Oct. 14, 1969 D. E. BERRY 3,472,512

MALLET ASSEMBLY

Filed Feb. 20, 1967 2 Sheets-Sheet 1

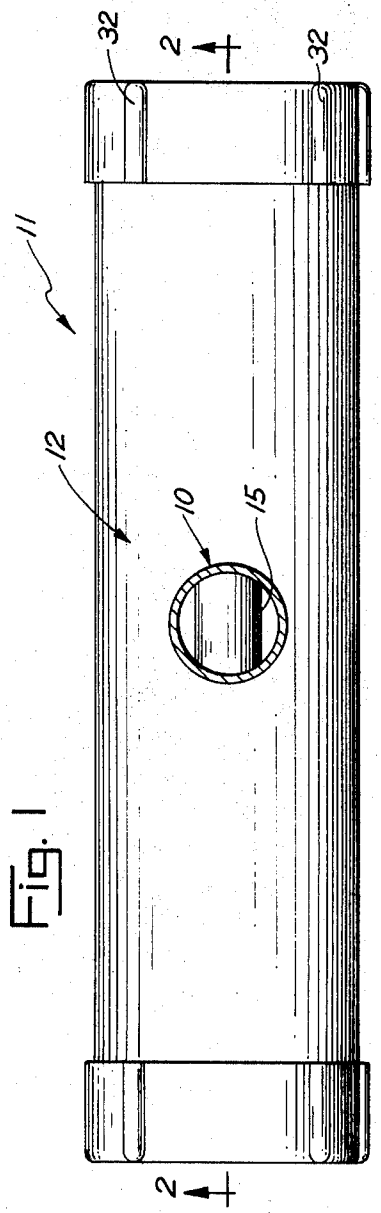


Fig. 1

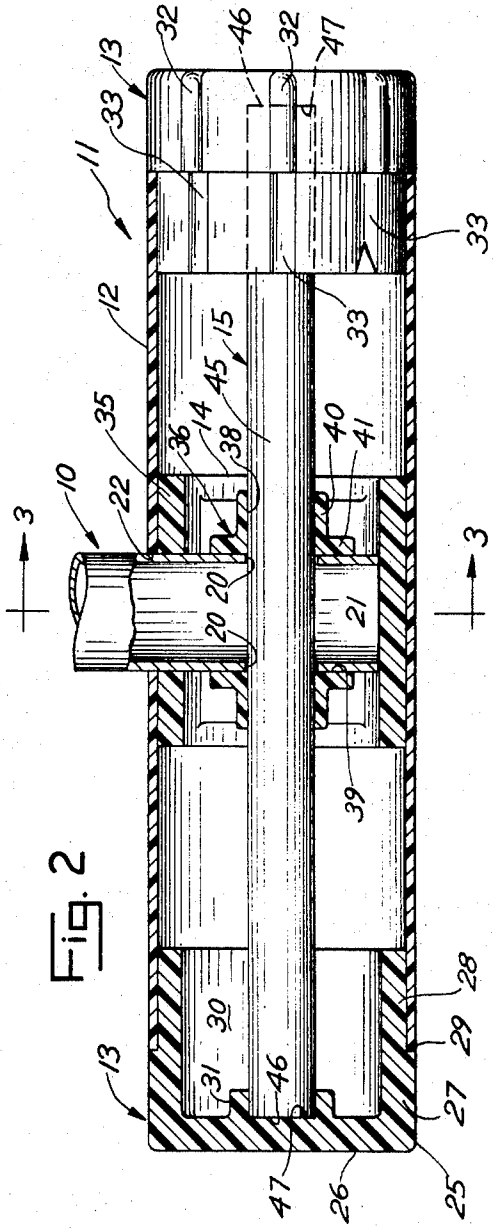


Fig. 2

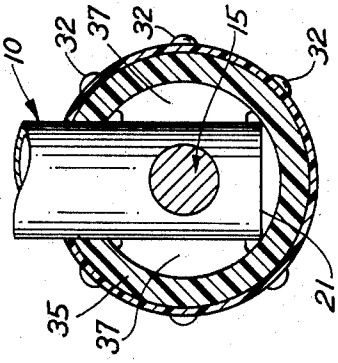


Fig. 3

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MALLET ASSEMBLY

