Golf Club Head Landscape

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Golf Clubs

Golf clubs are used in the sport of golf to hit a golf ball. Each club is composed of a shaft with a lance(grip) and a clubhead. Woods are used for long-distance fairway shots; irons, the most versatile class used for a variety of shots, and putters, used mainly on the green to roll the ball into the cup. An important variation in different clubs is loft, or the angle between the club's face and the vertical plane. It is loft that makes a golf ball leave the tee on an ascending trajectory, not the angle of swing; virtually all swings contact the ball with a horizontal motion. The impact of the club compresses the ball, while grooves on the clubface give the ball **backspin** (A well-struck golf shot will result in a large amount of backspin that will carry the ball higher into the air and further. Backspin also helps with distance control, as if there is enough backspin, the ball will "check" if it lands on the putting surface, and sometimes even creep backwards (in the opposite direction that the ball was flying) upon landing.). Together, the compression and backspin create lift. The majority of woods and irons are labeled with a number; higher numbers indicate shorter shafts and higher lofts, which give the ball a higher and shorter trajectory.

Types of Clubs

Drivers

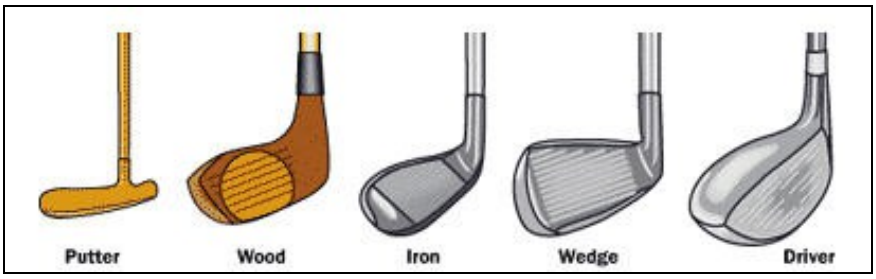
A driver is also called a 1-wood and is used for hitting a long, low tee shot across longer distances at long-yardage holes. They are made of forged titanium, stainless steel, or an Ti alloy and have a long shaft and wide head. Drivers vary in weights and lengths to match each lady golfer's handicap. There are three types of golf clubs:

- Forged titanium golf drivers are expensive and made up of larger titanium heads. They have an lightweight graphite shaft. For low and mid-handicap ladies.
- Stainless steel golf drivers have heavier, hard and strong compact heads. For low handicap golfers.
- Alloy golf drivers are less expensive and have Ti Alloy heads and graphite shafts. For starters and mid-handicappers.

Woods

Woods have a large head and a long shaft for maximum club speed and long-distance shots on the fairway. Originally woods had a clubhead made of wood, but nowadays they are also known as metalwoods, due to the fact that they are made of titanium, steel, or composite alloys. Higher-number lady golf club woods are generally called as fairway woods. They have a higher loft for high ball arcs, shallower face heights, and big flattened soles for easily gliding through the grass or rough. Most women have a driver, and a 3 and 5-wood in their bag. The heads have different volumes:

- Standard, 150-155 cc
- Midsized, up to 195 cc
- Oversized, up to 250 cc



Types of clubs

Irons

These are meant for approach shots less than 200 yards away from the green and for difficult lies, in the rough for example. The most common iron set includes all 3, 4, 5, 6, 7, 8, and 9-irons and a pitching wedge (see more on wedges below). The higher the number of an iron club, the shorter the shaft and the higher the loft. The 1 to 4 irons are long irons used for low and far distance shots. The 5 to 7 irons are called mid irons. And the 8-iron and up are short irons for short distance shots high in the air. There are two types of golf clubs irons heads: Cast, Cavity Back or Perimeter-Weighted irons have a large sweet spot. An forged Steel heads are more difficult because of a smaller sweet spot.

