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(54) **STRINGING MEANS FOR A BADMINTON RACKET**

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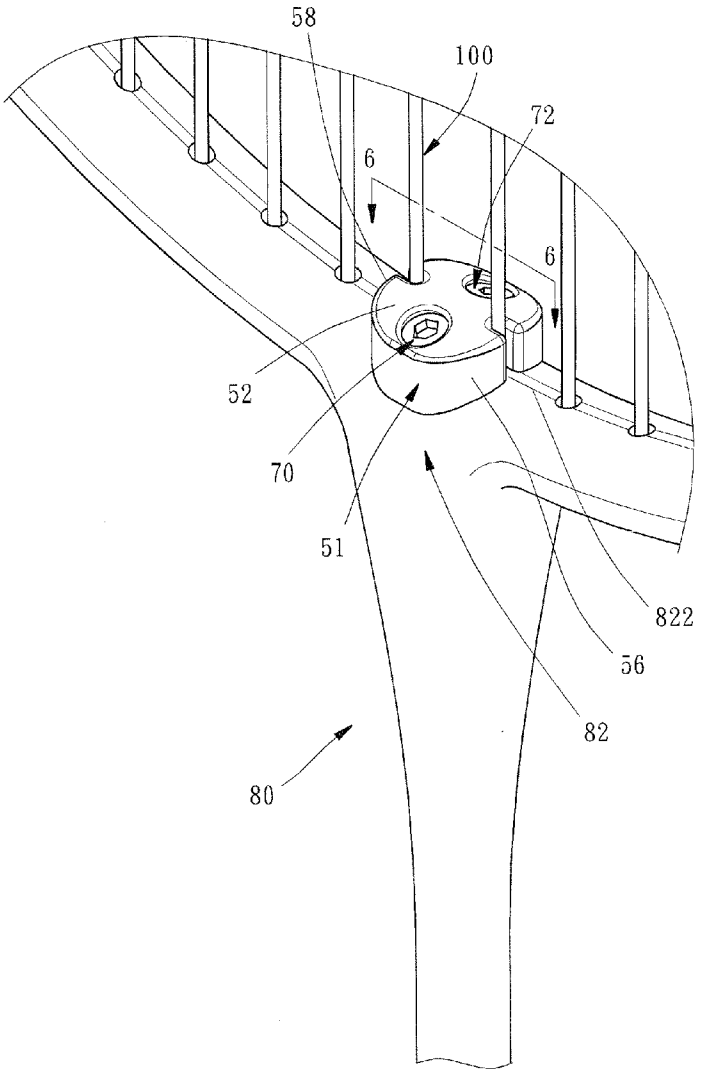
(57) **ABSTRACT**

A stringing means is made integrally with, or an independent device secured on, the throat of a badminton racket. The badminton racket includes a hoop-shaped head with a longitudinal axis, a shaft and a throat connecting the shaft to the head along the longitudinal axis thereof. The head of the racket defines a stringed hitting surface with a sweet zone. The stringing means comprises at least two guiding holes and a guiding channel. Each of the guiding holes is spaced apart in a predetermined distance and includes an opened outer end to be as a string inlet and an inner end connected with the guiding channel. When a badminton racket is equipped with such a stringing means, portions of the string chords for forming the sweet zone of the stringed hitting surface can thread through the means and extend in parallel with the longitudinal axis of the head.