Filed Feb. 20, 1967 2 Sheets-Sheet 2

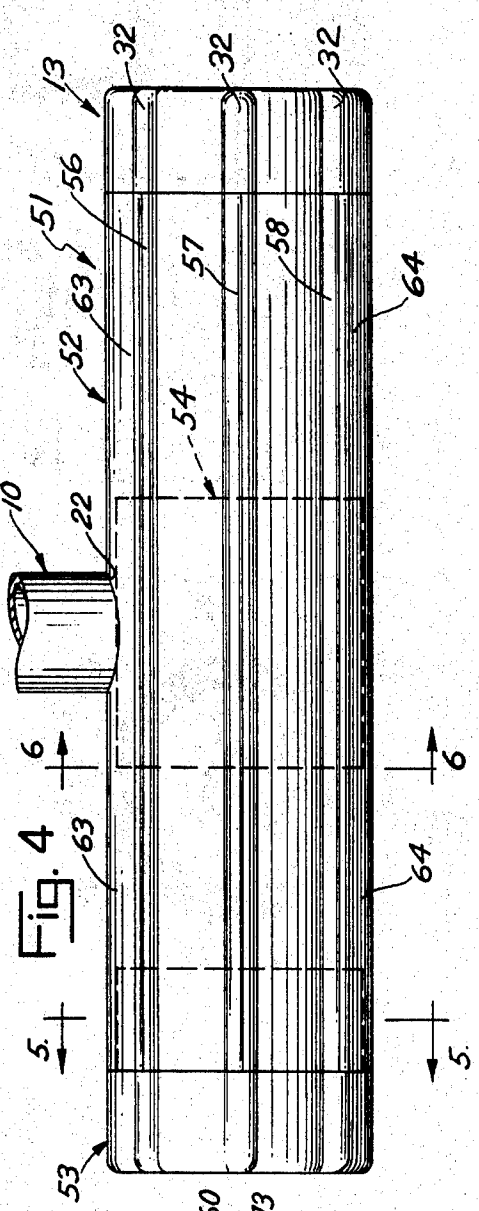


Fig. 4

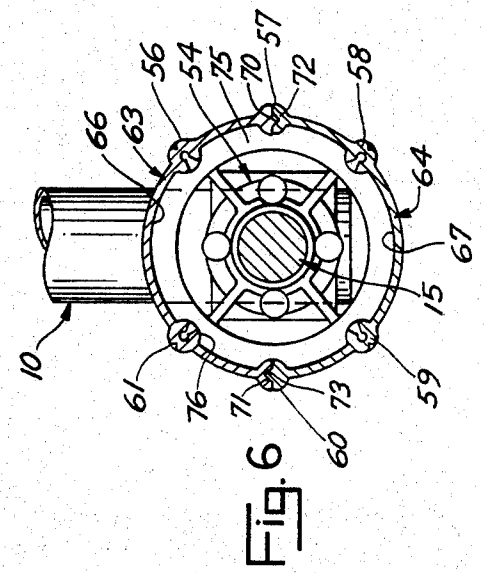


Fig. 6

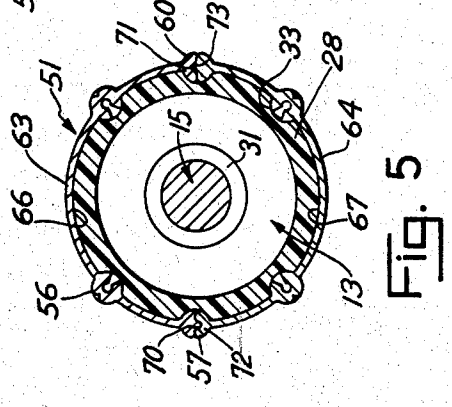


Fig. 5

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United States Patent Office 3,472,512
Patented Oct. 14, 1969

