

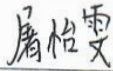
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December 5, 2018

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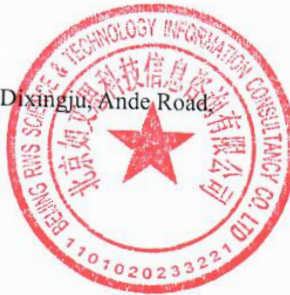
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(21) Application Number: Japanese Utility Model Application No. H01-64035 (22) Application Date: 31 May 1989 (65) Publication Number: Japanese Utility Model Publication No. H03-3395 (43) Publication Date: 14 January 1991	(71) Applicant: 999999999 KEYENCE CORPORATION, 2-13, Aketa-cho, Takatsuki-shi, Osaka (72) Inventor: Sasaki Ryoichi c/o KEYENCE CORPORATION, 2- 13, Aketa-cho, Takatsuki-shi, Osaka (72) Inventors: Ando Masaru c/o KEYENCE CORPORATION, 2- 13, Aketa-cho, Takatsuki-shi, Osaka (74) Agent: Patent Attorney Maruyama Toshiyuki (and 1 other) Examiner: Kanzaki Kiyoshi (56) Citations: Japanese Patent Application Publication No. S49-105644 (JP, A) Japanese Utility Model Application Publication No. S56-81793 (JP, U) Japanese Utility Model Application Publication No. S48-25894 (JP, U) Japanese Utility Model Application Publication No. S28-6817 (JP, Y1)
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(54) [Title of the Invention] PROPELLER FOR
FLYING TOY AND FIXTURE THEREOF

[Claims]

1. A propeller for a flying toy, the propeller being configured by: a propeller main body (2) for a flying toy, which is made of a soft material such as a foamed resin and in which wing pieces (23) are integrally formed; and a reinforcement member (3), which is formed in a plate shape from a material harder than that of the propeller main body (2), is attached to the center of an upper surface of the propeller main body (2), and covers base end sides of the respective wing pieces (23).

2. A fixture of a propeller, the fixture being configured by: a first locking member (5) fixed to an upper surface of a central portion of a propeller main body (2) for a flying toy, which is made of a soft material such as a foamed resin and in which wing pieces (23) are integrally formed; and a second locking member (6) fixed to a rotating shaft (73) of the propeller and detachably engaged with the first locking member (5), wherein a top end of the rotating shaft (73) protrudes out of the second locking member (6) and is removably fitted into holes (22) (53) respectively opened in the central portion of the propeller main body and the first locking member (5).

[Description of the Invention]

(Field of Industrial Application)

The present invention relates to a propeller for a flying toy and a fixture thereof that are used in a flying toy.

(Prior Art)

Forming a propeller from a soft material such as a foamed resin is known from Japanese Utility Model Application Publication No. S56-81793.

(Problem to be Solved by the Present Invention)

As shown in FIG. 9, the propeller is configured by connecting two wing pieces (23) (23) with a connecting tool (24), and when a lift force is applied by means of rotation, the wing pieces (23) are bent upward from base end sides thereof, and twisted deformation that reduces a suppressed angle occurs, so that a predetermined performance cannot be maintained nor can stable flight be expected.

In addition, generally, this type of propeller is as shown in FIG. 8, with a nut (8) buried in the

central portion of the propeller (1), and the nut (8) is attached by having a screw shaft (74) formed at a top end of a rotating shaft (73) screwed thereto.

For this reason, it is necessary to manufacture a propeller which rotates right with a left screw, and a propeller which rotates left with a right nut (8) and a rotating shaft (73).

Furthermore, since the nut (8) and the rotating shaft (73) receive a force in the tightening direction due to the rotation of the propeller, when the nut (8) and the rotating shaft of the propeller (73) are tightened more than necessary, the problem that it is difficult to remove the propeller when it is necessary to be replaced, occurs.

The present invention is intended to define a propeller for a flying toy which is capable of preventing deformation of the propeller and demonstrating a predetermined performance by mounting a reinforcement member onto a central portion of a propeller main body formed of a soft material.

In addition, the present invention is intended to define a fixture of a propeller which can easily be attached to and detached from a rotating shaft without depending on the direction of rotation of the propeller.

