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(54) **Boomerang**

(57) A boomerang comprises a member having two arms 11, 12 including an angle in an L-shape. At least one arm itself has two portions 13, 14 including an angle, but this angle is in the opposite sense to the angle of the L and preferably larger in magnitude. There may be

one or more apertures 35-37 in the region of the junction 17 between the two arms, and when there is a plurality of apertures they may be arranged linearly, decreasing in size towards the leading edge of the region as the boomerang spins.

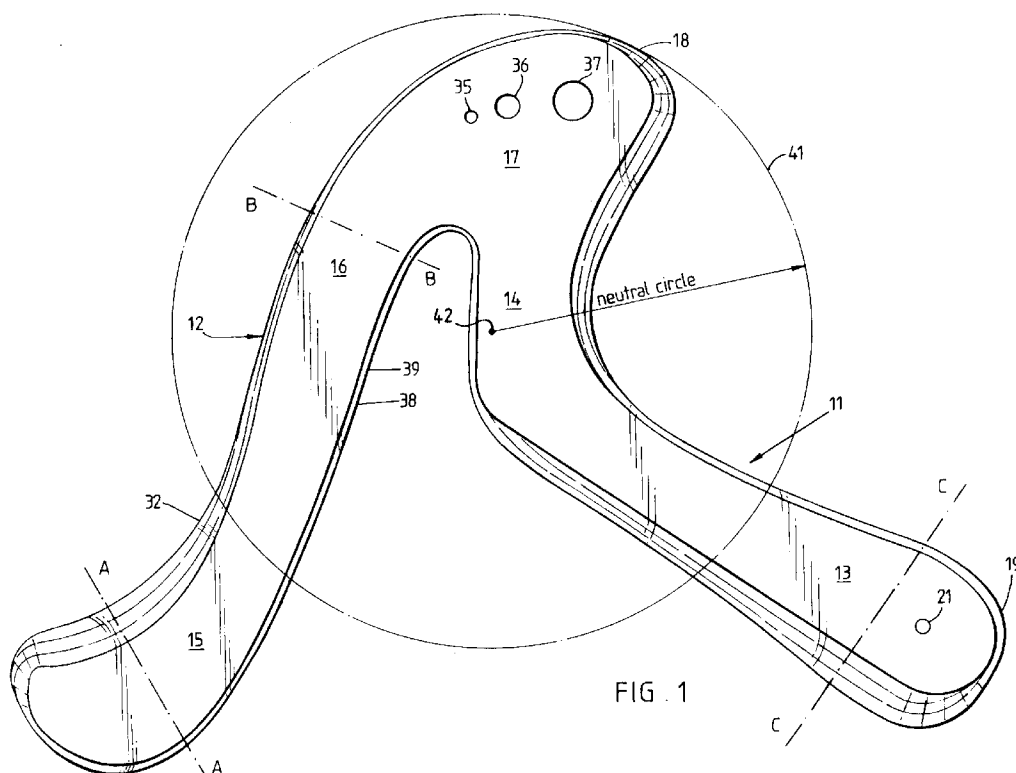


FIG. 1

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Description

The conventional boomerang comprises an L-shaped member which can be thrown through the air with a spinning action and has been found to have the property of returning to the thrower.

The flight of the boomerang can be affected by how it is thrown and the state of the air through which it is thrown and it is desired to make a boomerang more precise in returning to the thrower. It is also desired to make the boomerang safer to catch, and to this end it is preferred that the boomerang will hover towards the end of its flight.

According to the invention there is provided a boomerang comprising a member having two arms including an angle in an L-shape, one arm comprising two portions including an angle in the opposite sense to the angle included by the two arms. The free end of said one arm preferably includes an angle with the free end of the other arm between 60° and 120° , preferably 95° . The angle in the opposite sense included by the portions of said one arm is preferably within the range of 90° to 180° and preferably 110° .