3,472,512

MALLET ASSEMBLY

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Filed Feb. 20, 1967, Ser. No. 617,143
Int. Cl. A63b 59/10
U.S. Cl. 273—83 8 Claims

ABSTRACT OF THE DISCLOSURE

A substantially unbreakable croquet mallet constructed of preformed lightweight parts; the mallet head being generally hollow and having resilient caps closing the opposite ends thereof and including a heavy metal core rod extending between such caps which weights the mallet and anchors one end of the handle interiorly of the mallet head.

This invention relates generally to mallet structures and particularly to improvements in mallets for croquet and the like.

For a number of years croquet mallets and similar instruments conventionally have been constructed of wood or similar material; the mallet heads normally being turned on a lathe and provided with a threaded socket at one side thereof for threading connection with a matingly threaded end of an elongated wooden handle. Such wooden mallets are familiarly prone to splitting or chipping, particularly adjacent the ends of the mallet head which are used as striking surfaces for engaging a croquet ball or the like. Similarly, the hard wood mallets are apt to split the wooden croquet balls and the wooden handles employed therewith are all too frequently cracked or broken in operation. Of additional aggravation is the propensity of the threaded connection employed between the mallet head and handle to work loose in play or operation and/or for the wooden threads thereof to wear and break away, creating a dangerous and unsafe instrument to the user.

The present invention is directed to an improved mallet structure and means for rigidly affixing or anchoring handle means to the mallet head thereof. Briefly, the present invention comprises a generally hollow mallet head means having resilient cap members enclosing the opposite ends thereof to provide resilient striking or blow imparting surfaces at the outer ends of the mallet head. A core plug means is provided within the central interior of the tubular mallet head and presents an open socket for the inserted reception of one end of an elongated handle means. A heavy metal core rod extends interiorly along the longitudinal axis of the mallet head between the resilient cap ends thereon and through the central core plug and registering openings formed adjacent one end of the handle means. Such rod provides selectable striking weight to the mallet head and additionally serves as a means for positively interlocking the latter and the handle means. As a general proposition, the materials selected for the several parts of the mallet assembly are lightweight and preferably of plastic or lightweight metals having high impact strength and capable of being molded or extruded to desired form.

A principal object of this invention is to provide an improved mallet means.

Another object of this invention is to provide an improved means for attaching handle means to a mallet head.

Another important object of this invention is to provide an improved multi-part structure, particularly useful for croquet mallets and the like, in which the mallet head is hollow and made up of lightweight materials and includes means for selectively weighting the same to regulate its striking characteristics.

Another object of this invention is to provide an improved mallet structure as set forth in the immediately preceding object, in which resilient striking or blow imparting surfaces are provided at opposite ends of the mallet head.

Still another important object of this invention is to provide a new and improved combination of elements for a croquet mallet and like instrumentalities, which affords improved economies of production and manufacture and exhibits improved dependability and safety of operation.

A still further object of this invention is to provide an improved mallet construction in which a mallet head and handle means therefor are interlocked in a positive and substantially non-detachable manner.

Having thus described the present invention, its above and further objects, features and advantages, will be recognized from the following detailed description of a preferred and modified embodiment thereof illustrated in the accompanying drawings.

In the drawings:

FIG. 1 is a top plan view of a mallet assembly according to this invention;

FIG. 2 is a full sectional view with parts in elevation, taken substantially along vantage line 2—2 of FIG. 1 and looking in the direction of the arrows thereon to show the assembled relationship of parts employed in the assembly seen in FIG. 1;

FIG. 3 is a cross-sectional view taken substantially along vantage line 3—3 of FIG. 2 and looking in the direction of the arrows thereon;

FIG. 4 is a full side elevational view of a modified form of mallet assembly according to this invention;

FIG. 5 is a cross-sectional view taken substantially along vantage line 5—5 of FIG. 4 and looking in the direction of the arrows thereon; and

FIG. 6 is another cross-sectional view taken substantially along vantage line 6—6 of FIG. 4 and looking in the direction of the arrows thereon.