Means for solving the problems

30 A propeller for a flying toy according to the present invention is configured by: a propeller main body (2) for a flying toy, which is made of a soft material such as a foamed resin and in which wing pieces (23) are integrally formed; and a reinforcement member (3), which is formed in a plate shape from a material harder than that of the propeller main body (2), is attached to the center of an upper surface of the propeller main body (2), and covers base end sides of the respective wing pieces (23).

40 Furthermore, a fixture for attaching the propeller for a flying toy to a rotating shaft is configured by: a first locking member (5) fixed to an upper surface of a central portion of a propeller main body (2) for a flying toy, which is made of a soft material such as a foamed resin and in which wing pieces (23) are integrally formed; and a second locking member (6) fixed to a rotating shaft (73) of the
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propeller and detachably engaged with the first locking member (5), wherein a top end of the rotating shaft (73) protrudes from the second locking member (6) and is removably fitted into holes (22) (53) respectively opened in the central portion of the propeller main body and the first locking member (5).

(Action and Effect)

Even if the propeller (1) collides with other objects during rotation, only the propeller main body (2) formed of the soft material is destroyed, thereby preventing the other object from being damaged. Therefore, even though the propeller is without any protection cover, it is extremely safe.

Since the reinforcement member (3) is mounted to the central portion of the propeller main body (2), when the propeller rotates, both end sides are effectively prevented from bending from the central portion of the propeller main body in a lifting direction, and the predetermined performance can be demonstrated.

In addition, since the fixture of the propeller merely engages a first locking member (5) provided at the center of an upper surface of the propeller main body (2) and a second locking member (6) through which a rotating shaft (73) of the propeller penetrates, it is not necessary to prepare two types of screw, i.e. a right screw and a left screw, in response to the direction of rotation of the propeller as in the case of the screw engagement; furthermore, there is no problem specific to the propeller replacement which takes time and effort due to the screw being tightened more than necessary by the rotation of the propeller.

Since the rotating shaft (73) penetrates through the second locking member (6) and is fitted into a hole (22) at the center of the propeller main body (2) and a hole (52) of the first locking member (5), the center of the propeller main body (2) can be fixed to the rotating shaft (73) without deviation.

(Embodiments)

An example of the case in which a propeller (1) for a flying toy and a fixture (4) thereof in the present invention are provided for the flying toy (Japanese Patent Application No. S63-26355) previously proposed by the

applicant and as shown in FIG. 7 will be described.

In this flying toy, motors which are rotationally controlled by a pulse voltage are disposed independently of each other at four symmetrical positions around the flying toy body (71), and a propeller (1) is rotatably connected to each motor in a horizontal plane. One group of propellers (1) facing diagonally rotates in the direction opposite to the direction of rotation of the other group of propellers (1a), and the reaction force occurring due to the rotation of each set of propellers (1) (1a) is canceled by one another so that the flying toy can fly.

The flying toy (7) is equipped with a battery, a receiver, and an arithmetic processing circuit, receives the control radio wave from a remote control, controls the rotation of the motor by means of the pulse voltage, independently controls the rotation of each propeller, and performs vertical ascending and descending, forward and backward flying, direction changes, etc. However, the explanation of the flying principle is not directly related to the present invention and will therefore be omitted.

The propellers (1) (1a) are each detachably attached to a top end of the upward rotating shaft (73) of the motor (72) by a fixture (4).

As shown in FIG. 1, the propeller (1) is configured by a propeller main body (2) formed of a lightweight and soft thin material such as foamed resin, and a reinforcement member (3) mounted on the center of an upper surface of the main body.

The propeller main body (2) has a plurality of wing pieces (23) integrally formed from a narrow mounting portion (21) of the central portion.

In the embodiment, as shown in FIG. 2, the propeller main body (2), in which both sides of the mounting portion (21) of the central portion thereof are twisted in opposite directions to form a suppressed angle, is equipped with symmetrical wing pieces (23), and a small hole (22) is set in the central portion of the mounting portion (21).

FIG. 1 and FIG. 2 show a propeller for rotating left, but in the propeller for rotating right, the

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twisting direction of the wing pieces (23) is opposite to that of the propellers of FIG. 1 and FIG. 2.

As shown in FIG. 6, the propeller main body (2) is formed by punching an elongated member (20) which is curved in an arc shape in the width direction into a propeller shape.