The other arm may also have two portions including an angle in the opposite sense to the angle included between the free ends of the two arms and this included angle is preferably larger than the angle included between the two portions of said one arm and preferably in the range of 120° to 180° , preferably 150° .

The boomerang is preferably broadest at the junction between the two arms and this junction may be formed with an aperture, preferably a series of apertures. The series of apertures are preferably arranged in a linear region and are preferably graduated in size along the region.

The free ends of the arms are preferably chamfered along their trailing edges in the intended direction of spin when the boomerang is thrown and the graduation of the apertures is preferably such that the apertures decrease in size towards the leading edge of the boomerang when it spins. The apertures are preferably cylindrical. A weight may be mounted at the free end region of an arm, preferably said other arm.

An example of the invention will now be described with reference to the accompanying drawings in which:

Figure 1 is a plan of a boomerang embodying the present invention and

Figures 2 to 4 are sections on lines A-A, B-B and C-C of Figure 1.

The illustrated boomerang has two arms 11 and 12, the arm 11 comprising two approximately linear portions 13 and 14 and the arm 12 comprising two approximately linear portions 15 and 16. The free end portions 13 and 15 are slightly wider than the corresponding portions 14 and 16. The portions 14 and 16 are joined together at a junction 17 which is the broadest portion of the boomer-

ang, the portions 14 and 16 approaching the junction 17 at a small angle of approximately 30° , the junction area extending from the portions 14 and 16 to a stub end 18 which is rounded off. The portion 13 is longer than the portion 14 and is also longer than the portion 15. The portion 15 of the arm is shorter than the portion 16. The length of the portion 14 is comparable with the length of the stub portion at the junction between the arms 14 and 16. The relative lengths of the portions 13 and 15 control the lift provided to the boomerang and it is preferred that the leading arm 11 in the anticlockwise rotation provides more lift than the trailing arm 12.

The free end 19 of the arm 11 is rounded off with its upper surface in an approximate semicircle and is formed with an aperture 21 located at the centre of the semicircle. The width of the portion 13 tapers gently from a maximum adjacent the aperture almost to the junction 23 with the other portion 14, although the width increases slightly again as the junction with the portion 14 is approached. The two portions 13 and 14 include an angle in the opposite sense to the angle between the portions 13 and 15, of approximately 120° . The arm 11 at the junction 23 between the portions 13 and 14 is smoothly curved.

The arm 12 has a rounded free end 31 on the portion 15 although more stunted than the approximately semicircular shape of the free end 19 of the portion 13 and slightly distorted towards the trailing direction. There is no aperture in this free end although, if desired, a weight (not shown) can be mounted in the free end 15 to improve performance. The portion 16 is approximately linear whose width tapers slightly from a maximum adjacent the junction 17 towards the portion 15 and the portion 15 curves away from the portion 16 to include at the junction 32 on arm 12 an angle of approximately 30° in the opposite sense to the angle between the portions 14 and 16. As can be seen from Figure 2, the top of the trailing edge 33 of the portion 15 is chamfered and the leading edge bevelled at its underside 34 to provide a similar aerofoil shape to that of the portion 13, although it is less streamlined at both edges. In Figure 1 the outer boundary line 38 of the arms 11 and 12 denotes the outer boundary of the arms while the thick inner line 39 denotes the boundary of the top surface of the arms. It will be seen that the thick line is closer to the outer boundary line at the leading edges and further therefrom at the trailing edges, consistent with the chamfering of the latter edges. The portion 16 has its major surfaces parallel as can be seen from Figure 3, with equally rounded edges. This is consistent with the portion 16 being located near the centre of rotation of the boomerang so that neither edge has a major component of rotational velocity during flight.

The boomerang is intended to be held at the portion 13 and to be thrown so that it spins anticlockwise. The leading edge of the portion 13 in this direction of spinning has its top surface 24 in an aerofoil shape as can be seen from Figure 4 with a steep rise at its leading

edge and a gentle fall at its trailing edge. The leading edge has its underside bevelled at 25, as can also be seen in Figure 4.