Wedges

High-loft irons for striking balls high in the air at a short distance in various lies: like approach shots, chipping, pitching, recovery and bunker shots. There are four types of golf clubs wedges:

- Pitching Wedge(PW) - For at least 130 yards and longer from the fairway into the green. The loft is 46 to 51 degrees.
- Sand Wedge (SW) - For digging the ball out of a bunker and sand shots. The loft is 55 to 57 degrees.

- Gap Wedge (GW), Approach Wedge (AW), Dual Wedge (D), Attack Wedge (AW) or Utility Wedge (UW) - With all these types of golf clubs you can make a variety of green or bunker shots. These different types of golf clubs fill in between the pitching wedge and sand and lob wedge. 50 to 58 degrees loft.
- Lob Wedge (LW) - For high short-distance hits around obstacles and to the green. 60 to 64 degree lofted.

Putters

Used for pushing and rolling the golf ball from close distance along on the green or apron towards the cup. Every lady golfer must have this type of golf club.

- Utility & Hybrid Ladies Golf Clubs

Hybrid ladies golf clubs are a cross, with a clubhead that combines the features, characteristics and benefits of an iron and a wood. Many women replace their 2, 3, and 4-irons with these types of golf clubs.

Parts of the Club



Parts of club

- **The Grip**

The grip of the golf club is important because it connects the club to the golfer's hands. According to the rules of golf, recognized by both ruling bodies, the grip has to be round, without obvious bumps, lumps or hollows.

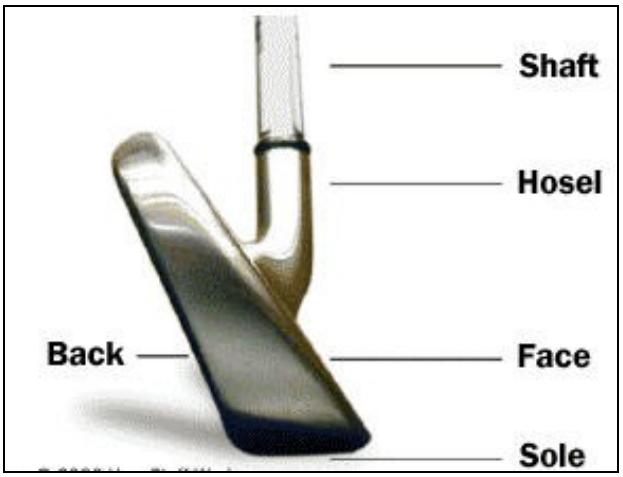
- **The Shaft**

The shaft of the golf club connects the grip to the head and, like the grip, must be basically round in cross section. Most modern golf club shafts are made of either steel or a carbon-fiber and resin composite. Carbon fiber has the advantage of being lighter than steel, but clubs with carbon-fiber shafts also tend to be more expensive.

