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Attorneys for Plaintiffs
FLYING HELIBALL, LLC and
WORLD TECH TOYS, INC.

UNITED STATES DISTRICT COURT

FOR THE CENTRAL DISTRICT OF CALIFORNIA

FLYING HELIBALL, LLC a California Limited Liability Company; WORLD TECH TOYS, INC., a California corporation; Plaintiffs, v. SAKAR INTERNATIONAL, INC., a New York Corporation; Defendant.	Case No.:2:25-cv-03315 **Complaint For Patent Infringement** **JURY TRIAL DEMANDED**

Plaintiffs Flying Heliball, LLC and World Tech Toys, Inc. ("Flying Heliball" or "WTT" or, collectively, "Plaintiffs") by and through their undersigned counsel, hereby complains against Defendant Sakar International, Inc., a New York Corporation ("Sakar"), respectfully alleges as follows:

NATURE OF THE ACTION

1. This is an action for infringement of Flying Heliball's United States Patent No. 7,100,866 under the Patent Act, 35 U.S.C. § 271, based on Defendant Sakar's unauthorized commercial manufacture, use, importation, offer for sale, and sale of its Sonic Heli-Drone Flyer ("the Accused Products") in the United States.

JURISDICTION AND VENUE

2. This court has original jurisdiction over the subject matter of this action pursuant to 28 U.S.C. §§ 1331 and 1338(a).

3. Prior to this lawsuit, the parties entered a non-disclosure agreement ("the NDA") to engage in settlement negotiations. The NDA provided that Flying Heliball and Sakar agreed to "any action that is brought or could be brought" under the NDA in the U.S. District Court for the Central District of California.

4. Personal jurisdiction over Defendant is proper in this District by consent of Flying Heliball and Sakar to the terms of the NDA. Separately, because of the Defendant's presence in this judicial district, and it has availed itself of the rights and benefits of the laws of California, and Defendant has derived substantial revenue from the sales of the Accused Products in California, and it has systematic and continuous business contacts with California.

5. Venue is proper in this district under 28 U.S.C. §§ 1391(b) and 1400(b). Venue is also proper because of the consent of the parties to the NDA.

THE PARTIES

6. Plaintiff Flying Heliball, LLC is a limited liability company formed under the laws of California having a principal place of business at 28777 Witherspoon Parkway, Valencia, California 91355 (hereinafter "Flying Heliball").

7. Plaintiff World Tech Toys, Inc. is a corporation formed under the laws of California having a principal place of business at 28777 Witherspoon Parkway, Valencia, California 91355 (hereinafter "WTT").

8. Upon information and belief, Defendant Sakar International, Inc. is a corporation that is incorporated in New York and has places of business in New York and New Jersey (hereinafter "Defendant").

FACTUAL BACKGROUND

9. Flying Heliball and its parent corporation, World Tech Toys, Inc., are international sellers and distributors of toys and are largely focused on radio-controlled helicopters and other flying vehicles.

10. United States Patent Number 7,100,866 ("the '866 Patent"), entitled Control System for a Flying Vehicle, was duly and legally issued on September 5, 2006, and names Jeffrey Rehkemper, Nicholas Grisolia, Peter Greenley, and Bret Gould as the inventors. Attached as **Exhibit A** is a true and correct copy of the '866 Patent.

11. The '866 Patent claims, among other things, in Claim 1, "A vehicle having a means for propelling in a vertical direction, further comprising: a transmitter positioned on the bottom of said vehicle for transmitting a signal from the vehicle downwardly away from said vehicle; a receiver positioned on the bottom of said vehicle for receiving said signal as it is bounced off of a surface, defined as a bounced signal; and a control system that automatically sets a speed of the propelling means in response to the receiver, said control system having a first means to set the speed of the propelling means to a first speed when the receiver receives the bounced signal and the control system having a second means to set the speed of the propelling means to a second speed when the receiver does not receive the bounced signal, the first speed being predefined as a speed that causes the vehicle to gain altitude and the second speed being predefined as a speed that causes the vehicle to lose altitude."