Turning initially to the preferred mallet assembly of this invention illustrated in FIGS. 1 through 3 of the drawings, it will be appreciated that as therein illustrated, such comprises a croquet mallet having a generally cylindrical handle means **10** and a generally cylindrical mallet head means **11** attached transversely across the lower end of the handle means. Mallet head means **11** is a multi-part combination of a generally cylindrical tubular body member **12**, a pair of end cap means **13**, **13** mounted over the open opposite ends of such body member, a central core plug means **14** disposed centrally within the interior of the body member and adapted to receive one end of the handle means **10** therein, as well as a generally elongated weighted core means **15** which extends therethrough, coaxially of the longitudinal axis of the mallet body member **12** and is engaged at its ends by the end cap means **13**, **13** (see FIG. 2).

The handle means **10**, as best shown in FIG. 1, may comprise a solid rod or, as shown, a hollow tubular member of cylindrical formation preferably constructed of lightweight material, such as aluminum or aluminum magnesium alloy metal and having an outside diameter suitable for hand gripping adjacent its outer end (not shown) in a known and conventional fashion. For croquet mallets of the type illustrated, the length of the handle means may vary to meet individual needs and requirements, but generally will be in the order of substantially two feet for the normal user.

It is to be noted that the lower end of the handle means (see FIG. 2) is provided with a diametrically opposed pair

of registeringly aligned cylindrical openings 20, 20 formed through the cylindrical side walls thereof and spaced axially inwardly of the lowermost end 21 thereof to define passageway means therethrough. The diameter of openings 20, 20 is substantially equivalent to that of the cylindrical core means 15 whereby the latter may be mounted transversely through the lower end of the handle means, passing through openings 20, 20 thereof with a slip fit in assembly. The core means 15 thereby serves to anchor the handle means securely and positively to the mallet head means 11, as will be described in greater detail hereinafter.

The mallet head means 11, as best illustrated in FIGS. 1 and 2, comprises a generally cylindrical tubular body member 12 which, in the particular illustrated embodiment, is formed as a molded or extruded member of rigid plastic material, such as rigid vinyl or the like, having high impact strength and typically bearing a wall thickness of substantially .090". The selection of such plastic material, according to known practice, makes it conveniently possible to impart various permanent colors to the body of the mallet head, which feature is most desirable for visual identification purposes. A cylindrical opening 22 is formed through one wall of the body member 12, coaxially of a transverse axis thereof passing through its longitudinal mid-point. Opening 22 is of a size to registeringly receive the lower end of handle means 10 therethrough with a slip fit in assembly so that the handle means is aligned normal or at right angles to the longitudinal axis of the body member, as shown.

The opposite open ends of the tubular body member 12 are closed over in assembly by a pair of resilient cap means 13, 13 which preferably are molded of resilient plastic material, such as resilient vinyl plastic, or alternatively rubber or rubber-like materials having substantial rigidity and hardness but resilient to impact. As shown best in FIG. 2 of the drawings, each of the cap means 13 is formed with a cup-like body 25 having an uninterrupted circular end wall portion 26 and a cylindrical side wall portion 27 extending integrally from the periphery of such wall portion 26. The axially inner or open end of wall 27 is inset with a reduced diameter to provide a reduced cylindrical wall portion 28, having a diameter conforming substantially to the internal diameter of the mallet body member 12 for slip fit inserted reception within the latter. The junction between the reduced cylindrical portion 28 and the larger diameter cylindrical side wall portion 27 provides an annular shoulder 29 extending therebetween. Shoulder 29 operates as an abutment stop means for engaging the outer axial end of the tubular body means 12 and thereby limiting the axial insertion of the cap means into the latter. A cup-like interior chamber 30, defined by the interior of the cap body 25 is particularly distinguished by an annular or cylindrical boss wall 31 disposed concentrically about the central axis of the cap means 13 and on the inside face of end wall 26 thereof. Such annular boss wall 31 operates to concentrically embrace an end portion of the core means 15 in assembly and serves thereby to guide and align the core means coaxially of the longitudinal axis of the mallet head means 11 in final assembly, as will be amplified in greater detail hereinafter.

