

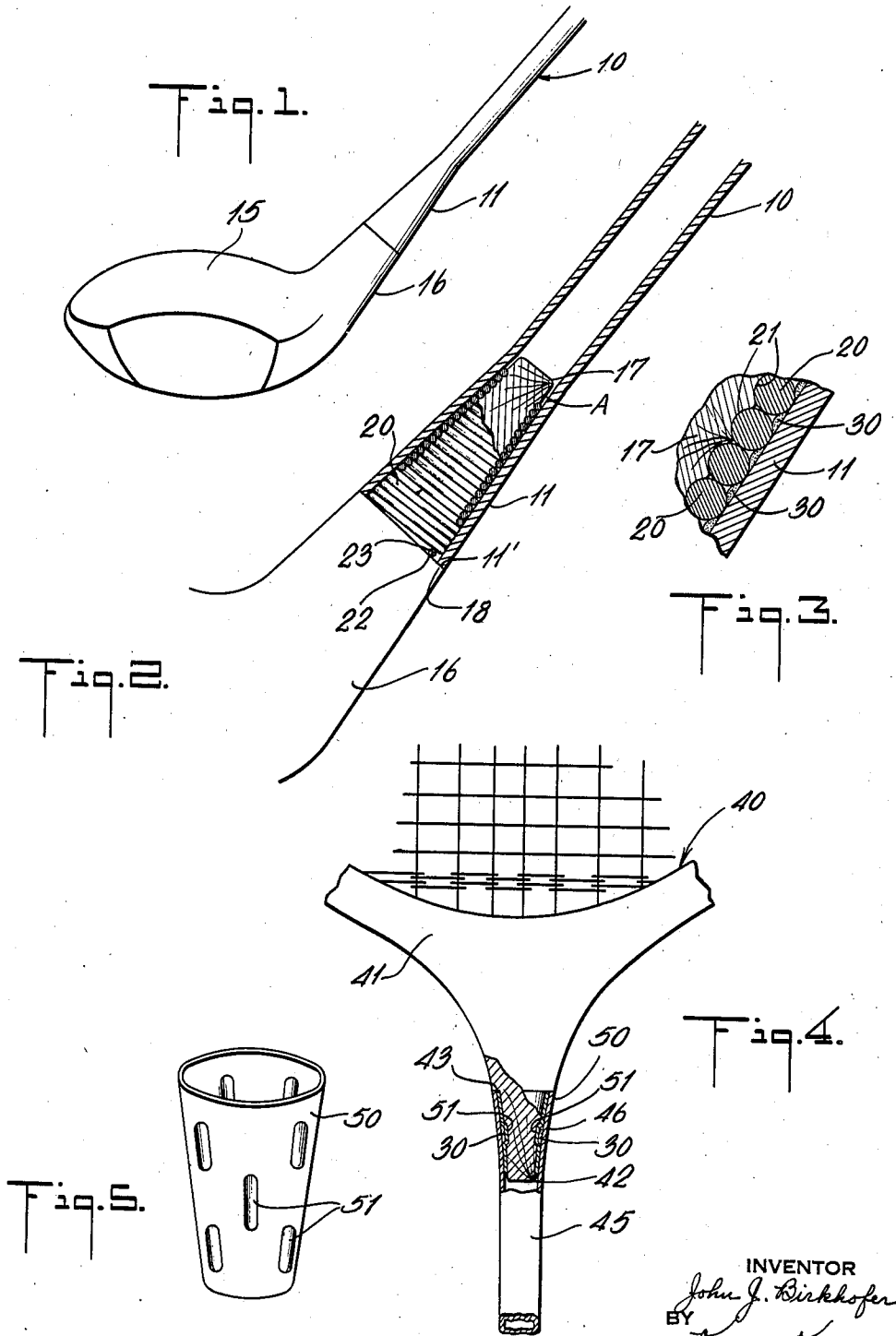
Nov. 25, 1941.