- **The Head**

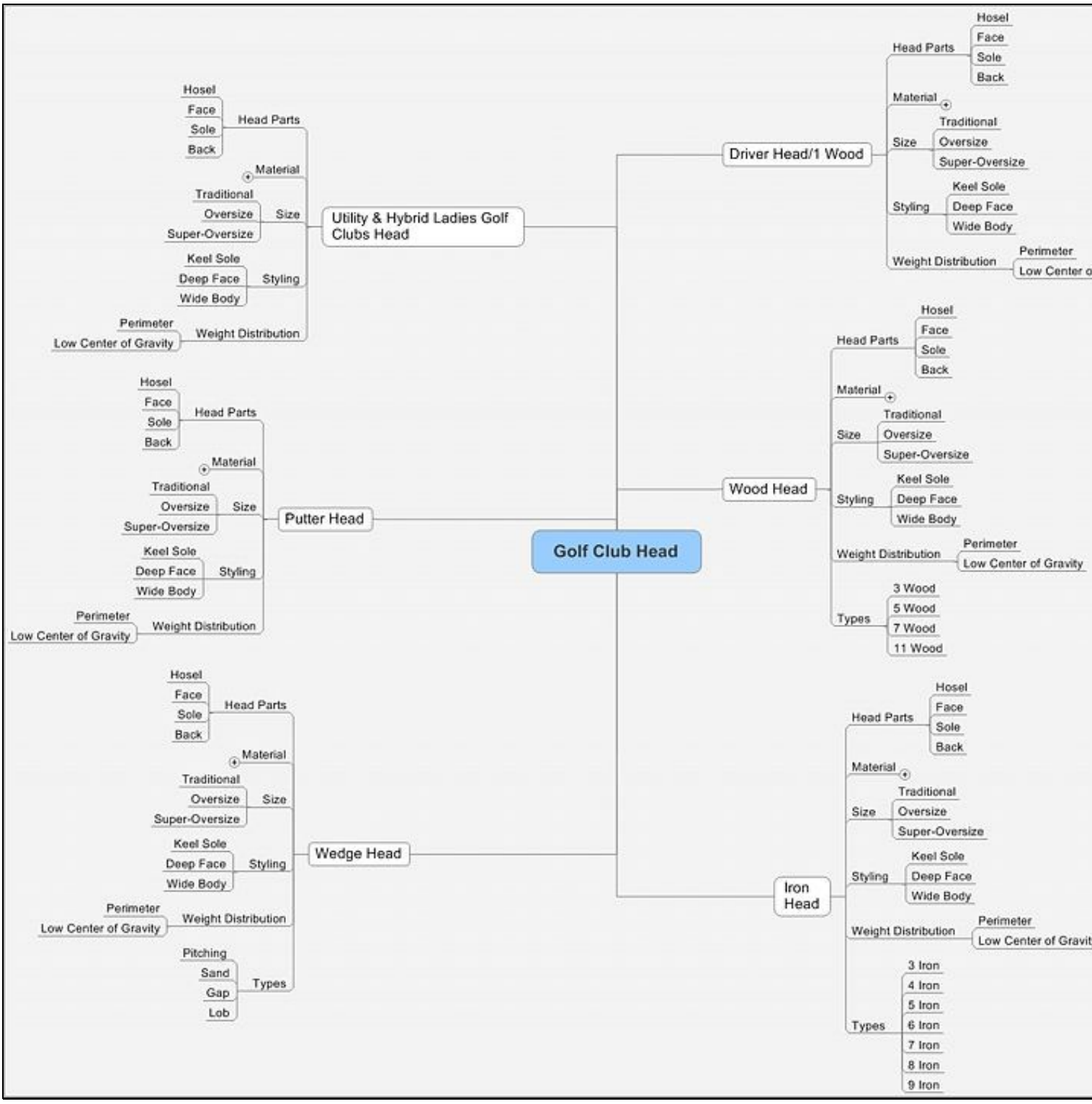
The head of the golf club is where all the energy of the swing is transferred to the golf ball. There is more variation in the appearance of golf club heads than there is in either shafts or grips, but all the variations fall into one of three broad categories: the heads of woods, irons and putters.

- **Parts of Club Head**



Parts of Head
The head of the golf club has several parts: the **Hosel**, where the head connects to the shaft; the **Face**, which actually strikes the ball; the **Sole**, which is the part closest to the ground; and the **Back**, which is on the side opposite the face.