It will be noted especially from FIGS. 1 and 2 of the drawings that the exterior surface of the cylindrical wall portion 27 of each of the cap means 13 is distinguished by a plurality of longitudinally extending, semi-cylindrical, raised bead portions 32, 32, which are largely for decorative purposes in the particular embodiment of this invention illustrated in FIGS. 1 through 3 of the drawings; there being six such raised beads in all, disposed in diametrically opposed pairs, as illustrated. It also is to be noted (see FIG. 2) that the reduced cylindrical wall portion 28 of each of the cap means, is conversely provided and formed with a corresponding plurality of semi-cylindrical grooves or indentations 33, 33 each aligned longitudinally with one of the raised beads 32, 32. While such grooves have no particular function in the mallet assembly as set out in FIGS. 1 through 3, they are of significant importance in the modified structure of FIGS. 4–6, as will appear from the description thereof appearing hereinafter.

The central core plug means 14, as best shown in FIGS. 2 and 3 of the drawings, comprises a rigid molded body 35 made of vinyl plastic like body member 12, and having a general cylindrical formation with an outside diameter substantially equivalent to the inside diameter of the tubular mallet body member 12. Thus, in assembly the body member 12 receives the core plug means coaxially within its interior with a tight press fit and is radially reinforced and supported thereby. As seen best in FIG. 2, the cylindrical body 35 of the plug means is provided with an integrally formed central hub block 36 which is joined to and held coaxially with respect to the cylindrical body 35 by means of plural transversely intervening web portions 37, 37 (see FIG. 3). Essentially, the hub block 36 is provided with transversely related cylindrical bores or passageway means 38 and 39 formed through transversely intersecting cylindrical arm portions 40 and 41, respectively, thereof, which surround such passageway means. One passageway means 38 is formed coaxially of the longitudinal axis of the body member 35 and arm portion 40 of the plug means 14 and receives the core means 15 coaxially therethrough with a press fit in assembly. The other passageway means 39 is related at right angles to passageway means 38 and is aligned coaxially of the central transverse axis of the plug body 35 and coaxially of arm portion 41 thereof. Passageway means 39 is of cylindrical formation having a diameter for insertedly receiving the lower end of the handle means 10 therein with a press fit in assembly. It is to be noted that such passageway means 39 is registeringly aligned in assembly with the handle receptive opening 22 of the tubular mallet body 12 by properly locating the core plug means 14 within the tubular mallet body. It is also to be noted that the passageway means 39 does not extend diametrically through the plug means 14, but is closed off at its lower end by the generally cylindrical walls of body 35 thereof, which thereby determines an insertion limit for the handle means 10 in the mallet head means 11. While both the passageway means 38 and 39 may be formed conveniently when molding the plug means 14, it is also fully contemplated herein that such passageway means, if desired, may be formed by drilling or boring operations after the plug means 14 is properly located and anchored in position centrally within the interior of the mallet body 12.

The core means 15 as illustrated in FIG. 2 of the drawings, preferably constitutes a cylindrical rod 45 of heavyweight metal, such as iron or steel. Rod 45 is mounted coaxially of the tubular body member 12 and extends through passageway means 38 of the core plug means 14 in assembly. End walls 46, 46 of the rod are tightly engaged by the opposing inner face portions 47, 47 of the end walls 26, 26, presented by the cap means 13 in assembly. In this respect it is to be noted that the length of the core bar or rod 45 is purposely slightly longer than the distance between the inside opposing inner faces 47, 47 which are bounded by the annular bosses 31 of the cap means, when the latter are fully inserted into the opposite open ends of the tubular mallet body member 12. The reason for this feature will be described with greater particularity hereinafter.