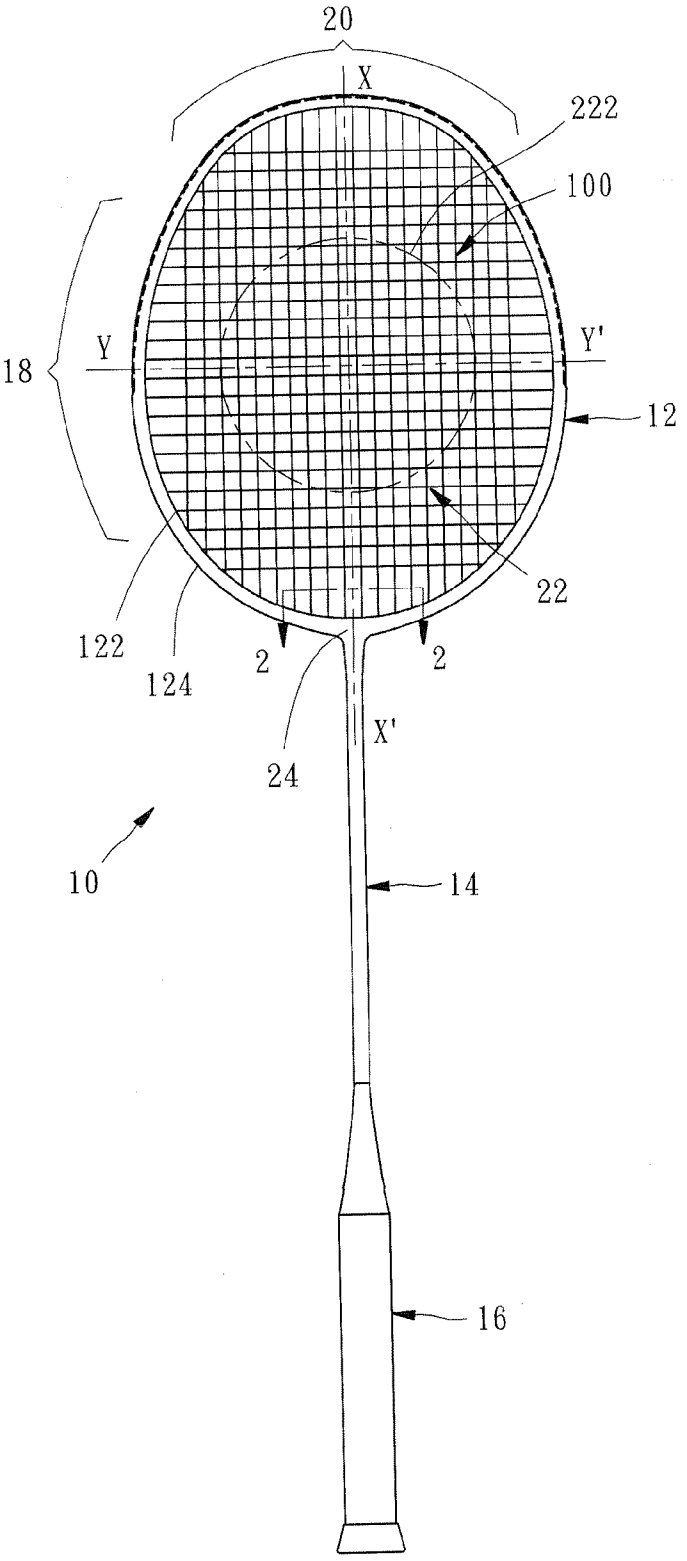


FIG. 1

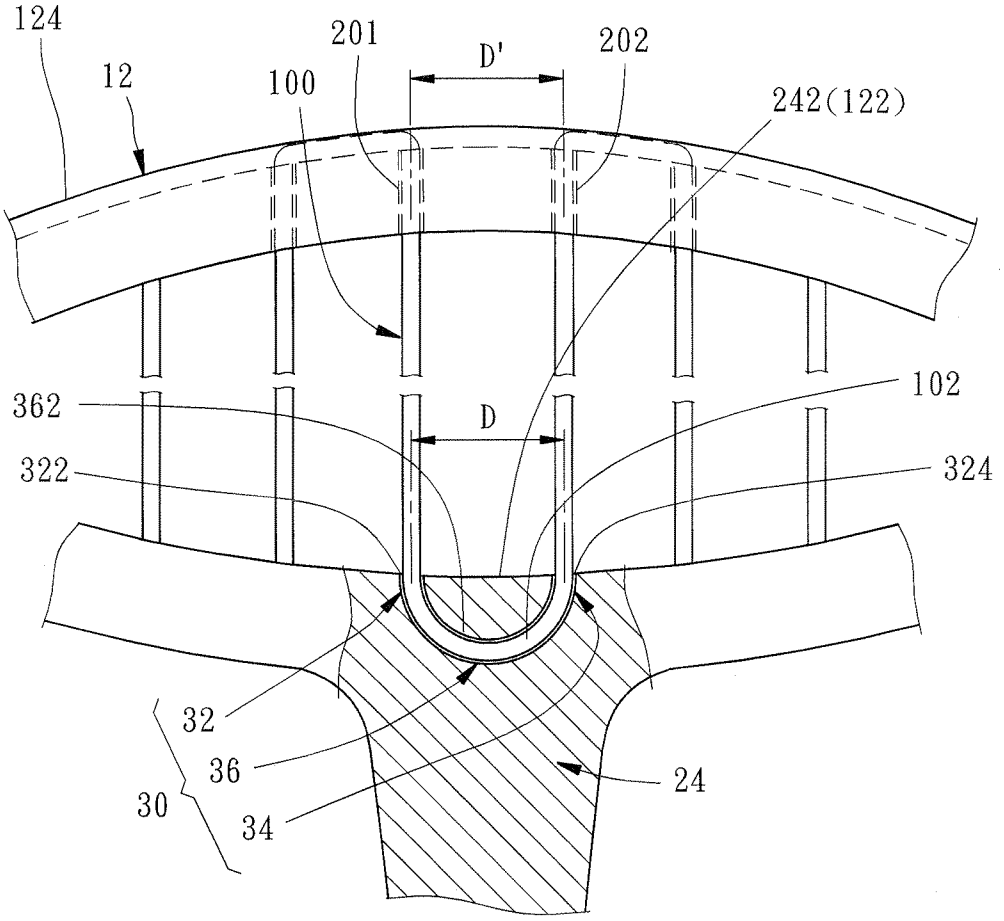


FIG. 2

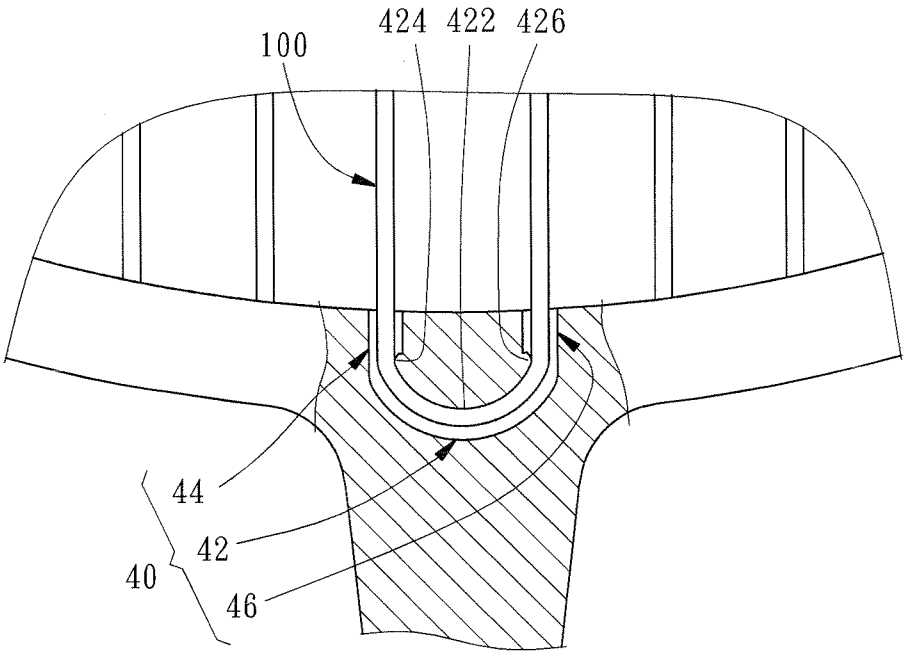


FIG. 3

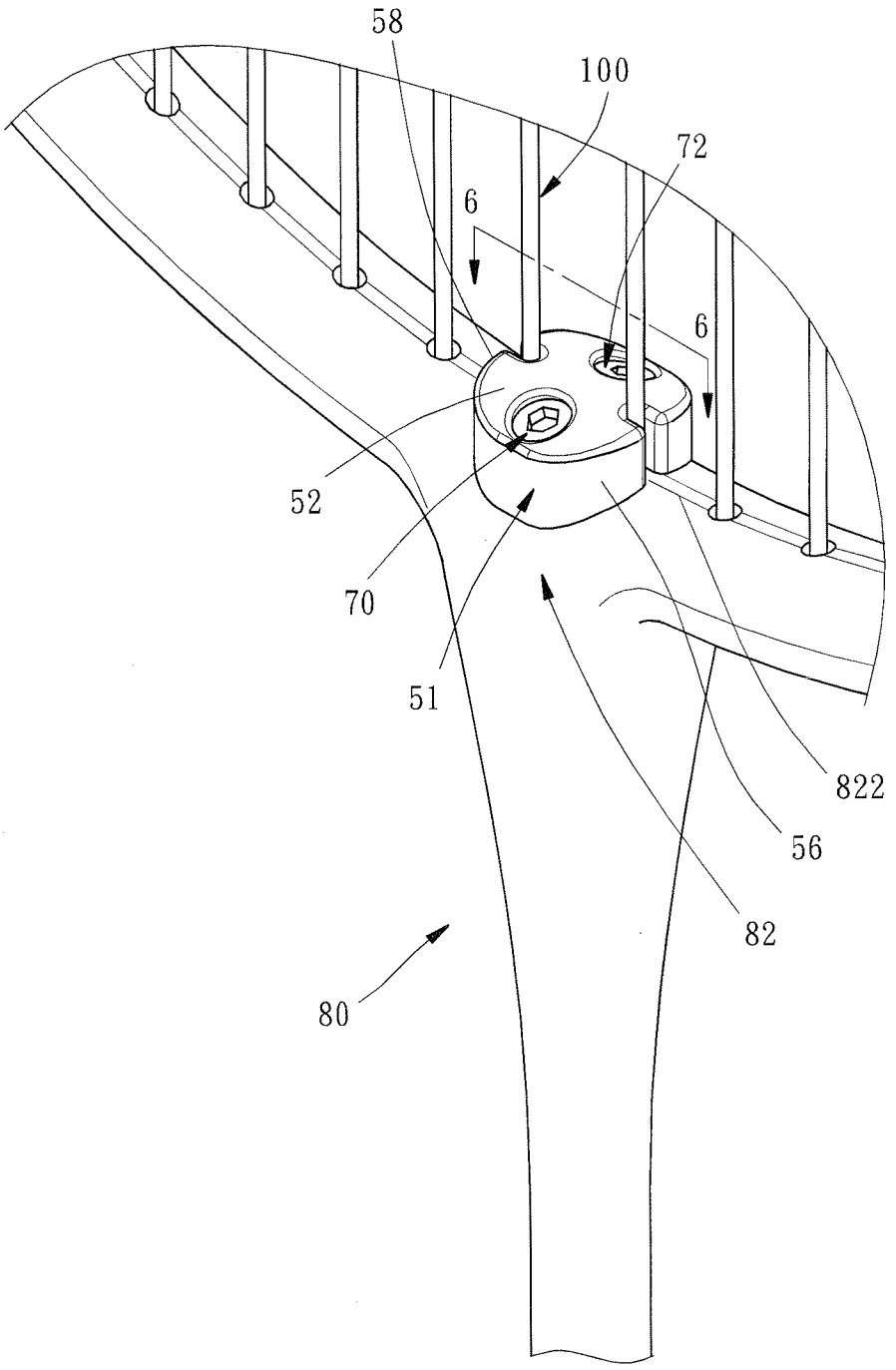


FIG. 4

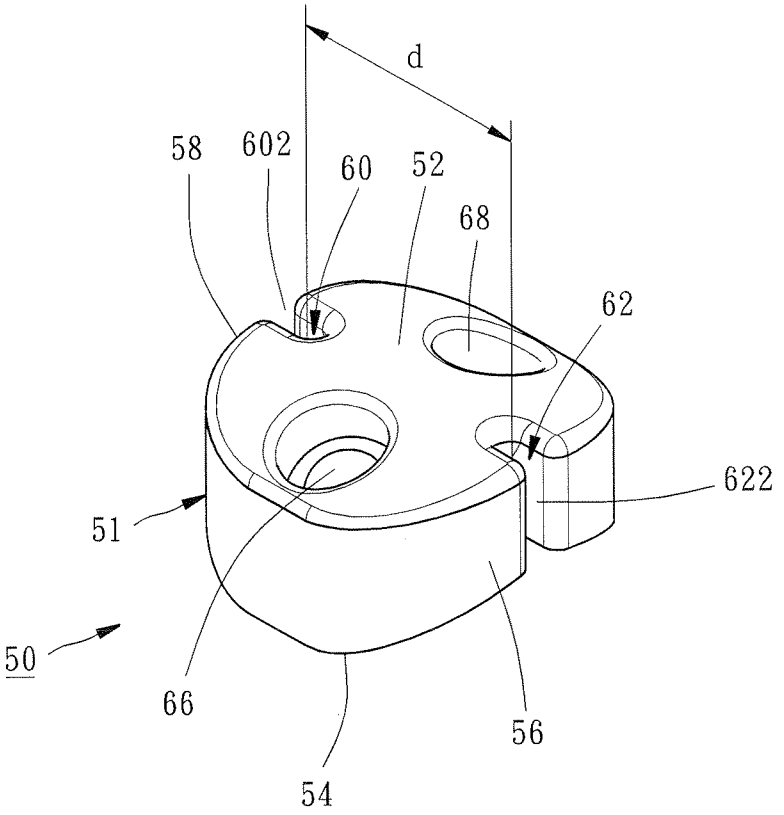


FIG. 5

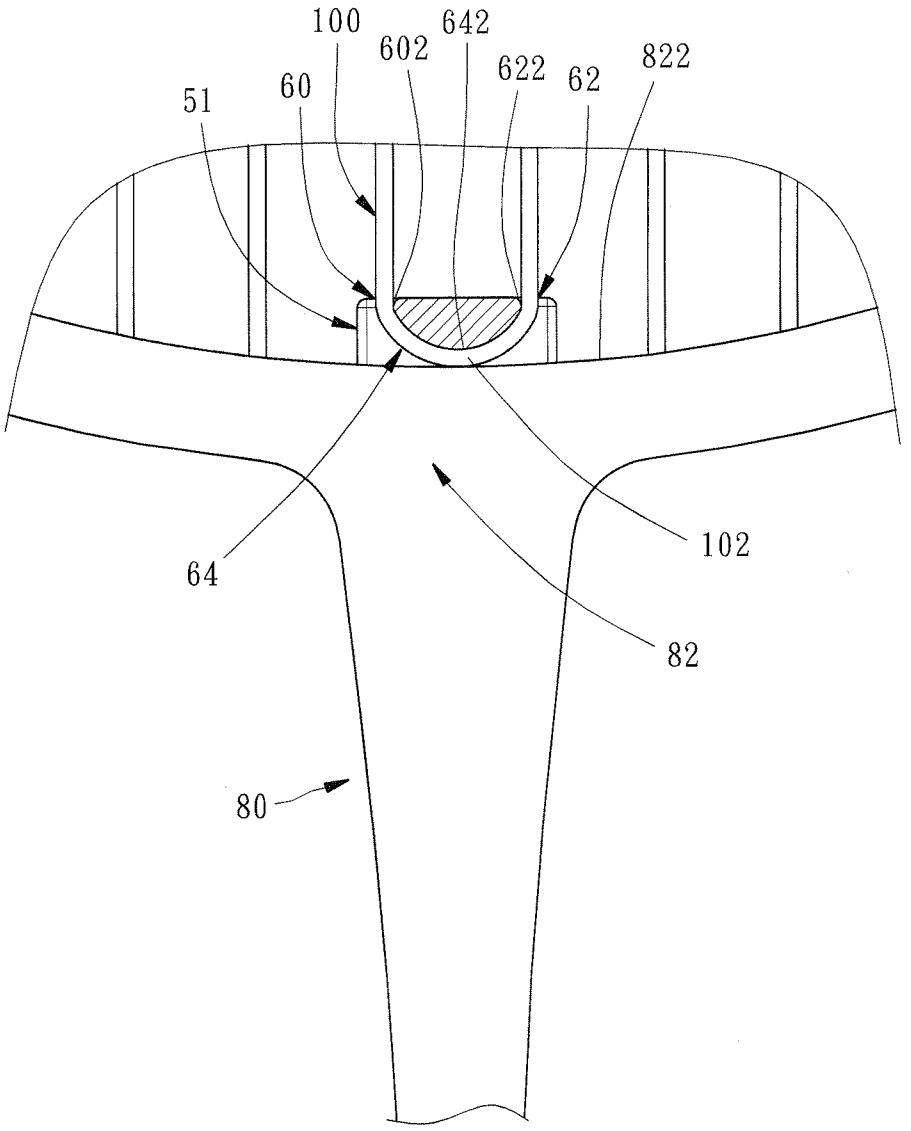


FIG. 6

STRINGING MEANS FOR A BADMINTON RACKET

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to badminton rackets and particularly to a stringing means for a badminton racket.

[0003] 2. Description of the Related Art

[0004] It is well known that badminton rackets typically include a hoop-shaped head and a shaft downwardly and outwardly extending from the head. The shaft usually includes a handle attached to the proximal end thereof. The handle generally is covered by a grip.

[0005] The head of such prior art badminton rackets normally is constructed to have a longitudinal axis, a transverse axis and a set of string holes to be threaded through by tensioned strings to form a stringed hitting surface with a sweet zone. The string holes are usually arranged in two groups. A first or longitudinal group of string holes are disposed on the upper and lower portions of the head and each longitudinal string hole has an axis parallel to the longitudinal axis of the head so that the stringed hitting surface includes a plurality of longitudinal string chords which thread through the longitudinal string holes and extend in parallel with the longitudinal axis of the head. A second or transverse group of string holes are disposed on the right and left portions of the head and each transverse string hole has an axis parallel to the transverse axis of the head to construct a plurality of transverse string chords extending in parallel with the transverse axis of the head. The head usually connects with the shaft at a single region as opposed to two or more areas commonly used with tennis racquets. This single connection region is hereinafter referred to as throat.