12. The ‘866 Patent claims, among other things, in Claim 10, “A system to control a direction of movement of a flying vehicle, the control system comprising: a transmitter/receiver pair positioned on the vehicle, the transmitter transmitting a signal from the vehicle in a predetermined direction; a means to fly said vehicle in a direction opposite of said predetermined direction when said signal is bounced off of a surface and received back by the receiver; and a means to fly said vehicle in a direction similar to said predetermined direction when said receiver does not receive said signal.”

13. In 2022, the ’866 Patent was assigned to Flying Heliball, which is the owner of the entire right, title, and interest ’866 Patent. The claims in the ’866 patent relate to a control system for a flying toy.

14. WTT is the exclusively licensee of the ‘866 Patent for all Sonic Heli-Drone Flyers.

15. Defendant sells an identical Sonic Heli-Drone Flyer as sold by WTT. Defendant’s Sonic Heli-Drone Flyer as well as other flying drone products infringe the ‘866 Patent (“the Accused Products”).

16. Defendant sells the Accused Products through third-party sellers including Burlington Coat Factory Warehouse Corporation, Burlington Stores, Inc. (collectively “Burlington”) and others (“the Third-Party Sellers”).

Defendant’s Infringing Activities and Products

17. Upon information and belief, Defendant has and continues to infringe the ‘866 Patent by making, using selling, and offering for sale the Accused Products in the United States. The Accused Products embody or use the inventions claimed in the ‘866 Patent.

18. Briefly, the Accused Products have a processor that is electrically connected to a battery, a motor assembly, a downward-facing sensor and receiver. The processor is programmed to emit a signal in a predetermined direction through the sensor. The signal is bounced off a surface as a bounced signal. That bounced

signal either is received or not received by the receiver. If the bounced signal is received by the receiver, then the processor engages the motor assembly to fly the Sonic Heli-Drone Flyer away from the surface.

19. More detailed claim charts for claim 1 and claim 10 are attached to this complaint in **Exhibit B**.

20. Upon information and belief, Defendant has been and is inducing infringement of the '866 Patent by actively and knowingly inducing others to make, use, sell, offer for sale, or import the Accused Products that embody or use the inventions claimed in the '866 Patent.

21. Specifically, Defendant has induced the Third-Party Sellers to sell the Accused Products knowing the Accused Products infringed the '866 Patent. Defendant actively encouraged infringement by reaching out to buyers at the Third-Party Sellers and encouraging those buyers to purchase goods that infringed the '886 Patent.

22. Upon information and belief, Defendant has known of the existence of the '866 Patent, and these acts of infringement have been willful and in disregard for the '866 Patent, without any reasonable basis for believing that it had a right to engage in the infringing conduct. Specifically, Burlington has provided Defendant with a copy of the '866 Patent and infringement allegations as shown in **Exhibit C**.

23. Flying Heliball's exclusive licensee WTT produces profits inexorably flow to Flying Heliball. Infringing marketplace participants add units into the marketplace, lower the price for each individual unit sold, and thus reduce the amount of revenue Flying Heliball makes from its licensees.

24. WTT, as the exclusive licensee of '866 Patent and as a licensee of the Sonic Heli-Drone Flyer, was the only person in the United States permitted to sell the Sonic Heli-Drone Flyer to retailers. As a result of Defendant's infringement, WTT lost out on sales that were made by Defendant for which WTT would have profited. WTT seeks to recover its lost profits from Defendant's sale of the Sonic

Heli-Drone Flyer.

COUNT ONE

(Patent Infringement Against Sakar)

25. Plaintiffs repeat and reallege paragraphs 1 through 23 hereof, as if fully set forth herein.

26. Upon information and belief, Defendant has infringed the '866 Patent by making, using, selling, or offering for sale in the United States, or importing into the United States, including within this judicial district, flying toys, including those sold under the name Sonic Heli-Drone Flyer, in violation of 35 U.S.C. § 271(a).

27. Upon information and belief, Defendant induced infringement of the '866 Patent by actively and knowingly inducing others to make, use, sell, offer for sale, or import flying toys that embody or use the invention claimed in the '866 Patent, including the Accused Products, in violation of 35 U.S.C. § 271(b).

28. Defendant's infringement was knowing, intentional, and willful.

29. Defendant's acts of infringement of the '866 Patent have caused Plaintiffs damages for which each is entitled to compensation pursuant to 35 U.S.C. § 284.