The reinforcement member (3) is formed into a substantially rectangular plate body from a material that is harder than the propeller main body (2) and as light-weight as wood, such as a hard resin. The upper surface is inclined towards a lower side in a circular arc toward both sides in the width direction, and a through hole (33) is set in the central portion. A recessed portion (31) into which the first locking member (5) of the fixture (4) to be described later is fitted, is formed at the center of a lower surface of the reinforcement member (3), and the recessed portion (31) is set in a longitudinal direction of the reinforcing member (3).

In addition, on the lower surface of the reinforcement member (3), a pressing ridge (32) for pressing the lower portion in the width direction of the wing piece (23) of the propeller main body (2), protrudes from a rotational symmetrical position in the longitudinal direction of the reinforcement member (3).

The fixture (4) for attaching the propeller (1) to the rotating shaft (73) is formed of a synthetic resin and configured by a first locking member (5) provided at the center of the upper surface of the propeller, and a second locking member (6) provided on the rotating shaft (73).

As shown in FIG. 2, the first locking member (5) is upwardly provided with a cylindrical shaft (52) at a central portion of a base plate (51) formed in a substantially cross shape, and a through hole (53) is set in the cylindrical shaft (52) so that the rotating shaft (73) is tightly fitted thereto.

Claw pieces (54) protrude downwardly at both ends of the base plate (51) in a transverse direction, and the top end of the claw piece (54) is bent inwardly to form a retaining piece (55). The lower surface of each of the retaining pieces (55) is formed on a slope (56) having a

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high inner end and a high slope.

The second locking member (6) is downwardly provided with a cylindrical shaft (62) at the center of a substantially rectangular base plate (61), and a through hole (63) is set in the cylindrical shaft (62) so that the rotating shaft (73) is tightly fitted thereon.

The base plate (61) is gently curved so that both ends in the longitudinal direction are lowered, and notches (64) for engaging and disengaging from the claw pieces (54) of the first locking member (5) are provided at both ends in the longitudinal direction.

On the upper surface of the base plate (61), two low protrusions (66) are formed on the line orthogonal to the imaginary line connecting the notches (64) with the through hole (63) interposed therebetween, and each protrusion has a gentle conical shape.

As shown in FIG. 3, the dimensional relationship of the propeller main body (2) and the fixture (4) are such that the distance W_1 between the claw pieces (54) of the first locking member (5) corresponds to the width W_2 of the central portion of the propeller main body (2) and corresponds to W_3 between the bottom edges (65) of both notches (64) of the second locking member (6).

The height H_1 from the lower surface of the base plate (51) of the first locking member (5) to the retaining piece (55) corresponds to height H_2 from the imaginary straight line L passing through the bottom edges (65) of both notches (64) of the base plate (61) of the second locking member (6) to the top of the protrusion (66) on the base plate (61).

When assembling the propeller, the first locking member (5) is placed on the center of the upper surface of the propeller main body (2), and both claw pieces (54) of the first locking member protrude downwardly from both ends in the width direction of the propeller main body (2).

A propeller is formed by adhering the reinforcement member (3) to the propeller main body (2) from above the first locking member (5) with an adhesive.

The second locking member (6) is fitted to the rotating shaft (73) and fixed with an adhesive in a state where the top end of the shaft is

made to protrude slightly.

In order to attach the propeller to the rotating shaft (73), the claw pieces (54) of the first locking member (5) on the propeller are made to face the notches (64) of the second locking member (6), and the propeller (1) is pushed into the rotating shaft (73).

The rotating shaft (73) is fitted in each hole (63) (22) (53) (33) in the center of the propeller and the bottom edge of the notches (64) of the second locking member (6) hits the slope (56) of the top end of the claw piece (54) of the first locking member (5) and is forcefully pushed in, whereby the claw piece (54) is pushed open by the elasticity of the resin, and the fitting of the second locking member (6) into the space between the claw pieces (54) is permitted.

When the bottom edge (65) of the notch (64) of the second locking member (6) penetrates between the claw pieces (54) beyond the retaining piece (55) of the top end of the claw piece (54), the claw piece (54) is resiliently restored and is restored to its original shape, and the retaining piece (55) is caught by the bottom edge (65) of the notch (64) of the second locking member (6) to hold the second locking member (6).