[0006] For being a joint of the head and the shaft, the throat is formed as an area that stress concentrates. In other words, when the badminton racket impacts a shuttlecock, the head and shaft will place a large amount of stress on the throat. As a result, it is not uncommon for badminton rackets to prematurely fail at the throat.

[0007] To address the premature failure issue, some existing badminton rackets have included T-shaped joints at the throat thereof. However, actually, there remained some problems yet to be solved. For example, the throat including T-shaped joint inherently required to be constructed with larger dimensions than the other racket portions. As a result, the axes of the longitudinal string holes disposed near the throat cannot parallel to the longitudinal axis of the head of the badminton racket, as shown in FIG. **3**(*a*) of U.S. Pat. No. 4,575,084, so that the string chords passing through such string holes tiltedly extend as comparing with other longitudinal string chords. This means that the friction between the inner wall of the longitudinal string holes and the string chords passing therethrough will be increased. Because the string chords near the throat construct the sweet zone of the stringed hitting surface, the rather large friction can negatively effect the tension transmitting of the string chords of the sweet zone, as a result, the playability of the racket is also negatively affected.

[0008] Thus, there is a need for a badminton racket that inhibits premature failure at the throat thereof without negatively affecting the tension transmitting of the strings chords of the sweet zone. Further speaking, what is needed is an improved stringing design that can effectively reduce the friction between the strings chords of the sweet zone and the inner wall of the string holes through which the string chords of the sweet zone thread.

SUMMARY OF THE INVENTION

[0009] The present invention provides a stringing means for a badminton racket wherein the racket includes a hoop-shaped head with a longitudinal axis, a shaft and a throat connecting the shaft to the head along the longitudinal axis thereof. The head of the racket defines a stringed hitting surface with a sweet zone. The stringing means is disposed on the throat of the racket and constructed in such a way that portions of the string chords for forming the sweet zone of the stringed hitting surface can thread through the means and extend in parallel with the longitudinal axis of the head.

[0010] According to a principal aspect of the present invention, a badminton racket comprises a hoop-shaped head with a longitudinal axis, a shaft and a throat connecting the head and the shaft along the longitudinal axis of the head. The head has an inner surface, an outer surfaces and a plurality of string holes disposed between the inner and outer surfaces to be threaded through by a tensioned string to form a stringed hitting surface with a sweet zone. The racket further comprises a stringing means disposed on the throat and constructed in such a way that portions of string chords for forming the sweet zone of the stringed hitting surface can thread through the means and extend in parallel with the longitudinal axis of the head.

[0011] According to another principal aspect of the present invention, a stringing means is integrally formed with the throat of a badminton racket. The stringing means comprises at least two guiding holes spaced apart in a predetermined distance and a guiding channel. Each of the guiding holes includes an opened outer end to be as a string inlet, and an inner end connected with the guiding channel.

[0012] According to a further principal aspect of the present invention, a stringing means comprises a body provided for being mounted on the throat of the badminton racket. The means further comprises at least two guiding holes and a guiding channel. The guiding holes are disposed on the body and spaced apart in a predetermined distance. Each of the guiding holes includes an opened outer end to be as a string inlet and an inner end. The guiding channel is also disposed on the body and connected with the inner end of each of the guiding holes. Thus, when the body is mounted on the throat of the badminton racket, portions of the string chords of the sweet zone of the stringed hitting surface will string through the body and extend in parallel with the longitudinal axis of the head of the racket.

[0013] The present invention will become more fully understood from the following detailed description, taken in conjunction with the drawings accompanying the application.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. **1** is a front perspective view of a badminton racket with a stringing means according to a first preferred embodiment of the present invention;

[0015] FIG. **2** is a merged drawing combined with an enlarged view of the upper portion of the head of the badminton racket of FIG. **1** and a cross-sectional view of the throat of the badminton racket of FIG. **1** taken along line **2-2** of FIG. **1**;

[0016] FIG. **3** is a cross-sectional view of the throat of a badminton racket with a stringing means in accordance with a second preferred embodiment of the present invention;

[0017] FIG. **4** is an enlarged view of the throat of a badminton racket on which a stringing means in accordance with a third preferred embodiment of the present invention is secured;

[0018] FIG. **5** is a perspective view of the stringing means shown in FIG. **4**; and

[0019] FIG. **6** is a cross-sectional view taken along line **6-6** of FIG. **4**.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0020] Referring firstly to FIG. **1**, a badminton racket is indicated generally at **10**. Racket **10** includes a hoop-shaped head **12**, a shaft **14** and a handle **16**.