30. This case is exceptional and, therefore, Plaintiffs are entitled to an award of attorneys' fees pursuant to 35 U.S.C. § 285.

WHEREFORE, Plaintiffs request judgment against Defendant as follows:

1. Adjudging that Defendant has infringed, and actively induced infringement of the '866 Patent, in violation of 35 U.S.C. § 271(a) and (b);

2. Ordering Defendant to account and pay damages adequate to compensate Plaintiffs for Defendant's infringement of the '866 Patent as well as pre-judgment and post-judgment interest and costs, pursuant to 35 U.S.C. § 284;

3. Ordering an accounting for any infringing sales and an award of lost profits to WTT for any such infringing sales;

4. Ordering that the damages award be increased up to three times the

actual amount assessed, pursuant to 35 U.S.C. § 284;

5. Declaring this case exceptional and awarding Plaintiffs their reasonable attorneys' fees, pursuant to 35 U.S.C. § 285; and

6. Awarding such other and further relief as this Court deems just and proper.

Dated: April 15, 2025

McKOWN BAILEY

By: */s/Aaron M. McKown*
Aaron M. McKown
Giovanna Castro-Matos
Attorneys for Plaintiffs
FLYING HELIBALL, LLC and
WORLD TECH TOYS, INC.

DEMAND FOR JURY TRIAL

A jury trial is demanded pursuant to Fed. R. Civ. P. 38.

Dated: April 15, 2025

McKOWN BAILEY

By: */s/Aaron M. McKown*
Aaron M. McKown
Giovanna Castro-Matos
Attorneys for Plaintiffs
FLYING HELIBALL, LLC and
WORLD TECH TOYS, INC.

Exhibit A

US007100866B2

(12) **United States Patent**
Rehkemper et al.

(10) **Patent No.: US 7,100,866 B2**
(45) **Date of Patent: Sep. 5, 2006**

(54) **CONTROL SYSTEM FOR A FLYING VEHICLE**

(75) Inventors: **Jeffrey Rehkemper**, Chicago, IL (US); **Nicholas Grisolia**, Chicago, IL (US); **Peter Greenley**, Chicago, IL (US); **Bret Gould**, Chicago, IL (US)

(73) Assignee: **Rehco, LLC**, Chicago, IL (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **11/035,606**

(22) Filed: **Jan. 14, 2005**

(65) **Prior Publication Data**

US 2006/0157615 A1 Jul. 20, 2006

(51) **Int. Cl.**
B64C 27/57 (2006.01)
B64C 11/02 (2006.01)

(52) **U.S. Cl.** **244/17.13**; 416/141; 446/37

(58) **Field of Classification Search** 244/17.11, 244/17.13, 17.25; 342/113, 171; 416/43, 416/44, 141; 701/7; 446/37, 36
See application file for complete search history.

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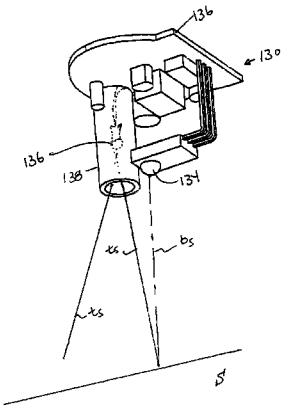
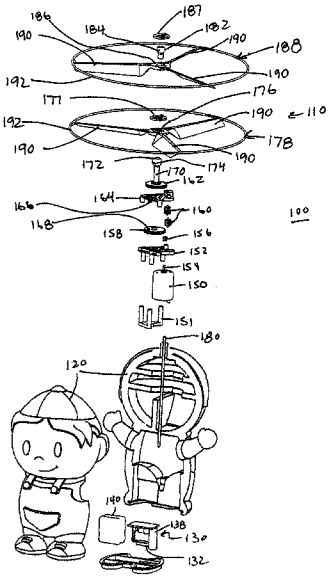
Primary Examiner—Galen Barefoot

(57) **ABSTRACT**

In one embodiment of the present invention there is described a vehicle having a propeller mechanism for propelling the vehicle in a horizontal direction. The vehicle includes a transmitter positioned on the bottom of the vehicle for transmitting a signal from the vehicle downwardly away from the vehicle. A receiver is positioned on the bottom of the vehicle for receiving the signal as it is bounced off of a surface, defined as a bounced signal. A control system is also provided that automatically sets a speed of the propeller mechanism in response to the receiver. The control system sets the speed of the propeller mechanism to a first speed when the receiver receives the bounced signal and the control system sets the speed of the propeller mechanism to a second speed when the receiver does not receive the bounced signal. The first speed is predefined as a speed that causes the vehicle to gain altitude, while the second speed is predefined as a speed that causes the vehicle to lose altitude. When the vehicle reaches a predetermined distance away from the surface of the object, the vehicle will hover at the predetermined distance as the control system toggles between the first and second speeds.