Golf Club Head Taxonomy



Golf Club Head Taxonomy

Search History

Concept Table

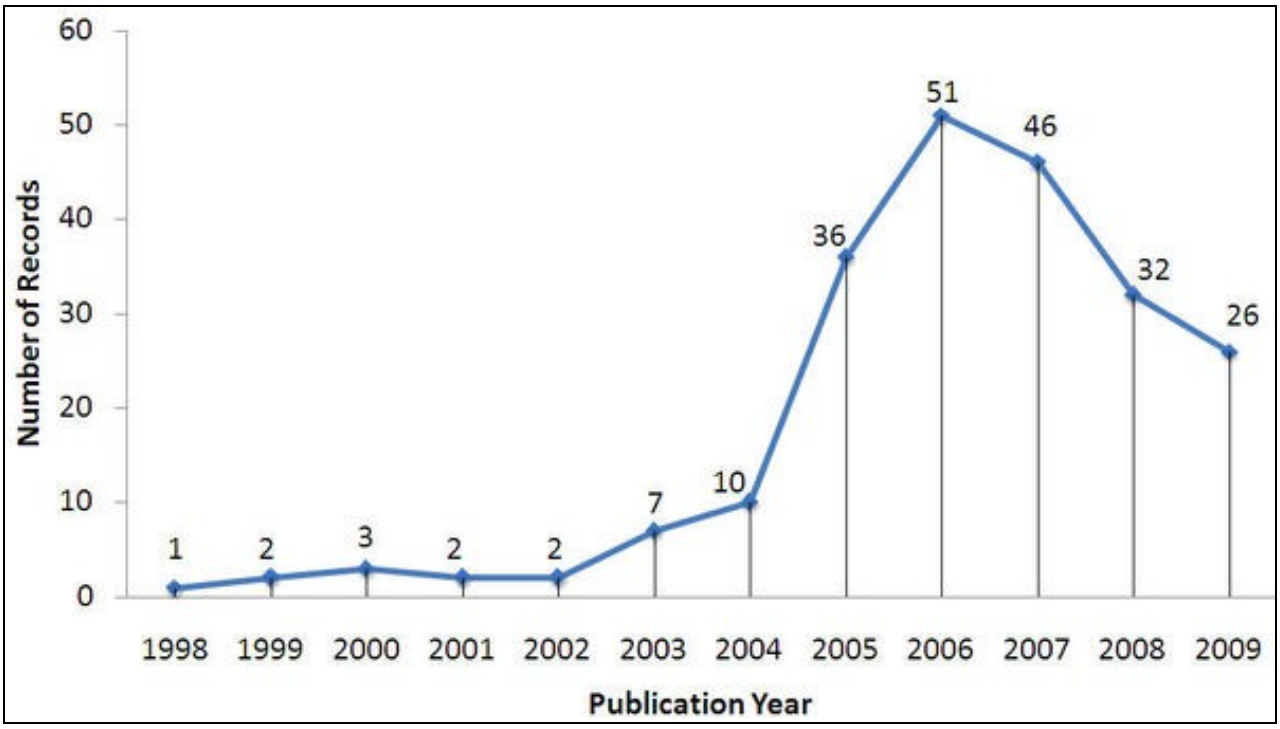
S.No	Concept 1	Concept 2	Concept 3	Concept 4	Concept 5	Assignee	Control Patents	Patent Class Code	Defination
1	Golf	Clubhead*	Driver	Hosel	Impact	Sumitomo Rubber	US7066833B2	473	Games using tangible projectile
2	Gouf	Club Adj2 Head*	Wood	Face	Projectil*	Srixon	US6932715B2	340	Putter
3			Iron	Sole			US6913546B2	341	Toe and heel weighting

		Ball Adj 2 Strik*				SRI Adj2 Sport*			
4		Putter Adj2 Head*	Wedge				US6875130B2	305	Head and shaft connection
5		Head*	Putter				US6875126B2	304	One piece head and shaft:
6		Strik* Adj2 Surface*	Hybrid				US6852038B2	292	Head, shaft, and handle having particular combined center of gravity:
7		Crown					US6849003B2	290	Particular correlated head characteristic:
8							US6776726B2	A63B*	
9							US6719645B2		
10							US6716114B2		