In the embodiment, the length H_1 from the lower surface of the base plate (51) of the first locking member (5) to the retaining piece (55) corresponds to height H_2 from the straight line L passing through the bottom edges (65) of notches (64) of the second locking member (6) to the top of the protrusion (66) on the base plate (61); in addition, since the base plate (61) of the second locking member (6) has a spring action at the both ends of the notch (64), which is inclined downwardly and has a spring action, when the second locking member (6) and the first locking member (5) are engaged as described above, the protrusion (66) on the upper surface of the second locking member (6) adheres to the back surface of the propeller main body (2) which is made of soft material; in addition, the base plate (61) of the second locking member (6) is slightly deformed at both ends with a notch (64) and is held by the claw piece (54) of the first locking member (5), so that no looseness occurs in the mounting

portion (21) of the propeller.

As described above, the propeller main body (2) is held between the base plate (51) of the first locking member (5) and the base plate (61) of the second locking member (6) and rotates integrally with the rotating shaft (73) by means of the rotation of the rotating shaft (73). Because the propeller main body (2) is subjected to an upward force on the lower surface of the wing piece (23) by means of the rotation, it is subject to a force in a lifting direction that bends both ends from the narrow central portion (21) of the propeller main body (2).

However, at the center of the upper surface of the propeller main body (2), the reinforcement member (3) is mounted in the longitudinal direction of the propeller, and bending of the propeller is effectively prevented.

10 If the claw piece (54) of the first locking member (5) is deflected outwardly with the fingers, the engagement between the first locking member (5) and the second locking member (6) is easily disengaged and the propeller can be replaced easily.

Since the rotating shaft (73) penetrates through the second locking member (6) and is fitted into a hole (22) at the center of the propeller main body (2) and a hole (52) of the second locking member (5), the center of the propeller main body (2) can be fixed to the rotating shaft (73) without deviation.

30 Still, in the embodiment of the present invention, a claw piece protrudes upwardly from both ends of the second locking member (6), and a notch in which the claw piece is detachably engaged with the first locking member (5) is set, and the same effect as described above can be obtained.

40 In addition, in the above-described embodiment, although the case where the propeller 2 is deployed in the horizontal plane as an example has been cited as an example, the present invention is applicable to a flying toy using one or more propellers, irrespective of the arrangement position of the propellers. Therefore, it goes without saying that it can be applied to a case where a plurality of propellers are provided in a vertical plane, 50 such as in a helicopter.

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If the longitudinal direction of the first locking member (5) of the present invention is configured to extend to both ends, and the pressing ridge for pressing the lower portion in the width direction of the wing piece (23) of the propeller main body (2) protrudes from the rotational symmetry position of the side edge of the base plate (51) in the longitudinal direction, the first locking member (5) can also be used as a reinforcement member for the propeller main body, and the number of parts thereof can be reduced.

The present invention is not limited to the configuration of the above embodiment, and various modifications can be made within the range described in the scope of utility model registration request.

[Brief Description of Drawings]

FIG. 1 is a slope view of a propeller; FIG. 2 is

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a slope view of a reinforcement member and a fixture; FIG. 3 is a cross sectional view showing a disassembled fixture; FIG. 4 is a sectional view taken along line IV-IV in FIG. 1; FIG. 5 is a slope view of a reinforcement member in a state where the reinforcement member is turned upside down; FIG. 6 is an explanatory view showing a manufacturing procedure of the propeller main body; FIG. 7 is a slope view of the flying toy previously proposed by the applicant; FIG. 8 is an explanatory view of a former fixture of a propeller; and FIG. 9 is a slope view of a propeller from a conventional example.