17 Claims, 10 Drawing Sheets





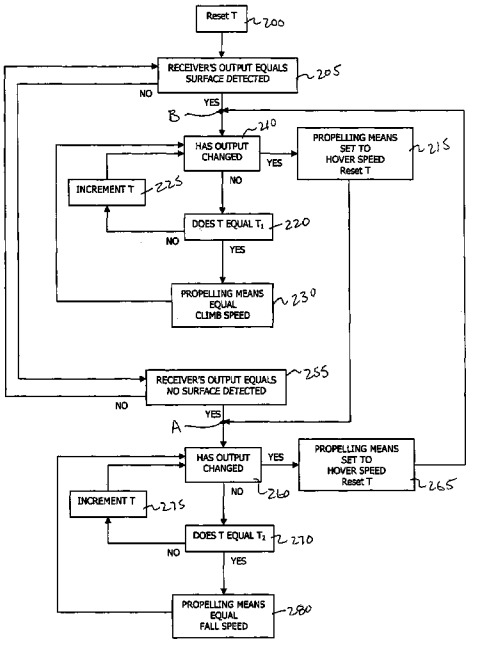


Figure 1

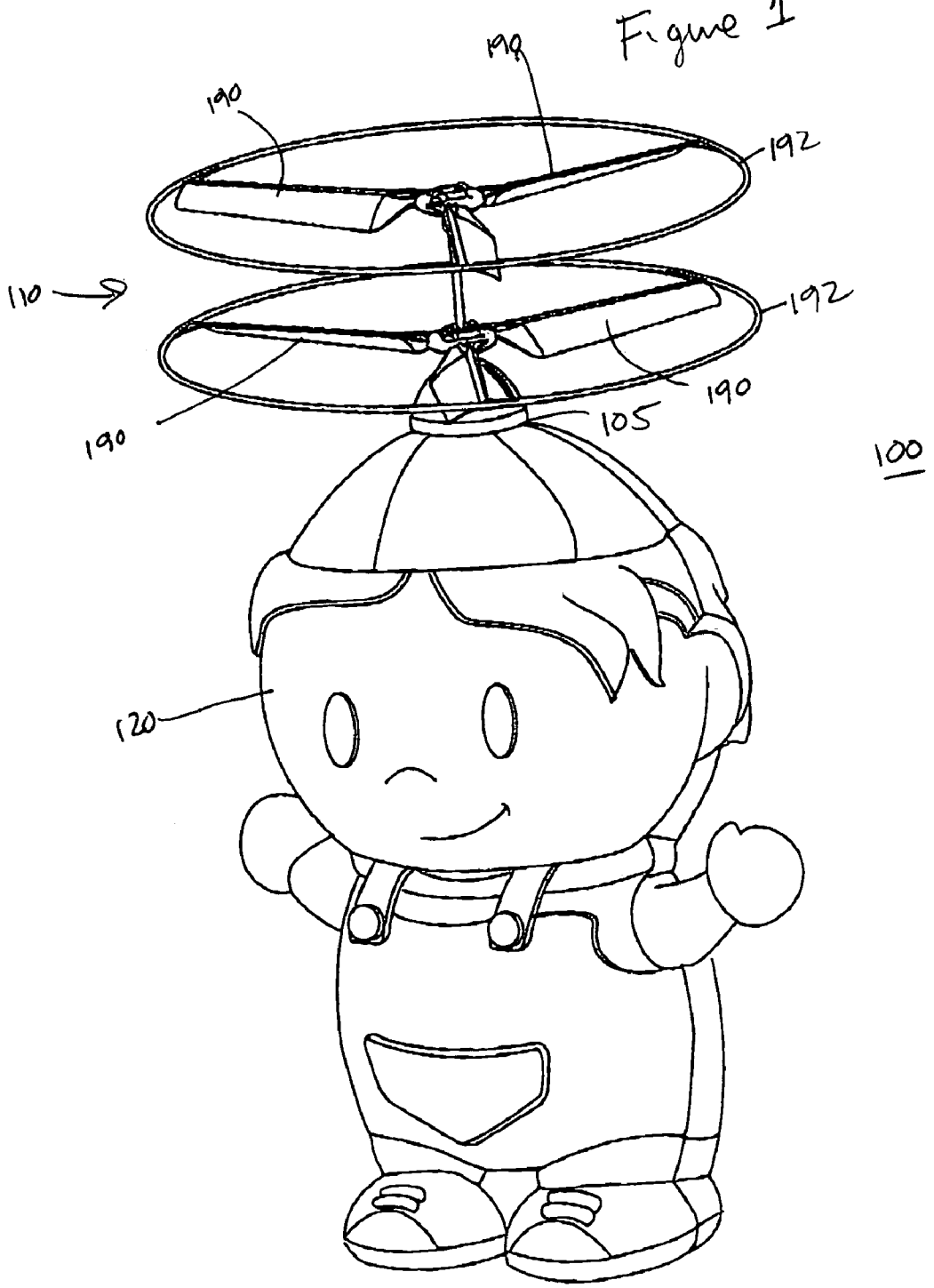


Figure 2

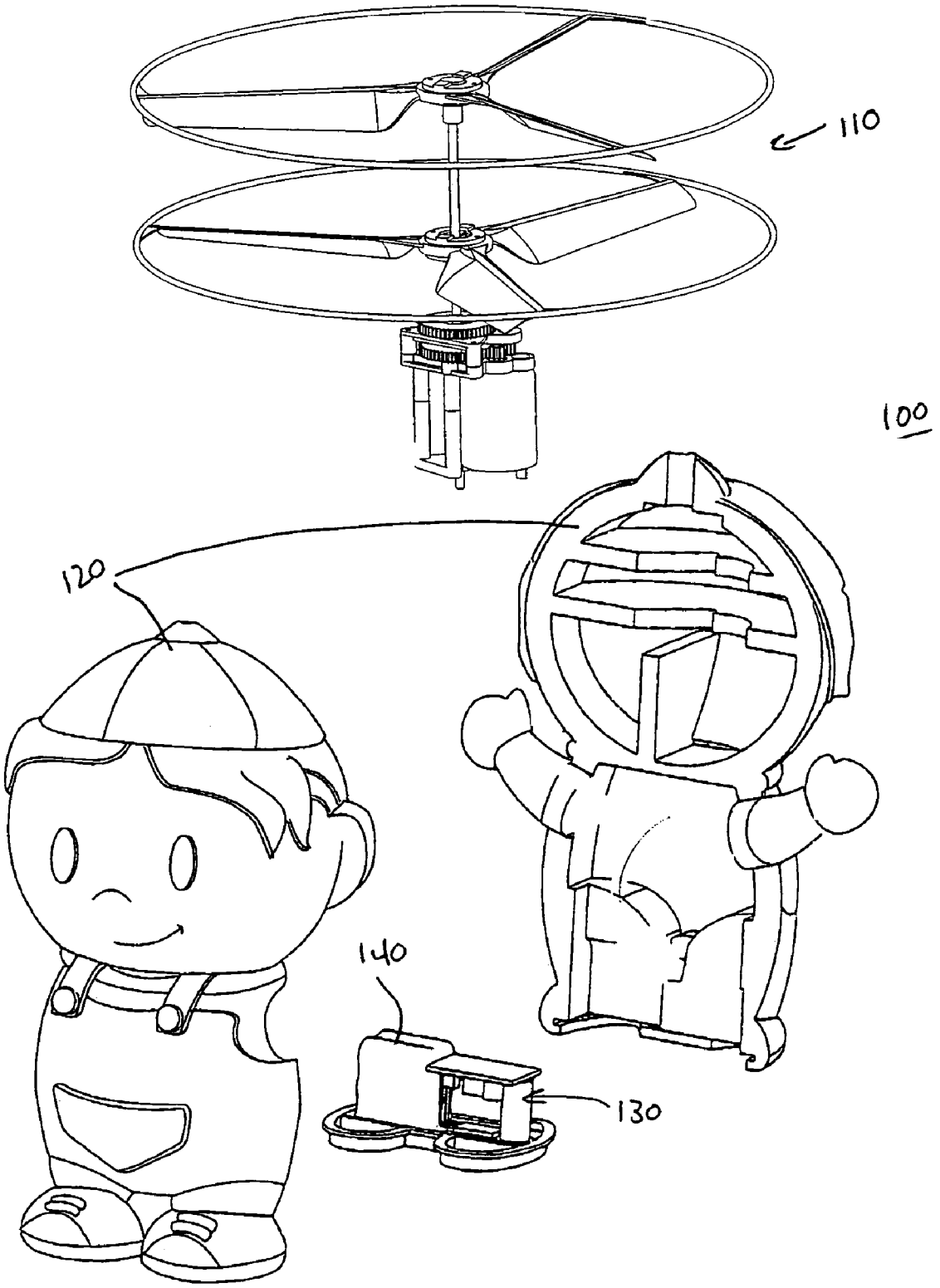