Search Strategy

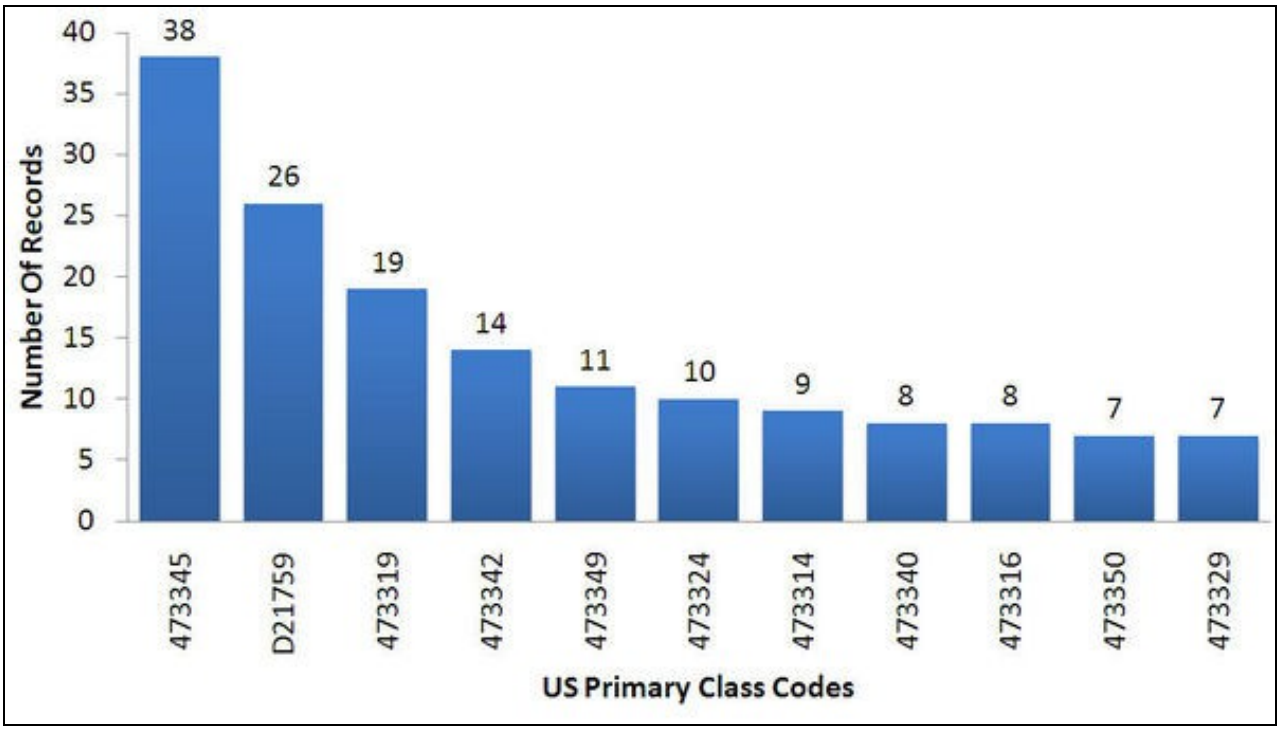
S.No	Concepts	Search String	Scope	Hits
1	Any Classification	(A63B*) OR (473* OR D21759)	Micropat - Full Text US - Grant & Application Date - 19981008 till date	31141
2	Keyword Set 1	((GOlf OR Gouf) AND (Clubhead* OR (Club Adj2 Head*) OR Head* OR Crown*)) OR ((Putter OR Driver OR Wood OR Iron OR Hybrid) Adj2 Head*) OR (Strik* Adj Surface) OR (Strik* Adj Face)	Same as above	20287
3	Keyword Set 2	(Hosel OR Face OR Sole) AND ((Golf adj2 Club adj2 Head*) OR (Clubhead* OR (Club Adj2 Head) OR Golfhead OR (Golf Adj2 Head)))	Same as above	5297
4	Assignee/Applicant	(Sumitomo Adj2 Rubber) Or (Srixon) Or (SRI Adj2 Sport*)	Same as above	1604
5	Assignee/Applicant (non-std)	(Sumitomo Adj2 Rubber) Or (Srixon) Or (SRI Adj2 Sport*)	Same as above	1594
6	Filter	(Golf Adj Ball)	Micropat - English Title US - Grant & Application Date - 19981008 till date	3644
7	Combined	2 OR 3		20296
8	Combined	7 AND 1		10057
9	Combined	4 OR 5		1604
10	Combined	8 AND 9		551
11	Combined- Final Query	10 NOT 6		218 (187 excluding family patents) - 73% efficiency