[0021] Hoop-shaped head **12** has a longitudinal axis X-X', a transverse axis Y-Y', an inner surface **122** and an outer surfaces **124**. Shaft **14** extends along axis X-X' and has a proximate end connected to the bottom portion of head **12** by a throat **24**. Connected to a distal end of shaft **14** is handle **16**. In this embodiment, head **12**, throat **24** and shaft **14** is made integrally of lightweight materials, such as aluminum alloy, FRP etc. Therefore, the upper surface **242** of throat **24** is also a portion of inner surface **122** of head **12**.

[0022] Disposed between inner and outer surfaces **122**, **124** are a plurality of transverse string holes **18** and a plurality of longitudinal string holes **20**. A string **100** tensionedly threads through string holes **18**, **20** to form a stringed hitting surface **22** with a sweet zone **222**.

[0023] Badminton racket **10** further comprises a stringing means **30** disposed on throat **24**. In this embodiment, stringing means **30** integrally formed with throat **24** and includes two guiding holes **32**, **34** spaced apart in a predetermined distance and a guiding channel **36** with a curved bearing surface **362**. Each of guiding holes **32**, **34** has an opened outer end **322**, **324** to be as a string inlet and an inner end connected with guiding channel **36**. Speaking detailedly, each of guiding holes **32**, **34** corresponds respectively to one of top string holes **201**, **202** disposed on the upper portion of head **12**. The distance D between guiding holes **32**, **34** is equal to the distance D' between top string holes **201**, **202** so that guiding hole **32** and top string hole **201** have a first common axis and guiding hole **34** and top string hole **202** have a second common axis. Thus, string **100** coming from top string hole **201** will extend in parallel with longitudinal axis X-X' of head **12**, then enter into guiding hole **32** from opened end **322**, form a loop **102** received on curved bearing surface **362**, pass out from opened end **324** of guiding hole **34**, extend in parallel with longitudinal axis X-X' of head **12** and lastly thread through top string hole **202**.

[0024] As shown in FIG. **2**, for having stringing means **20** disposed on throat **24**, the two major longitudinal string chords of sweet zone **222** of stringed hitting surface **22** extend in parallel with longitudinal axis X-X' of head **12** rather than extend at an angle therewith. The result is that the friction between each of the two major longitudinal string chords of sweet zone **222** and the inner wall of each of the string holes through which the major longitudinal string chord of sweet zone **222** threads is effectively reduced. Thus, the objects or advantages of the present invention can be achieved.

[0025] Referring to FIG. **3**, in a particularly preferred embodiment, a stringing means **40** is also formed integrally with the throat of a badminton racket. Stringing means **40** is substantially the same as stringing means **30** described above. The difference between stringing means **40** and stringing means **30** is that curved bearing surface **422** of guiding channel **42** of stringing means **40** has a pair of suspending portion **424**, **426** disposed respectively on opposing longitudinal ends thereof. In this embodiment, each of suspending portions **424**, **426** is a projecting area facing to guiding holes **44**, **46**. This ensures that string threads through guiding channel **42** without touching the inner wall of each of guiding holes **44**, **46** and means the friction between the inner wall of guiding holes **44**, **46** and the string threading therethrough will be largely reduced. As a result, the tension among the string chords of the sweet zone produced during impacting a shuttlecock can be smoothly transmitted.

[0026] FIGS. **4-6** show a further alternative stringing means **50** embodied according to the present invention. In this embodiment, stringing means **50** is an independent device secured on throat **82** of badminton racket **80**. Stringing means **50** includes a block body **51** made of lightweight materials, such as FRP, aluminum, titanium or other metallic alloys. Block body **51** has a top surface **52**, a bottom surface **54** and side surface **56**, **58**.

[0027] Stringing means **50** further includes a pair of guiding holes **60**, **62** and a guiding channel **64**. Guiding holes **60**, **62** is disposed on body **51** and spaced apart in a distance "d" and extend from top surface **52** to bottom surface **58**. The distance "d" is equal to the distance of a pair of upper string holes (not shown in the drawings) of badminton racket **80** to which guiding holes **60**, **62** correspond. Guiding channel **64** is also disposed on body **51** and has a pair of opposing open ends connected respectively with each of guiding holes **60**, **62**.

