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(54) **BASEBALL OR SOFTBALL BAT**

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(76) Inventors: **Masaaki Okuyama, Osaka (JP);
Kazunori Misono, Osaka (JP)**

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Correspondence Address:

**TROUTMAN SANDERS LLP
BANK OF AMERICA PLAZA, SUITE 5200
600 PEACHTREE STREET, NE
ATLANTA, GA 30308-2216 (US)**

ABSTRACT

(57) A sweet spot **3** of an impact portion **2** has a smaller diameter than the other portions of the impact portion **2**, whereby the impact portion **2** has an intermediate tapering shape in the longitudinal direction. Thus, even if hit with a portion at some distance from the sweet spot, rebound performance is not significantly reduced. Therefore, a bat having a large sweet area and capable of reducing the occurrence of foul balls is obtained.

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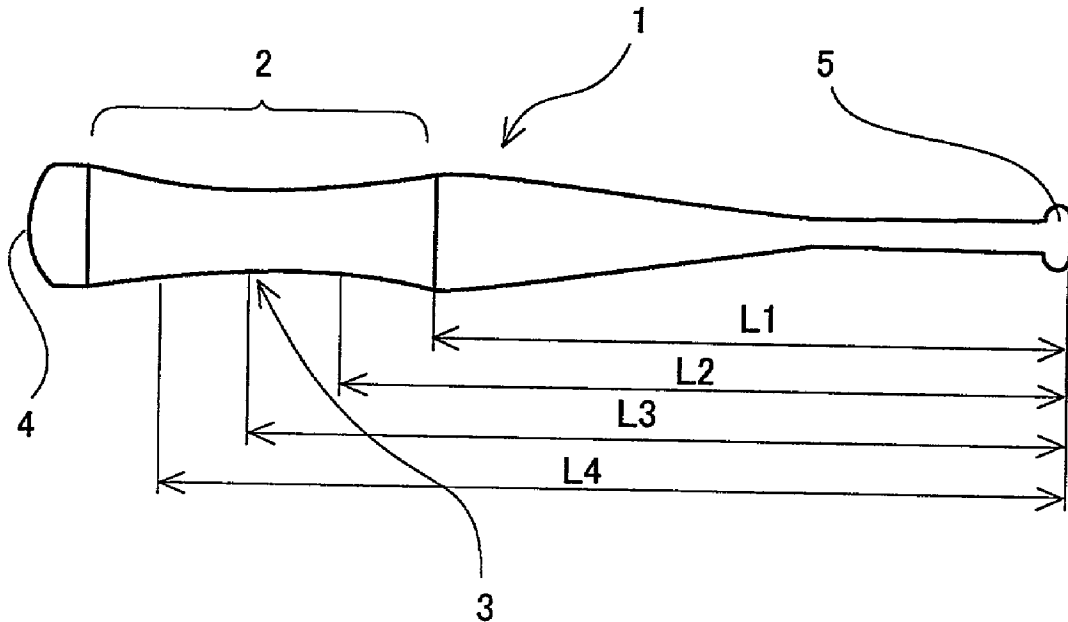