As it is contemplated, according to this invention, that the core means 15 will serve to weight the mallet head for effective striking and swing characteristics, such weighting may be selectively varied to meet individual taste and needs by increasing or decreasing the weight of the means 15. Such variation may take place for instance, by selecting heavy and lighter weight materials for the rod means or by selectively adding weight to or removing portions of a standard weight rod or bar 45.

In assembling the above described elements according to the illustrated embodiments set out in FIGS. 1–3 of the drawings, the plastic core plug **14** is inserted coaxially into the interior of the tubular mallet body member **12** and located centrally along the latter's lengthwise axis. A suitable adhesive, such as epoxy glue or the like is preferably employed to weld the plug means in position. Thereafter, passageway means **39** in the core plug means **14** and the opening **22** in the walls of the body member **12** may be simultaneously formed as by drilling or boring, if desired, in order to affect the necessary registering alignment thereof for receiving the lower end of the handle means **10**. The tubular handle means **10** is then inserted through opening **22** and bottomed in passageway means **39**, with the bottom end **21** thereof engaging the interior wall of the cylindrical body **35** of the plug means (see FIG. 2). The core means **15** is then inserted coaxially through passageway means **38** of the core plug and through the registeringly aligned opposed openings **20**, **20** of the handle means. In this respect, it is also convenient and time-saving to drill or form the openings **20**, **20** and the passageway means **38** simultaneously after the core plug **14** has been locked in position, thereby to insure registration and alignment of openings **20**, **20** and passageway means **38** coaxially of the longitudinal axis of the mallet body. After the core means is in place, the end caps **13** are positioned over the outer ends of the core rod **45** and pressed coaxially into the open ends of the tubular body member **12** until the shoulders **29** stop against the outer ends of the latter. Like plug means **14**, the caps **13** are also preferably cemented or welded in place by suitable adhesive, such as epoxy glue, placed between the outer surfaces of the reduced cylindrical wall portions **28** of the cap means and the opposing inside wall areas of the tubular body member **12**.

As previously mentioned, when the caps **13** are finally assembled and locked in position in the opposite ends of the tubular body member **12**, the annular stop shoulders **29** thereon abut the outer ends of the tubular body member **12** and the inside faces **47** of the cap end walls **26** centrally engage the ends **46**, **46** of the core rod **45**. Under these conditions, since the rod means **45** is of slightly excessive length, the same is held under axial compression, usually in an appropriate fixture press until the weld connection between the cap means and body member **12** has set. Conversely the "sweet spot" or hitting areas of the cap end walls **26** are slightly tensioned to maintain compressive force against the ends of the core rod. Because of this feature, striking a croquet ball or other object with either end of a mallet serves to transmit the reactive force of the blow directly along the rod means **45** to the opposite cap means **13**, rather than imposing such force directly on the outer ends of the rather thin walled tubular body member **12** of the mallet head. Thus the force of a blow delivered by either end of the mallet, according to the aforedescribed construction, is substantially evenly distributed over both ends thereof and is eventually transmitted to the side walls of the mallet body member **12** and handle means **10** via the welded connection between the body member and the cap means **13**. This relationship provides improved strength and wearability to the mallet structure of this invention.

It is also important to recognize that with a mallet assembly of the order above described, the core bar means **15** not only serves as a means for selectively regulating the striking weight and swing characteristics of the mallet, but also as a means for positively anchoring the handle means **10** within the interior of the mallet head means **11** in such a fashion that the handle means is substantially irremovably anchored in position according to that objective of this invention.

Turning now to the features of the modified assembly illustrated in FIGS. 4 through 6 of the drawings, it will be recognized that the same comprises cylindrical handle means **10**, a transversely related and generally cylindrical

mallet head means **51** comprising a generally cylindrical body member **52** having its opposite open ends enclosed by cap means **13**, **13** and carrying a centrally located interior core plug means **54** and an axially disposed core means **15** thereon, organized generally in accordance with the previously described embodiment of FIGS. 1–3.