In the area of the junction 17, three apertures 35, 36, 37 are arranged in a general linear arrangement, although the central aperture 36 is displaced slightly towards the stub end 18 of the junction area from the line joining the other two apertures. The apertures are cylindrical and are of decreasing radii, the smallest aperture being closest to the arm 12. The three apertures 35-37 can be considered to lie on an arc which is centred approximately at the junction 23 between the portions 13 and 14 at the arm 11. The sharp edges of the cylindrical holes are believed to cause turbulence during flight, to assist the hovering property of the boomerang.

A neutral circle 41 can be drawn on a centre 42 at the centre of gravity of the boomerang and with its circumference tangential to the periphery of the stub end 18. The two arms 11 and 12 have approximately equal extent beyond the neutral circle.

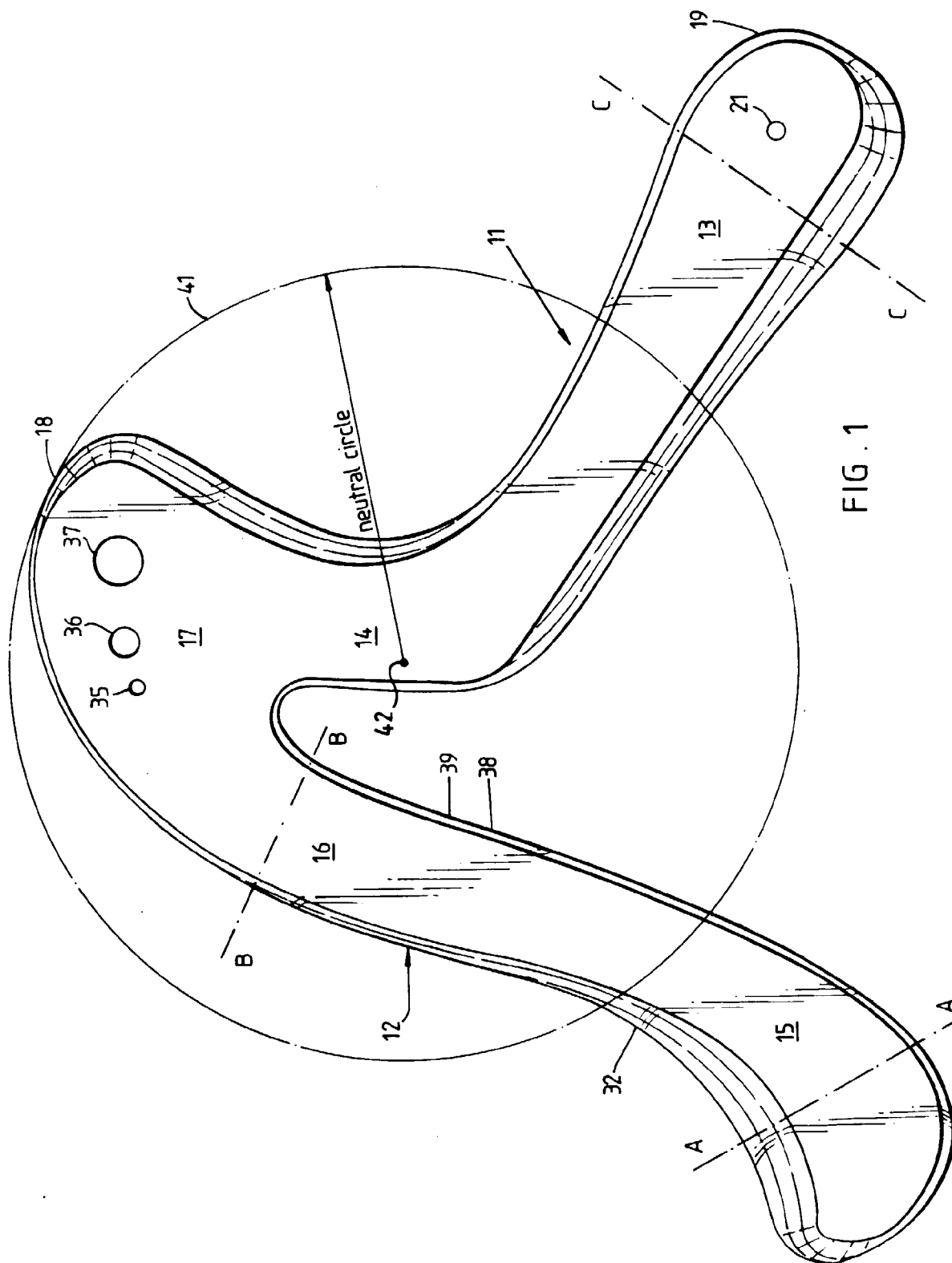
The boomerang is ideally made of wood, for example plywood, but other materials such as plastics and carbon fibre material could be used if desired. The arms are preferably solid.