IP Filing Trend



IP Filing Based on Publication Year

Technology Trend



Technology Trend Based on US Primary Class Codes

- US Class Codes

S.No	US Code	Definition
1	473314	**Games using tangible projectile:** Club or club support: Head and shaft connection: Particular relationship between shaft longitudinal axis and head orientation
2	473316	**Games using tangible projectile:** Club or club support: Head and shaft connection: Shaft
3	473319	**Games using tangible projectile:** Club or club support: Head and shaft connection: Shaft: Including nonmetallic material or vibratory wave modifying feature: Filament (e.g., fiber, etc.) or sheet wrapped about shaft longitudinal axis

4	473324	**Games using tangible projectile:** Club or club support: Head and shaft connection: Head
5	473329	**Games using tangible projectile:** Club or club support: Head and shaft connection: Head: Striking face surface deforms upon impact (e.g., resilient, etc.)
6	473340	**Games using tangible projectile:** Club or club support: Head and shaft connection: Head: Putter
7	473342	**Games using tangible projectile:** Club or club support: Head and shaft connection: Head: Striking face insert
8	473345	**Games using tangible projectile:** Club or club support: Head and shaft connection: Head: Hollow body
9	473349	**Games using tangible projectile:** Club or club support: Head and shaft connection: Head: Particular material composition or mass distribution
10	473350	**Games using tangible projectile:** Club or club support: Head and shaft connection: Head: Particular material composition or mass distribution: Recess or cavity behind striking face
11	D21759	**Games using tangible projectile:** Striking, launching, or catching implement: Bat, club, or racket: Element or attachment: Golf specific

Sample Analysis of Patents

S. No.	Pat #	Title	Abstract	Publication Year	Assignee / Applicant	Patent Focus	Dolcera Summary
1	US7066833B2	Golf club head	A golf club head comprises a face portion having a front face defining a clubface for hitting a ball and a back face facing a hollow, wherein the clubface is provided along the edge thereof with a frontal groove having a groove width of not less than 0.5 mm, and the back face is provided with a backside groove extending along the frontal groove.	2006	Sumitomo Rubber Industries, Ltd.	Face with frontal groove	Golf club head has face portion having club face provided with frontal groove having width of not less than 0.5 mm such that face portion also includes back face provided with backside groove extending along frontal groove.
2	US6932715B2	Golf club head	A golf club head including a head base body which surface is formed with a coating film, the coating film including a topcoat layer consisting of an acrylic resin coating material containing polyethylene wax of 1.0 to 10.0 parts by weight with respect to acrylic resin solid content of 100 parts by weight. It is possible to improve abrasion resistance while making the best use of excellent impact resistance of the acrylic resin coating material, and thus, to effectively prevent peeling of the coating film. Further, it is possible to enhance the interlayer adhesion of inner layers with the topcoat layer.	2005	Sumitomo Rubber Industries, Ltd.	Topcoat layer coated head	Golf club head comprises head base body whose surface is formed with coating film with topcoat layer consisting of acrylic resin coating material.
3	US6913546B2	Wood-type golf club head	A wood-type golf club head comprises a club face provided with a high-resilience part whose Young?s modulus E is in a range of from 40 to 80 GPa. The head volume is in a range of from 270 to 420 cc. The horizontal inertial moment is in a range of from 3000 to 4500 (g?sq.cm), and the gravity point depth is in a range of from 15 to 25 mm.	2005	Sumitomo Rubber Industries, Ltd.	Design specification of head	Wood-type golf club head for hitting golf ball when playing golf, has volume ranging from 270 to 420 cc, horizontal inertial moment ranging from 3000 to 4500 grams square centimeter, and gravity point depth ranging from 15 to 25 cm.
4	US6875130B2	Wood-type golf club head	A wood-type golf club head which has a head volume of not less than 320 cc, a gravity point distance (C) in a range of from 25 to 35 mm, and a heel area width (A) in a range of from 30 to 52% of a clubhead width (B) .	2005	Sumitomo Rubber Industries, Ltd.	Projection of head center	Wood golf-club head, sets center of gravity distance between point, which projects head center of gravity on vertical plane, and shaft axis to 25 to 35 millimeters.
5	US6875126B2	Golf club head	A golf club head containing a hollow main frame and a face plate; the hollow main frame is composed of a main body and a crown plate welded to the main	2005	Sumitomo Rubber Industries, Ltd.	Crown plated head	Golf club head has crown plate formed with thickness ranging from 0.3 to