Briefly, the modifications in the assembly of FIGS. 4 through 6 of the drawings, not found in the previously described embodiment, center about mallet head means **51**, particularly body member **52** thereof and the internal core plug means **54**. Otherwise, all of the remaining parts, namely, the handle means **10**, the end cap means **13**, and the central core means **15**, are identical to such members of the assembly set out in FIGS. 1 through 3. As it will appear, however, the function of cap means **13** in the modified assembly set out in FIG. 4, is somewhat different than the total functioning of the same cap means **13** as previously mentioned.

Turning now to the features of the modified head means **51**, it will be noted that whereas body member **12** of FIGS. 1–3 is a unitary cylindrical member having smooth exterior and interior walls, the body member **52** of FIGS. 4–6 is generally distinguished by a plurality of longitudinally extending, circumferentially spaced, cylindrical beads or ribs **56–61** which project radially inwardly and outwardly of the cylindrical walls of the body member **52** in longitudinal alignment with the raised beads **32** of end cap means **13** and grooves **33** previously described. Of further important consequence with respect to the modified body member **52** is the fact that the same is split lengthwise to provide two semi-cylindrical half-shell portions **63** and **64** (see FIG. 5). The upper half-shell portion **63** contains the opening **22** medially through the upper side thereof for receiving the cylindrical handle means **10** therethrough so that the latter may be locked to internal core means **15**, in a manner identical to the previously described relationship of handle means **10** and core means **15**.

Preferably, the body member **52** is formed as an extrusion from rigid plastic or lightweight metals, such as aluminum, magnesium alloy, or the like. Both of the half-shell portions **63** and **64** thereof consist of identical lengths of such extrusion. As above noted (see FIG. 5) the several beads or ribs on the body member, project not only exteriorly of the generally cylindrical external surface thereof, but also project radially inwardly of the internal surfaces **66** and **67** of the respective half-shell portions **63** and **64** thereof. In a sense, each of the bead portions **56–61** constitutes a cylindrical rib which is generally diametrically traversed by the cylindrical walls of the body member **52**. This relationship is best shown from the cross-sectional FIGURES 5 and 6 of the drawings.

It is of particular significance to note the structural relationship of the two equatorial beads **57** and **60** (see FIGS. 5 and 6) which constitute longitudinal joints of mating connection between the two semi-cylindrical half-shell portions **63** and **64** of the body member. Observing the illustrated cross-section of upper half-shell **63**, (FIGS. 5 and 6) it will be noted that the portion thereof involved in the bead means **57** constitutes a semi-cylindrical male formation distinguished by a centrally extending tongue projection **70** substantially V-shaped in cross-section depending from the lower edge thereof. Conversely, the opposite diametrical margin of the half-shell member **63** has a semi-cylindrical section or portion of bead **60** which is provided with a substantially V-shaped groove **71** extending therealong. The groove and tongue alignment on the lower half-shell portion **64**, is conversely arranged with a female groove **72** provided in bead section **57** thereof to matingly engage the V-shaped tongue **70** above described. In a similar fashion, the section or portion of bead **60** associated with the lower half-shell portion **64** is formed with a V-shaped tongue **73** which mates with the overdisposed V-shaped groove **71**. Thus the sections

of the split beads 57 and 60 on the two shell portions 63 and 64 are adapted to matingly internest with one another in assembly to align such two half-shells into the cylindrical body member 52.

