THE INTRODUCTION OF THE RUBBER BALL

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THE RUBBER BALL was the invention of Coburn Haskell, a Cleveland golfer, in association with Bertram G. Work, of the B. F. Goodrich Co., at Akron, Ohio. In 1898 Haskell adapted the art of winding rubber thread produced by Goodrich under tension on a solid rubber core to produce a ball far livelier than the gutta.

The earliest covers were of black gutta percha, lightly lined by hand. Paint tended to fill the indentations, causing the balls to duck in flight just as had the first, smooth gutta balls. Dave Foulis, a Chicago professional, put one in an Agrippa mold and produced the bramble marking which was common to both the late gutta and early rubber balls.

Haskell balls were placed on the market by Goodrich in 1899 and became known as "bounding billies." It is estimated that they could be hit about 25 yards farther than the gutta, just as the gutta was about 25 yards longer than the feathery. The consensus at first, however, was that the distance a player gained did not offset the difficulty of controlling the lively ball on the green.

Travis Proves the Point

Walter J. Travis, considered the best putter of his day, resolved this debate by using a Haskell ball from an Agrippa mold in winning the USGA Amateur Championship in September, 1901. The gutta thereafter became a relic of the past, and the game was again revolutionized and popularized as it had been with the advent of the gutta.

The day of the ball made by hand in the professional's shop was then ending. A. G. Spalding & Bros., at Chicopee, Mass., a manufacturer of sporting goods, had undertaken production of gutta balls in 1898 and obtained a license to produce its first rubber ball, the Spalding Wizard, in 1903. Soon thereafter the balata cover was developed for Spalding, and its improved adhering qualities made it an important innovation.

WALTER J. TRAVIS

Earliest experiments with the rubber ball concerned the core. It was determined that the best cores, for resilience, were mobile cores which offered least resistance to distortion of the ball caused by clubhead impact. Operating on this theory, the Kempshall Golf Ball Co. produced the Kempshall Water Core, in which a small sac of water was substituted for solid rubber. The competition to produce a longer ball was under way. Manufacturers tried lead in solution, in an effort to combine weight with a mobile core, but lead proved injurious to curious children and animals. Zinc oxide

From an exhibit of the development of clubs and balls in "Golf House."

was substituted, but the pigment tended to settle and unbalance the ball. In the Twenties, true solutions involving glue, glycerin and water were developed for first-line balls.

More telling improvements have been made in winding, the critical factor in the modern ball. Machines replaced men and were constantly improved for this process. The race was to him who could obtain the greatest tension—to him who could most closely approach the breaking point of rubber thread. The earliest thread was of wild rubber from the Amazon River basin; development of plantation rubber greatly improved the quality of thread for this race.

Early rubber balls were made with the bramble and reverse mesh markings of the gutta ball, but experiments developed improvements as they revealed the best relationship of both depth and area of indentation to the ball's total surface. William Taylor, in England, reversed the markings on his molds to produce the dimple, in contrast to the bramble, in 1908. The mesh, in contrast to the original reverse mesh, was a natural aftermath.

Sizes and Weights

Haskell balls at first were light and large, about 1.55 ounces in weight and 1.71 inches in diameter, and they floated. In the absence of regulations governing size or weight, manufacturers pursued one another's leads in the quest for the most efficient combination. Heavy solutions in the core increased the weight to about 1.72 ounces in the first decade. Then both size and weight underwent a gradual reduction to 1.62 ounces by 1.63 inches about the time the Haskell patent expired in 1915.

Expiration of this patent increased the competition, which had tended to make courses obsolete. Therefore, in 1920 the USGA and the Royal and Ancient Golf Club of St. Andrews, Scotland, agreed jointly that (1) after May 1, 1921, balls used in their Championships must weigh not more than 1.62 ounces and measure not less than 1.62 inches, and (2) the two organizations would take whatever steps they deemed necessary in the future to limit the power of the ball. The ball actually was unchanged by this regulation; it continued to measure 1.63 inches, .01 inch above the minimum.

In 1923, the USGA decided that the power should be reduced. A series of experiments under William C. Fownes, Jr., and Herbert Jaques, Jr., led to introduction in the United States in 1930 of the so-called "balloon ball," weighing not more than 1.55 ounces and measuring not less than 1.68 inches. This ball, with no regulation of its velocity, became standard in the United States on January 1, 1931, and was the first deviation from the British ball. It proved too light to hold on line in flight in a wind or on a green as it lost momentum, and it survived only one year.

The present slightly heavier ball, weighing not more than 1.62 ounces and measuring not less than 1.68 inches, became standard in the United States on January 1, 1932. The velocity of this ball was not regulated, however, until the USGA completed a satisfactory testing machine in 1941. Since January 1, 1942, the USGA has required that the velocity of the ball be not greater than 250 feet per second when measured on the Association's machine under specified conditions.

Effect on Clubs

Golf was being overtaken by the industrial revolution when the rubber ball came into the game at the beginning of the

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twentieth century. These two factors wrought major changes in the clubs and the methods by which they were produced as craftsmanship moved out of the individual professional's shop and into the factory.

The harder rubber ball brought about the use of persimmon and later laminated clubheads. Hard insets appeared in the faces. Increased demand led to the adaptation of shoe-last machine tools for the fashioning of wooden clubheads. Sockets were bored in the hosels, and shafts were inserted rather than spliced. Drop-forging almost completely replaced hand-forging in the fashioning of iron clubs, and faces were deepened to accommodate the livelier ball and were machine-lined to increase the spin on the ball in flight. Stainless steels replaced carbon steels. Seamless steel shafts took the place of hickory. Composition materials were developed as an alternative to leather in grips, and the grip foundations were molded in so many ways that they were regulated in 1947. Inventive minds created novel clubs, not only center-shafted and aluminum putters and the sand wedge but also types which were such radical departures from the traditional form and make that they could not be approved by the USGA or by the Royal and Ancient Golf Club of St. Andrews, Scotland.