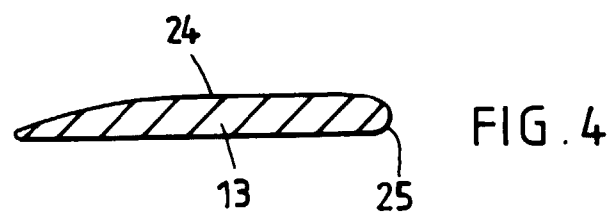
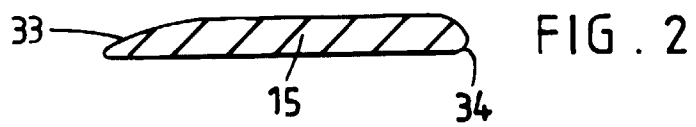
of said one arm.

8. A boomerang as claimed in any one of claims 1 to 7 wherein its width is broadest at the junction between the two arms and this junction is formed with an aperture therethrough.
9. A boomerang as claimed in any one of claims 1 to 8 wherein the free ends of the arms are chamfered along their trailing edges in the intended direction of spin when the boomerang is thrown.
10. A boomerang as claimed in claim 8 and claim 9 comprising a series of said apertures, arranged in a linear region and decreasing in size towards the leading edge of the boomerang.

Claims

1. A boomerang comprising a member having two arms including an angle in an L-shape, one arm comprising two portions including an angle in the opposite sense to the angle included by the two arms.
2. A boomerang as claimed in claim 1 wherein the free end of said one arm includes an angle with the free end of the other arm between 60° and 120°.
3. A boomerang as claimed in claim 2 wherein the free end of said one arm includes an angle with the free end of the other arm of 90°.
4. A boomerang as claimed in any one of claims 1 to 3 wherein the angle in the opposite sense included by the portions of said one arm is within the range of 90° to 180°.
5. A boomerang as claimed in claim 4 where the angle in the opposite sense is 110°.
6. A boomerang as claimed in any one of claims 1 to 5 wherein the other arm also has two portions including an angle in the opposite sense to the angle included between the free ends of the two arms.
7. A boomerang as claimed in claim 6 wherein the angle between the two portions of the other arm is larger than the angle included between the two portions







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EUROPEAN SEARCH REPORT

Application Number
EP 97 30 0954

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	FR 1 317 353 A (MARTY)	1-7,9	A63B65/08
Y	* the whole document *	8	

X	AU 48944 85 B (CAMBOURN) * page 2, line 16 - page 6, line 5; figures 1-5 *	1-7,9	

Y	US 5 045 011 A (LOVIK) * column 5, line 64 - column 6, line 4; figures 8-10 *	8	

A	DE 93 02 718 U (FA. WINFRIED GORNY) * the whole document *	8	

A	FR 83 450 E (MARTY) -----		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 15 May 1997	Examiner Giesen, M
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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