine and different clubs as the best method of learning.

3. The most effective method for altering the loft and lie of the harder, cast stainless steel clubs is to apply a series of firm exertions on the hosel with the bending bar. As opposed to the more constant steady pressure used to bend forged carbon steel heads, this method of stainless bending is best described as a series of "jolts" of firm pressure with the bar. ON the harder stainless heads, you will not feel the actual bend as it occurs.

4. Until you have achieved experience in bending the softer clubs, you may wish to turn down requests for altering the harder stainless steel type clubs. However, to become a full service repair shop you will eventually need to acquire the skills required to bend these heads. Regardless of experience, The GolfWorks does not recommend attempting to bend a hard, cast stainless steel head of the over-the-hosel type construction. While there are some models of these irons or putters that have been made from brass or very soft stainless steel, the general rule is to turn these clubs away. Should the hosel post extending up the shaft break, in cannot be effectively rewelded.

5. If you should happen to break a conventional shaft inside hosel iron head, The GolfWorks does offer welding as on of its repair services. Check the services section of the current GolfWorks catalog for the cost of this repair service.

G. FITTING OF LOFT AND LIE

The GolfWorks recommends that you read and study *The Complete Golf Club Fitting Plan*. Methods for fitting both in the address position as well as during impact are discussed in detail, and should be well in mind before any fitting session.

H. MANUFACTURERS' SPECIFICATIONS FOR LOFT AND LIE

Sometimes you will be asked to adjust a particular club to the original manufacturers' specifications for loft or lie. You may refer to Appendix 8 in the book, *Golf Club Design, Fitting, Alteration and Repair*, Appendix 8 in the 4th edition of *Golf Club Repair in Pictures* or pages 48-63 of Reference Tables and Information section from *The Complete Golf Club Fitting Plan* for lists of many of the manufacturers' specifications or check the manufacturer's website.

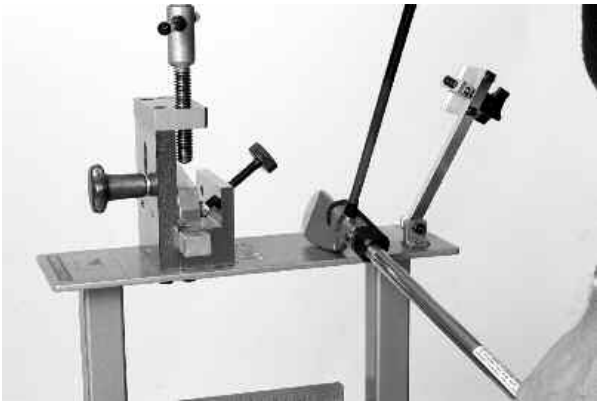
I. CHARGING FOR YOUR SERVICE

The general national average for altering the loft/lie is between $2.50 and $5.00 per club. Most shops will offer a flat fee for altering a full set of 8 or more clubs which will fall between $20 and $30. When assembling and selling a new set of irons, it is customary to offer the fitting and adjustment of loft/lie as on of the selling features of the set. It is an enticement for buying the set if you offer this service included in the total price of the new set.

J. ANOTHER METHOD OF CORRECTLY PLACING THE BENDING BAR FOR ALTERING LIE

(Applicable only with the Deluxe Bending Bar)

As mentioned earlier, the proper placement of the Bending Bar for the alteration of lie can be confusing to the beginning repairman. Try this method shown here for a foolproof method of accurate lie bending. Before you place the head in Bending Unit, tighten the Bending Bar on the hosel so the bar is directly in line with the sole of the club. Now place the club into the Bending Unit and tighten the clamp. Be sure to bend lie by either pulling up directly in line with the back of the hosel (upright adjustment) or by pushing down in line with the hosel (flattening adjustment).



K. TROUBLESHOOTING AND MAINTAINING YOUR MACHINE

1. Occasionally place a small dab of grease on the threads and tip of the Double Handle Clamping Screw to assure smooth operation.

2. Remember to NEVER overtighten the Steel Mushroom Knob on the Hold Down. Finger tight is all that is necessary.

3. Be sure the pin protruding from the head of the shoulder bolt remains in the channel found between the two holes of the Hold Down. When changing your machine from right to left hand and back, this is of primary importance.

4. Expect some marks to form on the Steel Wedge Plate that supports the sole of the club when held in the Bending Unit. This part is machined from cold rolled steel and is designed to absorb the pressures of the clamping.

5. Expect a wear mark to form where the Double Handle Clamping Screw contacts the Hold Down. This is completely normal for all golf club machines.

6. Occasionally check and retighten the Bending Unit to the base if applicable.

7. Always use the Brass Hosel Protectors with Economy Bending Bar to cut down on the degree of marking that the hosel may undergo during alteration. A tremendous amount of pressure is exerted during bending and it is normal to leave a small mark on the back of most hosels. Keeping the Bending Bar tight will help as well.

Parts List - The Golf Club Machine

Item	Order Part No.	Description	Required
1	GAMP01	Club Holding Arm Assembly (complete)	1
2	GAMP11	Face Progression Sticker	1
3	GAMP12	3/8" Shoulder Bolt/Washer	1
4	GAMP13	Double Handle Clamping Screw	1
5	GAMP15	Wedge Base Piece	1
6	GAMP16	Upright Base Piece	1
7	GAMP17	Top Base Piece	1
8	GAMP18	Hold Down Vise	1
9	GAMP19	Steel Mushroom Knob & Washer	1
10	GAMP20	Brass Hold Down Plugs	3
11	GAMP21	Brass Toe Stop w/Set Screw 1/4" x 20	1
12	GAMP22	Registration Plate	1
13	GAA	Custom Fitting Pads	2
14	GAMP23	Identification Emblems	2
15	GAMP24	Base Leveling Feet	4
16	GAMP25	Golf Club Machine Stand	1
N/S	GAMP26	Hex Key Wrenches (1-lrg., 1-sm)	2
N/S	GAMP27	Golf Club Machine Operating Manual	1
N/S	GAMP28	3/8" x 16 Cap Screws (for assembly of bending unit)	4

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Current prices will be quoted on request. Please mention serial number when ordering parts.