These changes had their genesis in the United States when Julian W. Curtiss, of A. G. Spalding & Bros., purchased some clubs in London in 1892 for resale in his company's retail stores. Two years later, Spalding employed some Scottish clubmakers and began producing its own clubs.

Hand-modeling of woods and hand-forging of irons naturally did not long survive the demands of factory production. Within the first decade, the Crawford, McGregor & Canby Co., in Dayton, Ohio, a maker of shoe-lasts, was turning out wooden heads, foundries were converting drop-forging processes to iron heads, and Allan Lard, in Chicopee, Mass., was experimenting with perforated steel rods for shafts.

A. W. Knight, of the General Electric Co., in Schenectady, N.Y., joined this inventive movement and produced an aluminum-headed putter with the shaft attached near the center, instead of at the heel. Walter J. Travis, of New York, used this "Schenectady" putter in winning the British Amateur Championship in 1904, and center-shafted clubs subsequently were banned in Britain.

The import of all these developments was such that, in promulgating its revised code of Rules in September, 1908, the Royal and Ancient Golf Club of St. Andrews appended the notation that it would not sanction any substantial departure from the traditional and accepted form and make of golf clubs. This principle has been invoked many times in an effort to preserve the original form of the game.

Iron Club Faces

When Jock Hutchison won the British Open in 1921 with deeply slotted faces on his pitching clubs, the Royal and Ancient Golf Club banned such faces, and the USGA concurred with a regulation governing markings which became effective in 1924. After Horton Smith had so effectively used a sand wedge with a concave face designed by E. M. MacClain, of Houston, Texas, the principle of concavity was banned in 1931. However, Gene Sarazen developed a straight-faced sand wedge and used it so well in winning the British and USGA Opens in 1932 that he completed the revolution of bunker play.

Experiments with steel shafts went through several phases. Lard's perforated steel rod was no substitute for hickory, and the locked-seam shaft proved not the answer, either, although the USGA approved such shafts in 1924. However, in 1924, the Union Hardware Co., of Torrington, Conn., drew a seamless shaft of high carbon steel which could be heat-treated and tempered. This came into the game in the late Twenties, was approved by the Royal and Ancient Golf Club in 1929, and substantially replaced hickory in the early Thirties.

Improvement of the steel shaft was accompanied by the general introduction of numbered clubs, rather than named clubs,

The patent papers for the Haskell ball

BERTRAM G. WORK, OF AKRON, AND COBURN HASKELL, OF CLEVELAND, OHIO.

BALL.

SPECIFICATION forming part of Letters Patent No. 622,834, dated April 11, 1899.

Application filed August 9, 1898. Serial No. 688,152. (No model.)

To all whom it may concern:

Be it known that we, BERTRAM G. WORK, residing at Akron, in the county of Summit, and COBURN HASKELL, residing at Cleveland, in the county of Cuyahoga, State of Ohio, citizens of the United States, have invented a new and useful Improvement in Balls, of which the following is a specification.

Our invention is in the nature of an improved ball for use more especially in the game of golf, though it may be used in other games where a ball of similar properties is desired.

Our object is to provide a ball for the above purposes which shall possess the essential qualities of lightness and durability and which shall also have the property of being comparatively non-resilient under the moderate impacts incident to its use, but highly resilient under the stronger impacts.

We accomplish the objects sought by making the main body of the core of rubber thread wound under tension into spherical form and providing the same with an adequately-thick covering of gutta-percha or one of its substitutes, such as balata gum, the covering possessing the attributes, comparatively speaking, of inelasticity, toughness, hardness, and degree of plasticity, as by dipping it in boiling water, and then placing the core thus wrapped in a mold and subjecting the whole to sufficient pressure to form it to the exact shape desired, which shape is retained on cooling; but the shell may be produced by any other method which may be found practicable. The shell thus formed to be effective must be of such thickness as to remain comparatively rigid under the moderate impacts to which the ball is subjected, as in the case of light blows with the golf-club or on striking the earth, but to yield under the more violent impacts, as in "driving," whereby the force is brought to bear upon the elastic core.

B is the complete ball, and B' B^2 the halves of the comparatively unyielding shell which receives the elastic core A. The exterior surface of the ball may be roughened, as shown in Fig. 1, by using a mold having intersecting ridges on its inner surface.

Fig. 5 shows a complete half-section of the ball, the core being shown as made simply by winding a rubber thread upon itself to form a sphere.

Fig. 6 shows the rubber winding inclosing a small central-core-section C, which may be

and by the merchandising of matched sets, rather than individual clubs; clubs had become more numerous and more finely graduated than the names which had been applied to them and shafts could be manufactured to specifications for flexibility and point of flex. Where formerly a golfer seeking new clubs went through a rack of mashies until he found one that "felt right" and then tried to find other clubs of similar feel, he now bought a whole set manufactured to impart the same feel. The merchandising aspect of this development was perhaps something more than a happy coincidence for the manufacturers. In any case, the merchandising opportunities inherent in the numbered and matched sets were carried to an extreme, and in 1938 the USGA limited to fourteen the number of clubs a player might use in a round. The Royal and Ancient Golf Club concurred in a similar edict the next year.