(1).....propeller, (2).....propeller main body,
(3).....reinforcement member,
(4).....fixture, (5).....first locking member,
(6).....second locking member,
(7).....flying toy

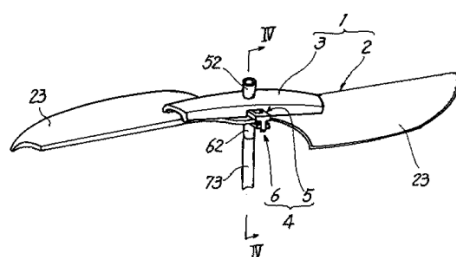


Fig. 1

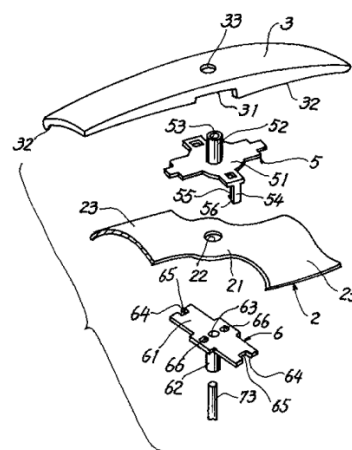


Fig. 2

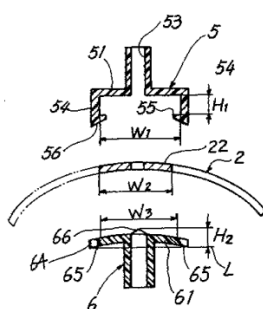


Fig. 3

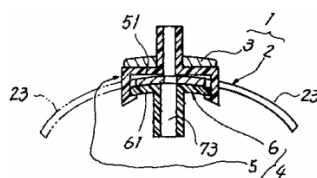


Fig. 4

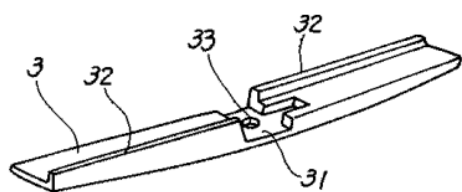


Fig. 5

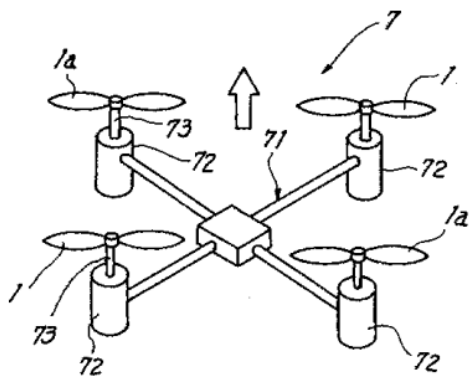


Fig. 7

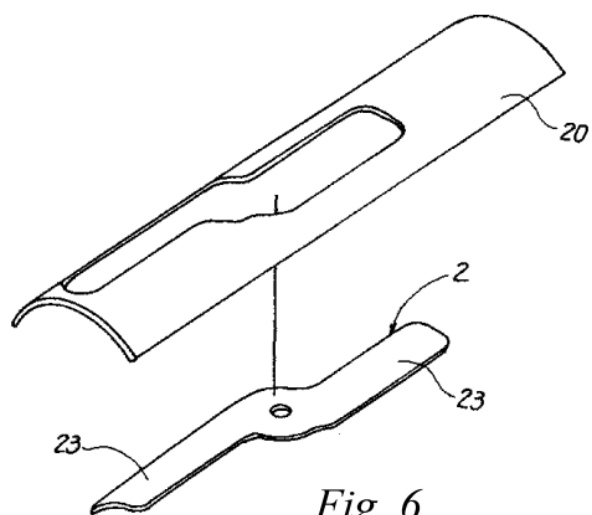


Fig. 6

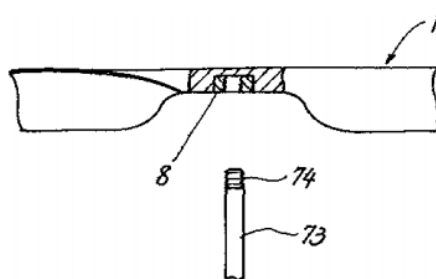


Fig. 8

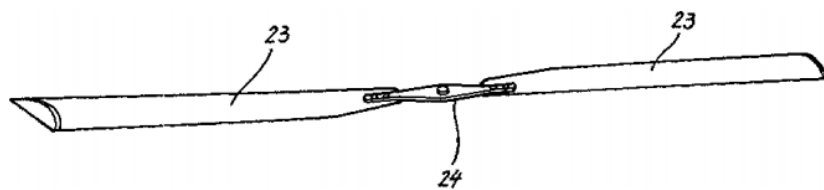


Fig. 9