[0028] As shown in FIG. **4**, in this embodiment, stringing means **50** is secured on top surface **822** of throat **82** of badminton racket **80** by two screws **70**, **72** screwing into a pair of through holes **66**, **68** disposed on body **51**. Each of guiding holes **60**, **62** preferably has an opened side **602** , **622** so that an U-shaped stringing channel can be formed on body **51** for being easily threaded through.

[0029] When badminton racket **80** is constructed to have stringing means **50** secured on throat **82** thereof, as shown in FIG. **6**, string **100** coming from top string hole will extend in parallel with longitudinal axis of the head of the racket to enter into guiding hole **60** from opened end **602**, then form a loop **102** received on curved bearing surface **642**, and then pass out from opened end **622** of guiding hole **62**, lastly extend in parallel with longitudinal to the top string hole. Thus, the two major longitudinal string chords located on the sweet zone of the stringed hitting surface of the badminton racket **80** will extend in parallel with the longitudinal axis of the head of the racket **80** rather than extend at an angle therewith. Therefore, the objects or advantages of the present invention are achieved.

What is claimed is:

1. A stringing means for a badminton racket wherein the racket includes a hoop-shaped head with a longitudinal axis, a shaft and a throat connecting the shaft to the head along the longitudinal axis thereof, the head defines a stringed hitting surface with a sweet zone, said stringing means is disposed on the throat of the racket and constructed in such a way that portions of the string chords of the sweet zone of the stringed hitting surface can string through said stringing means and extend in parallel with the longitudinal axis of the head of the racket.

2. The stringing means of claim 1, wherein said stringing means is integrally formed with the throat and comprises at least two guiding holes spaced apart in a predetermined distance and a guiding channel; each of said guiding holes includes an opened outer end to be as a string inlet and an inner end connected with said guiding channel.

3. The stringing means of claim 2, wherein said guiding channel has a curved bearing surface with opposing longitudinal ends.

4. The stringing means of claim 3, wherein said guiding channel includes a pair of suspending portions, each of said suspending portions is disposed respectively on each of said longitudinal ends of said curved bearing surface.

5. The stringing means of claim 4, wherein each of said suspending portions is a projecting area facing to each of said guiding holes.

6. A badminton racket comprising a hoop-shaped head with a longitudinal axis, a shaft and a throat connecting the shaft to the head along the longitudinal axis thereof, said head having an inner surface, an outer surfaces and a plurality of string holes disposed between said inner and outer surfaces to be threaded through by a tensioned string to form a stringed hitting surface with a sweet zone; said racket further comprising a stringing means disposed on the throat thereof and constructed in such a way that portions of string chords of the sweet zone of the stringed hitting surface can thread therethrough and extend in parallel with the longitudinal axis of the head.

7. The badminton racket of claim 6, wherein said stringing means is integrally formed with the throat and comprises at least two guiding holes spaced apart in a predetermined distance and a guiding channel, each of said guiding holes includes an opened outer end to be as a string inlet and an inner end connected with said guiding channel.

8. The badminton racket of claim 7, wherein said guiding channel has a curved bearing surface with opposing longitudinal ends.

9. The badminton racket of claim 8, wherein said guiding channel further includes a pair of suspending portions, each of said suspending portions is disposed respectively on each of said longitudinal ends of said curved bearing surface.

10. The badminton racket of claim 9, wherein each of said suspending portions is a projecting area facing to each of said guiding holes.

11. The badminton racket of claim 7, wherein the string holes includes two upper string holes disposed on the upper portion of the head, each of said upper string holes respectively corresponds to one of said guiding holes such that each of said upper string holes and each of said guiding holes to which said upper string hole corresponds are in a common axis.

12. The stringing means of claim 1, wherein said stringing means comprises a block body secured on the throat of the badminton racket.

13. The stringing means of claim 12, further comprising at least two guiding holes and a guiding channel, each of said guiding holes being disposed on said body and spaced apart in a predetermined distance, each of said guiding holes including an opened outer end to be as a string inlet and an inner end, said guiding channel being disposed on said body and connected with said inner end of each of said guiding holes.

14. The stringing means of claim 13, wherein said guiding channel has a curved bearing surface with opposing longitudinal ends.

15. The stringing means of claim 14, wherein said guiding channel further includes a pair of suspending portions, each of said suspending portions is disposed respectively on each of said longitudinal ends of said curved bearing surface.

16. The stringing means of claim 14, wherein each of said suspending portions is a projecting area facing to each of said guiding holes.

17. The stringing means of claim 12, wherein said body includes through holes to be tightly secured on the throat of the badminton racket by screws or the like.

18. The stringing means of claim 13, wherein each of said guiding holes has an opened side.

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