FIG. 1

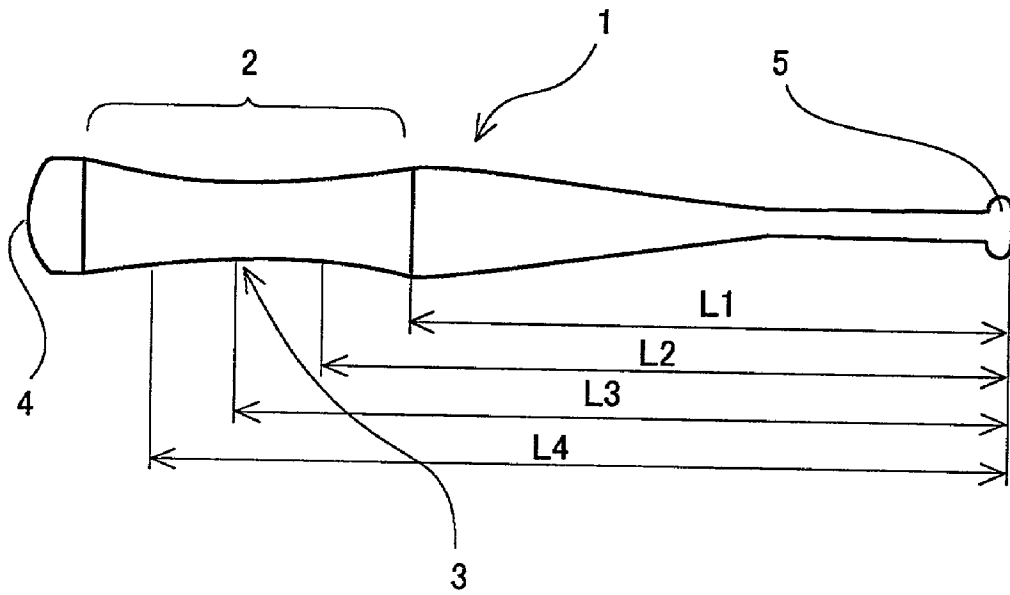


FIG. 2

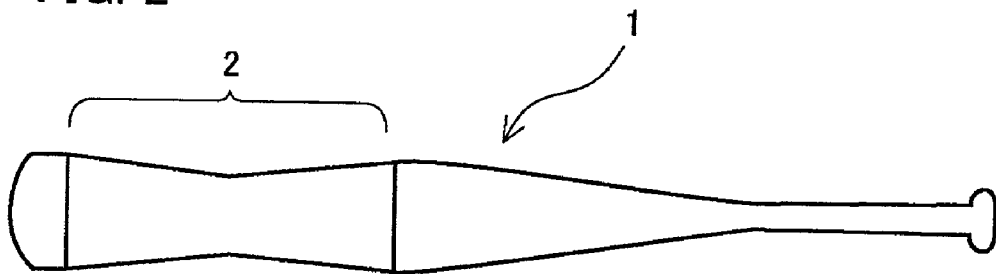


FIG. 3

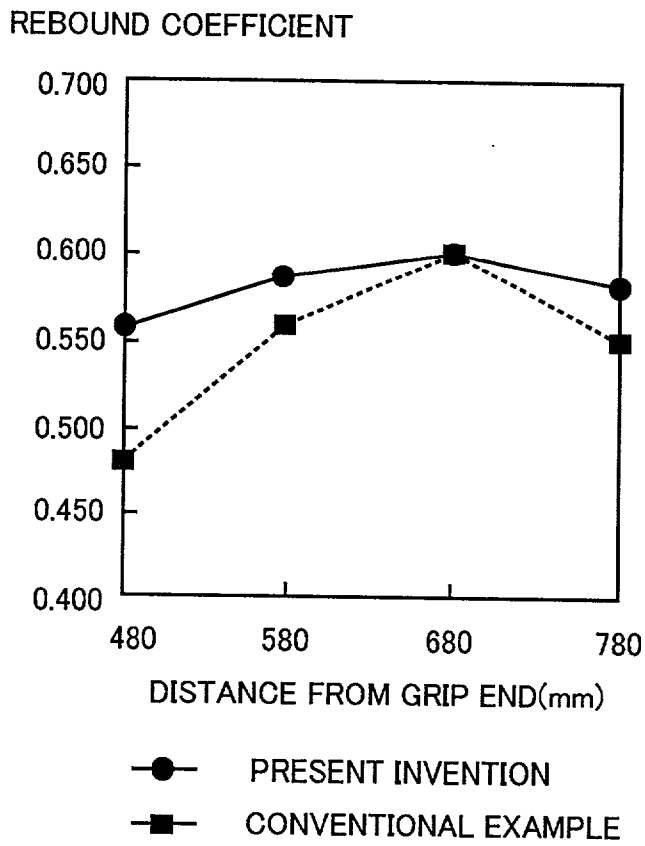
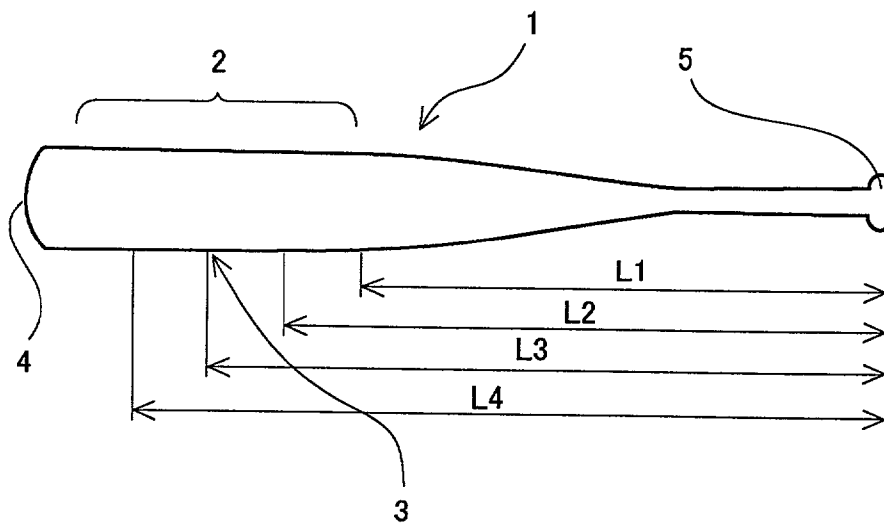