			body, the main body containing a hosel part, a sole part and a side part extending upwards from the periphery of the sole part except for a front edge of the sole part thereby providing an open top and an open front, and the crown plate covers said open top, whereby the main frame has an opening on the front thereof. The face plate is welded to the main frame to cover the front opening of the main frame; the face plate includes a face part defining a clubface, and a flange part extending backward from at least the upper edge of the face part; the main frame further including eaves extending from an upper edge of the opening to the inside of the flange part, wherein the thickness of crown plate is in the range of 0.3 to 1.5 mm.				1.5 mm and welded to main body of main frame to cover open top of main body.
6	US6852038B2	Golf club head and method of making the same	A golf club head comprises a hollow body having a cavity, a plurality of rib-like walls provided on the inner surface of the hollow body so as to extend backward from a position near the face portion, and a sound bar disposed behind the face portion so as to extend along the back face of the face portion. A method of making a golf club head comprises making a wax model of the hollow main body having an opening, wherein in order to prevent deformation of the wax model during making a casting mold, the wax model is provided with a brace which extends across the opening and protruding walls which are disposed on the inner surface of the wax model and extend backwards from the opening.	2005	Sumitomo Rubber Industries, Ltd.	Club head with sound bar	Golf club head has at least sound bar which is provided behind face portion of hollow body, on which rib-like walls are provided on inner surface, and extended at small distance from back face of face portion.
7	US6849003B2	Golf club head	A golf club head made of a fiber reinforced resin, comprising: a face hitting a ball; a crown forming an upper surface of the head; a sole forming a bottom surface of the head; a side extending between the crown and the sole from an edge on a toe side of the face to an edge on a heel side through a back face; and a hosel into which a shaft is inserted, wherein the crown has a thickness of equal to or less than 2.2 mm, and includes at least partially a high elastic part made of a fiber reinforced resin reinforced by at least one kind of fiber having a tensile elasticity modulus between 380 and 900 (GPa), and the hosel is provided with a vibration absorbent having a loss tangent between 0.7 and 1.5 at a temperature of 10° C. in the vicinity thereof.	2005	Sumitomo Rubber Industries, Ltd.	Fiber reinforced resin club head	Golf club head made of fiber reinforced resin, has hosel which is provided with vibration absorbent having loss tangent between 0.7 and 1.5 at temperature of 10 degrees Centigrade in vicinity.
8	US6776726B2	Golf club head	A golf club head comprises a ball striking face provided with a central region having a surface hardness Hc and a peripheral region surrounding the central region and having a surface hardness Hp less than the surface hardness Hc.	2004	Sumitomo Rubber Industries, Ltd.	Surface hardness of head	Golf club head has ball striking face provided with central region having surface hardness and peripheral region surrounding central region.
9	US6719645B2	Golf club head	A golf club head comprises a main body and a face member attached to the main body. The face member comprises a main portion forming a ball striking face and an extended part. The extended part extends 5 to 30 mm backward from at least part of the edge of the ball striking face. The thickness of the extended part is less than the thickness of the main portion.	2004	Sumitomo Rubber Industries, Ltd.	Design specification of head	Golf club head with ball striking surface and extension surface about 5-30 millimeters from edge of ball striking surface, such that thickness of extension surface is less than that of main portion.
10	US6716114B2	Wood-type golf club head	A wood-type golf club head having a head volume of not less than 300 cc comprises a head main body having a club face for striking a golf ball and a hosel defining a shaft center line (CL) corresponding to the center line of a club shaft, wherein the center of gravity (G) of	2004	Sumitomo Rubber Industries, Ltd.	Design specification of head	Wood type golf club head sets required distance from center of gravity of club head to shaft center line of