As best illustrated in FIG. 6 of the drawings, core plug means 54 therein viewed is identical to core plug means 14 previously described, except that the cylindrical exterior of its body 75 is provided with a plurality of longitudinally extending and parallel disposed semi-cylindrical grooves 76, 76 each of which matingly receives the internal projecting portions of one of the several beads or ribs 56–61 on the body member 52. As previously described, the plug means 54 preferably is formed of rigid vinyl plastic, or the like, and is intended to be glued in place at the center of the body member 52 to receive handle means 10. It immediately will be understood that the several grooves 76 of the plug means matingly interfit and closely receive the internal projections of the several shell beads 56–61 and thereby serve to rigidly interlock and properly align the two half-shell portions 63 and 64 for assembly with handle means 10 while preventing their free disassociation when assembled over core means 54, particularly when the latter is welded or glued in position by a suitable adhesive such as epoxy resin glue, or the like. Other than the several semi-cylindrical grooves 76, core means 54 is identical to previously described core means 14 illustrated in FIGS. 1 through 3. As such, core plug means 54 serves to align the central core means 15 coaxially of the mallet head means 51 and end caps 13, 13. Likewise, the core plug means 54 serves in conjunction with the core means, to positively anchor the lower end of the handle means 10 within the interior of the mallet head.

Due to the fact that the formation of the tubular body member 52 of the mallet head bears the internal longitudinally extending semi-cylindrical bead portions as above related, it will be appreciated that the end cap means 13, 13 must likewise accommodate such internal bead projections. For this reason, the end caps 13 have the cylindrical portions 28 thereof, which extend inwardly of the opposite open ends of the mallet body member, in assembly, formed with the plurality of spaced longitudinally extending semi-cylindrical grooves 33 (see FIGS. 2 and 5) as previously mentioned. Such grooves readily receive and nest with the inward projecting portions of the several ribs 56–61, and the caps 13 are glued in place in final assembly, as described heretofore.

From the foregoing, those familiar with the art will readily recognize that the described preferred and modified embodiments of this invention illustrated in the accompanying drawings are susceptible to numerous changes, modifications and substitutions of equivalents without departing from the spirit and scope thereof. Consequently, it is intended that this invention be unlimited by the foregoing description except as may appear in the following appended claims.

I claim:

1. A mallet assembly comprising, elongated handle means having a passageway formed transversely therethrough adjacent one end thereof, mallet head means including a generally cylindrical tubular body member having a central opening in one side thereof, rigid core plug means mounted in the central interior of said body member and comprising first passageway means extending inwardly of one side thereof and communicating with said opening to provide a socket for the reception of said one end of said handle means therein and a second pasageway means transversely intersecting said first passageway means thereof and extending through said plug means in coaxial alignment with said body member, rigid core means comprising an elongated rod removably mounted coaxially through said second passageway means and traversing said passageway of said handle means to positively lock the latter in said socket, and cap means mounted over the opposite open ends of said tubular body member and including means formed coaxially of said second passageway means for receiving opposite ends of said rod in close fitting relationship thereby to align and maintain said rod coaxially of said body member.

2. The combination of claim 1 wherein said rod is held under axial compression by and extends between said cap means whereby force applied to either of said cap means is transmitted substantially directly to the other said cap means by said rod means.

3. The combination of claim 1 wherein said tubular body member comprises a pair of semi-cylindrical half-shell portions having means nestingly interlocking abuttingly adjacent edges thereof in assembly, each of said half-shell portions having a plurality of semi-cylindrical ribs circumferentially spaced and projecting radially inwardly of the interior surface thereof; and said plug means is formed as a generally cylindrical member having a body portion provided with a plurality of circumferentially spaced longitudinally extending grooves adapted to nestingly interfit with said projecting ribs and thereby interlock said half-shells in cylindrical assembly.

4. The combination of claim 3 wherein said semi-cylindrical half-shell portions comprise lightweight metal extrusions.

5. The combination of claim 1 wherein said mallet head means is hollow and said core means comprises selected elongated weight means regulatory of the striking and swinging characteristics of the mallet assembly.

6. The combination of claim 1 wherein said body member, core plug means and cap means are adhesively welded together in assembly.

7. The combination of claim 1 wherein said cap means are of resilient material and provide yieldable striking surfaces at opposite ends of the mallet assembly.

8. The combination of claim 1 wherein said body member, plug means and cap means are molded plastic members and said handle means comprises a lightweight metal tube of cylindrical formation.

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U.S. Cl. X.R.

145—36