FIG. 4 PRIOR ART



BASEBALL OR SOFTBALL BAT

BACKGROUND OF THE INVENTION

[0001] 1. Field of the Invention

[0002] The present invention relates to an improvement of a baseball or softball bat hereinafter referred to as a bat). The present invention provides a high-performance bat having a large sweet area that can achieve a good slugging distance even when a ball is hit with a portion other than a sweet spot, by forming the outer shape of the impact portion of the bat to have an intermediate tapering portion or recessed portion in the longitudinal direction.

[0003] 2. Description of the Background Art

[0004] The greater diameter of an impact portion tends to provide a smaller stiffness for elliptic deformation and hence give higher rebound performance to a ball. Then, it is generally known that a bat which gives excellent rebound performance can be effectively designed by making the diameter of an impact portion as large as possible.

[0005] On the other hand, if the diameter of the impact portion is too large, the bat becomes too heavy for a hitter to take a comfortable swing. If such a large diameter is to be maintained with less weight, sufficient strength is not obtained.

[0006] Then, to give improved rebound performance to the conventional bat, it has been necessary to reduce the impact portion in length so that the diameter of the impact portion is made large with less weight. As such, the conventional bat has a small sweet area.

[0007] As shown in FIG. 4, the conventional bat has an impact portion having a perimeter of a linear or gentle convex curve in the longitudinal direction. Thus, if a right-handed batter hits a rather outside ball with the impact portion near a leading edge, the stroke may result in a foul ball on the first base side.

[0008] On the other hand, if a right-handed batter hits a rather inside ball with the impact portion near a grip end, the stroke may result in a foul ball on the third base side.

SUMMARY OF THE INVENTION

[0009] Therefore, the present invention aims at providing a bat which has such a large sweet area that a certain level of rebound performance is ensured even if a ball is hit with a portion at some distance from a sweet spot, and which may reduce the occurrence of foul balls.

[0010] The baseball or softball bat of the present invention includes an impact portion which has a smaller diameter at a sweet spot than at the other locations of the impact portion, and which has a recessed external shape in the longitudinal direction.

[0011] The outline of a recessed part of the impact portion may be a curve, straight line, arc, or ellipse. The perimeter of the recessed part has a curvature radius of 200-1000 cm.

[0012] Preferably, the diameter of the impact portion increases from the sweet spot toward the leading edge and grip end of the bat.

[0013] The foregoing and other objects, features, aspects and advantages of the present invention will become more

apparent from the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1 is a plan view of a bat according to the present invention.

[0015] FIG. 2 is a plan view of a bat according to another embodiment of the present invention.

[0016] FIG. 3 is a graph showing a comparison result of rebound performance between the bat of the present invention and the conventional bat.

[0017] FIG. 4 is a plan view of the conventional bat.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0018] Now, the embodiment of the present invention will be described.