			the club head is disposed at a distance (L) of from 26 to 36 mm from said shaft center line (CL), a sweet spot (s) on the club face is disposed at a distance of not more than 3 mm from a club face center (c) of the club face, the club face has a toe-side end (Fe) disposed at a distance (B) of from 13 to 30 mm in the toe-heel direction towards the heel from a toe-side end (Te) of the club head, and a heel end (He) of the club head is disposed at a distance (A) of from 10 to 16 mm from the shaft center line (CL).				hosel, as well as distance from sweet spot to center of club face.

Sample Office Action Analysis

S.No.	Pat/Pub	Examiner	Assigne - Normalized	# of Applications Filed	Corresponding number of allowances	Number of abandonments	Pendency of applications issuing as patents	Time period from filing to first action (excluding expedited applications)	Number of appeals taken	R E (
1	US6797106B2	Aftergut, Jeff H.	Callaway Golf	1	1	0	2.8	1/10/2003 - 10/22/2003	0	
2	US6676537B2	Arbes, Carl J.	Top Flite Golf	1	1	0	3.7	12/8/2000 - 12/11/2002	0	
3	US7394917B2	Azarian, Seyed	SRI Sports	1	1	0	3.6	06/22/2004 - 06/27/2007	0	
4	US6860819B2	Blau, Stephen	Acushnet Company	1	1	0	2.8	11-12-2002 - 03-13-2003	0	
5	US7137903B2	Blau, Stephen	Acushnet Company	1	1	0	3.5	4/21/2004 - 11/23/2005	0	
6	US6679784B2	Blau, Stephen	Acushnet Company	1	1	0	3.5	12/23/2002 - 6/13/2003	0	
7	US7029402B2	Blau, Stephen	Bridgestone Sports	1	1	0	2.9	1/16/2003 - 12/15/2003	1	
8	US6984180B2	Blau, Stephen	Bridgestone Sports	1	1	0	3.6	3/13/2003 - 3/10/2004	0	
9	US6780123B2	Blau, Stephen	Bridgestone Sports	1	1	0		3/13/2003 - 1/28/2004	0	
10	US7507165B2			1	1	0			1	

		Blau, Stephen	Bridgestone Sports				12/29/2005 - 12/5/2006	
11	US7300359B2	Blau, Stephen	Callaway Golf	1	1	0	8/14/2006 - 8/6/2007	0
12	US7115046B1	Blau, Stephen	Callaway Golf	1	1	0	5/4/2005 - 7/18/2006	0

Notes

- Notice of allowance is equal to the number of NOA mentioned in the Image File Wrapper.
- First office is considered when there is any rejection of claims and there is a response from the patent office.
- Usually CTNF (Non-Final Rejection) is considered as first office action after the patent has been filed.
- In some cases CTRS (Response to Election / Restriction Filed) is considered as the first office action which is also related to claim rejection.
- In some patents Image Wrapper file is not available for them the data has been collected from the Transaction history.