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2,264,035

JOINT

Original Filed Aug. 23, 1939



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UNITED STATES PATENT OFFICE

2,264,035

JOINT

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Original application August 23, 1939, Serial No.
291,473. Divided and this application March
15, 1941, Serial No. 383,517

5 Claims. (Cl. 273-73)

The present invention relates to joint structure and more particularly to means for and a method of joining two part implements such as tennis rackets, golf clubs or the like having a wooden part and metal part, which must be joined securely. This application is a division of my co-pending application Serial Number 291,473, filed August 23, 1939.

In golf clubs, tennis rackets or other similar sports implements embodying a wooden head member carried by a shaft handle or the like of a different material such as metal, the problem of securely joining the head member is of prevailing importance. The joint must be secure to prevent separation of the parts during use with consequent danger to players and spectators. The joint must be simple, effective and capable of being made quickly on a mass production basis. Furthermore, the joint must be slightly without sacrifice of strength or efficiency. Sightliness of the joint is a cardinal necessity for successful merchandising because the purchasers of sporting goods react most favorably to goods having a trim, graceful appearance. The use of the means and method herein described result in a joint which in no way detracts from the appearance of the implement. It is a principal object of the present invention to provide a method and means for obtaining a joint meeting the foregoing requirements.

To the accomplishment of the foregoing and such other objects as may hereinafter appear, this invention consists in the method, construction and arrangement of parts hereinafter described and then sought to be defined in the appended claims, reference being had to the accompanying drawing forming a part hereof and which shows, merely for the purposes of illustrative disclosure, preferred embodiments of the invention, it being expressly understood, however, that various changes may be made in practice within the scope of the claims without digressing from the inventive idea.

In the accompanying drawing, in which similar reference characters denote corresponding parts:

Figure 1 is a fragmentary side elevation of a golf club embodying the novel joint structure of the invention;

Fig. 2 is an enlarged vertical section illustrating the details of the joint structure;

Fig. 3 is an enlarged fragmentary section of a portion of the joint structure shown in Fig. 2;

Fig. 4 is a fragmentary side elevation partially

in vertical section illustrating a modified form of joint structure embodying the invention as applied to a tennis racket; and

Fig. 5 is a perspective view of a metallic sleeve embodied in the modified joint structure illustrated in Fig. 4 but equally applicable to the golf club of Figs. 1 and 2.

Referring to the drawing and first to Figs. 1 to 3 inclusive, 10 denotes a golf club shaft of metal. This shaft may be solid, or tubular as in the embodiment shown. The lower end of the shaft is flared to form the tapered socket 11. This socket in sectional elevation is frusto-conical in shape and, in the embodiment shown, has a smooth inner surface.

A wooden golf club head 15 is adapted to be attached to the shaft 10. To this end, the hosel 16 of said shaft has a reduced tenon or tongue portion 17 in the shape of a truncated cone which is adapted to project into the socket 11. The diametrical dimensions of the tenon portion are such as to provide a clearance A from the inner walls of the socket 11. A shoulder 18 is defined between the base end of the tenon and the body of the hosel.

A wire 20 of copper or other suitable metallic material is tightly wound around the conical surface of the tenon portion 17. The wire winding is made sufficiently tight to cause the wire to bite into the surface of the wooden tenon as at 21, so that when the ends 22 (one only shown) of said wire are fixed or anchored in suitable manner to the wound body of the wire at 23 as by soldering or the like, there will be no danger or possibility of said wound body slipping off the tenon.

The wire surfaced tenon is now dipped in or otherwise coated with a flux. Then molten uniting metal such as solder is applied to the flux covered winding by dipping or otherwise. Likewise, first flux and then molten uniting metal are applied to the inner face of the socket 11 of the shaft. While the uniting metal retained by the wire on the tenon and by the inner socket face is still in molten condition, the tenon 19 is rammed or otherwise forced into the socket so that its bottom edge 11' abuts the shoulder 18. The uniting metal carried by the wire and that on the socket wall thus are united. Upon cooling, for example by dipping the joined parts in cold water, the uniting metal hardens and securely fixes the wire wound tenon to the socket wall. It is to be noted that the bonding metal or solder 30 penetrates the interstices or surface depressions between adjacent

turns of the winding so that the winding is firmly secured to the socket.