[0019] Referring to FIG. 1, a bat 1 of the present invention has a smaller diameter at a sweet spot 3 of an impact portion 2 that gives the maximum bounce to a ball than at the other locations of impact portion 2. Impact portion 2 has a recessed outer shape. More specifically, impact portion 2 has a perimeter of an intermediate tapering shape in the longitudinal direction.

[0020] The recessed shape is obtained with the diameter of impact portion 2 being minimum at the location of sweet spot 3 and gradually increasing toward a leading edge 4 and a grip end 5 of bat 1. Thus, even if hit with the portion other than sweet spot 3, bat 1 has a large sweet area and exhibits less reduction in rebound performance because of the larger diameters of impact portion 2.

[0021] The outline of the recessed portion is desirably part of a curve, and especially an arc or ellipse with a curvature radius of 200-1000 cm. However, it may be part of a straight line as shown in FIG. 2.

[0022] Bat 1 can be made of various materials including wood, metal, fiber reinforced plastic (FRP) and the like. Bat 1 of the present invention can be made of any material.

[0023] If made of wood, bat 1 is formed by turning, followed by reinforcement by resin injection or the like.

[0024] If made of metal, bat 1 is formed by the conventional manufacturing method and then processed to have a tapering impact portion 2 with use of a metal roller or the like.

[0025] If made of FRP, for example, bat 1 is formed to have a tapering impact portion 2 with use of a mold having the corresponding shape.

[0026] Bat 1 does not necessarily have to be formed of a single material, but may be formed of different materials. For example, a tapering tubular member of FRP may be used for impact portion 2 of metal bat 1, or a tapering metal tubular member may be used for impact portion 2 of FRP bat 1.

[0027] Table 1 and FIG. 3 show a comparison result of rebound performance between baseball bat 1 of the present invention shown in FIG. 1 and conventional baseball bat 1 shown in FIG. 4.

Distance from grip end (mm)	Present invention		Conventional example	
	Diameter (mm)	Rebound Coefficient	Diameter (mm)	Rebound Coefficient
L1 480	69.0	0.560	63.0	0.480
L2 580	64.5	0.585	63.0	0.560
L3 680	63.0	0.600	63.0	0.600
L4 780	64.5	0.580	63.0	0.550

[0028] As is apparent from the above result, sweet spot 3 (portion about 680 mm from the grip end) exhibits the highest rebound (restitution) coefficient, and the rebound coefficient decreases as away from sweet spot 3.

[0029] Although conventional bat 1 exhibits a considerable decrease in rebound coefficient as away from sweet spot 3, bat 1 of the present invention exhibits only a slight decrease in rebound coefficient because of the increasing diameter of the impact portion, having a large sweet area.

[0030] In the present invention, the diameter of the impact portion at the sweet spot is minimum and then the diameter gradually increases toward the leading edge and grip end of the bat. Thus, if hit with the portion other than the sweet spot, the decrease in rebound performance is not considerable because of the increasing diameter of the impact portion. As such, the bat has a large sweet area.

[0031] Further, the intermediate tapering shape of the impact portion helps the ball hit with the end of the impact portion to be directed to a fair zone. Thus, the occurrence of foul balls and hence game length are reduced.

[0032] Although the present invention has been described and illustrated in detail, it is clearly understood that the same is by way of illustration and example only and is not to be taken by way of limitation, the spirit and scope of the present invention being limited only by the terms of the appended claims.

What is claimed is:

1. A baseball or softball bat, wherein a sweet spot of an impact portion has a smaller diameter than other portions of said impact portion, and said impact portion has a recessed outer shape in a longitudinal direction.

2. The baseball or softball bat according to claim 1, wherein an outline of a recessed part of said impact portion includes a curve.

3. The baseball or softball bat according to claim 2, wherein the outline of the recessed part of said impact portion is part of an arc or ellipse.

4. The baseball or softball bat according to claim 3, wherein the outline of the recessed part has a curvature radius of 200-1000 cm.

5. The baseball or softball bat according to claim 1, wherein the diameter of said impact portion increases from said sweet spot toward a leading edge and grip end of said bat.

6. The baseball or softball bat according to claim 1, wherein the outline of the recessed part of said impact portion includes a straight line.

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