The joint thus obtained presents no unsightly external wrappings, collars, sleeves or the like. As can be seen in Fig. 1, the outer surface configuration at the open end 11' of the socket matches both dimensionally and in shape the outer surface of the head 16 at the shoulder 18. Also since the shoulder 18 on the hosel abuts the end 11' of the socket. These factors thus give a continuous smooth external outline to the hosel end of the shaft which merges with the body of the shaft.

The method just described is applicable for joining wooden and metal parts other than golf clubs, the requisite being (1) that a socket be provided on the metal part and a metal surface be provided on the tenon of the wooden part which fits in the socket, and (2) that both the wire and inner socket surface be capable of adhering to a uniting metal such as solder or the like.

A modified form of joint structure is illustrated in Figs. 4 and 5 as applied to a wooden tennis racket frame and metal handle. While the particular joint structure is shown with respect to a tennis racket, the joint structure is equally applicable to a golf club or other device.

In the latter figures, 40 denotes a tennis racket frame. The base 41 of the frame has a tenon or tongue 42 of reduced diameter shaped to frusto-conical form. A shoulder 43 is defined by the tenon and the base.

The handle 45 of the racket is of metal and like shaft 10 may be tubular or solid. The upper end of this handle is provided with a flared socket 46 shaped to frusto-conical form interiorly and adapted to receive the tenon 41.

A tubular metal sheath 50 also having frusto-conical form and admeasured to fit snugly about the surface of the tenon 41 is provided. This sheath is provided with clinching members 51 which serve to secure the sheath to the wooden tenon. The sheath is forced over the tenon and then the clinching members are driven into the wooden body of the tenon as illustrated in Fig. 4.

In assembling the racket frame and handle, the sheathed tenon 42 is dipped into or otherwise coated with a flux. Then a molten uniting metal, such as solder, which adheres to the surface of the sheath is applied to the sheath. Similarly, the inner surface of the socket 46 is dipped or coated with flux and then with the molten uniting metal. While the said uniting metal on both parts is in molten condition, the sheathed tenon 42 is driven or forced into the socket 46 until the upper edge of said socket abuts the shoulder 43. The joint is then cooled by dipping in water or the like to harden the uniting metal. The firm union of the sheath and socket surfaces by the uniting metal results in a very strongly joined racket frame and handle which will not come apart during stresses incident to play. It is to be noted that the uniting metal or solder 30 penetrates the depressions in the surface of the sleeve formed by the clinching members 51 when they are driven into the wood of the tenon so that the sheath 50 is very firmly secured to the socket.

Thus the process, in either of its aspects, generally comprises providing a wooden member having a tongue or tenon and a metal member having a socket into which said tenon is adapted to extend, applying a metal sheath or covering to the tenon and binding said sheath or covering

to the said tenon by causing it to bite into the wood thereof, treating the inner socket surface and the metal surface covering the tenon with a flux to permit adhesion thereon of a uniting metal such as solder, applying uniting metal in molten condition to both said surfaces and while said applied uniting metal is in molten condition, inserting the tenon into the socket and then cooling the united parts to harden the uniting metal.

It will be observed that in both modifications the head and the socket at their junction are so admeasured as to present a smooth, unbroken outline thereat. It will also be observed that in both modifications the metallic covering 20 or 50 has in effect a broken outer surface provided with depressions into which the bonding metal united with the smooth internal surface of the socket extends.

It will be observed, too, that in the latter modification, the extension of the bonding metal into the depressions formed by the embedment of the clinching members 51 creates abutments of bonding metal which strengthen the joint still further by increasing its resistance to rotary stresses.

Modifications in structure and method are contemplated within the scope of the claims. I do not wish, therefore, to be restricted to the exact details described.

I claim:

1. Means for effecting a permanent joint between two parts at least one of which is of metal, said means comprising a socket on one part having a substantially smooth inner surface, a reduced tenon on the other part extending into said socket and being so admeasured as to provide a clearance between its surface and said inner surface of said socket, a metallic covering enveloping said tenon, clinching members integral with said covering each of which is driven into and permanently embedded in said tenon, and so embedded provide said covering with an external surface having depressions above each clinching member, said last named surface being so admeasured that its undepressed portions extend into said clearance and into contact with said inner surface of said socket while its depressions are spaced from said inner surface of said socket, and metallic bonding material bonding the entire outer surface of said covering to said inner surface of said socket, said metallic bonding material filling substantially all those portions of said clearance not filled by said metallic covering and extending into the said depressions of said external surface of said covering.

2. In a device of the character described having a wooden head and a metallic handle shaft, means for permanently joining said head and said shaft, said means comprising a flared open-ended socket integral with one end of said shaft, a complementally shaped reduced tenon having a base and integral with the said head, said tenon defining a shoulder on said head at said base, and said tenon being so admeasured as to provide a clearance between its surface and the inner surface of said socket, and said socket having an outer surface configuration and dimensions at its open end matching that of said head at said shoulder, a metallic covering surrounding said tenon, clinching members integral with said covering each of which is permanently embedded in said tenon leaving depressions in the outer surface of said covering over said clinching mem-

bers, said covering being so admeasured that portions of said outer surface extend into said clearance, said covering being bonded to said inner surface of said socket by hardened bonding material, said bonding material filling portions of said clearance not filled by said covering, and the edge of the open end of said socket abutting said shoulder whereby a continuous smooth external outline at said joint is effected.

3. In a device of the character described having a wooden part and a metallic part, means for permanently joining said wooden part to said metallic part, said means comprising a flared, open-ended socket on said metal part, a tapered tenon on said wooden part extending into said socket and being so admeasured as to provide a clearance between its surface and the inner surface of said socket, a tapered tubular metal sheath fitting over said tenon, clinching members integral with said sheath driven into and embedded in said tenon, and so embedded providing the outer surface of said sheath with depressions over said clinching members, said sheath being so admeasured that it extends into said clearance, and metallic bonding material bonding said sheath to the inner surface of said socket, said bonding material filling all portions of said clearance not filled by said sheath and extending into said depressions.

4. In a device of the character described having a wooden head and a metallic shaft, means for effecting a permanent joint between said head and said shaft, said means comprising a socket on said shaft, a tenon on said head extending into said socket and being so admeasured as to provide a clearance between its surface and the inner surface of said socket, a metallic sheath surrounding said tenon, clinching members in-

tegral with said sheath driven into and embedded in said tenon and so embedded providing the outer surface of said sheath with depressions over the said members, said sheath being so admeasured that it extends into said clearance, said sheath being bonded permanently to said inner surface of said socket by metallic bonding material, and said bonding material filling all portions of said clearance not filled by said sheath and extending into said depressions.

5. In a device of the character described having a wooden head and a metallic handle shaft, means for permanently joining said head and said shaft, said means comprising a flared open-ended socket integral with one end of said shaft, a complementally shaped tenon having a base integral with said head, said tenon defining a shoulder at said base and being so admeasured as to provide a clearance between its surface and the inner surface of said socket, and said socket having an outer surface configuration and dimensions at its open end matching that of said head at said shoulder, a metallic sheath fitting snugly about the surface of said tenon and clinching members integral with said sheath and driven into said tenon leaving depressions in the outer surface of said sheath, said sheath being so admeasured as to extend into said clearance, said sheath being bonded to the inner surface of said socket by hardened bonding material, said bonding material filling all portions of said clearance not filled by said covering and extending into said depressions, and the edge of the open end of said socket abutting said shoulder whereby a continuous smooth external outline at said joint is effected.

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