Figure 3a

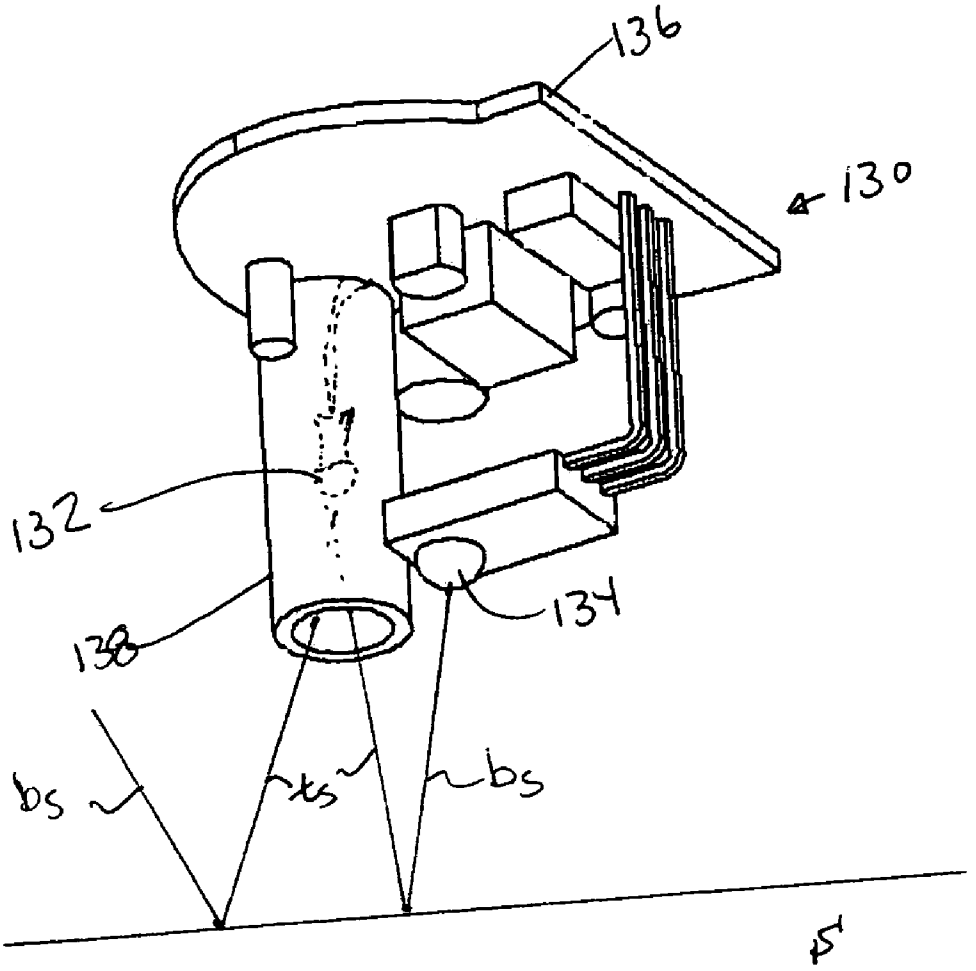


Figure 3b

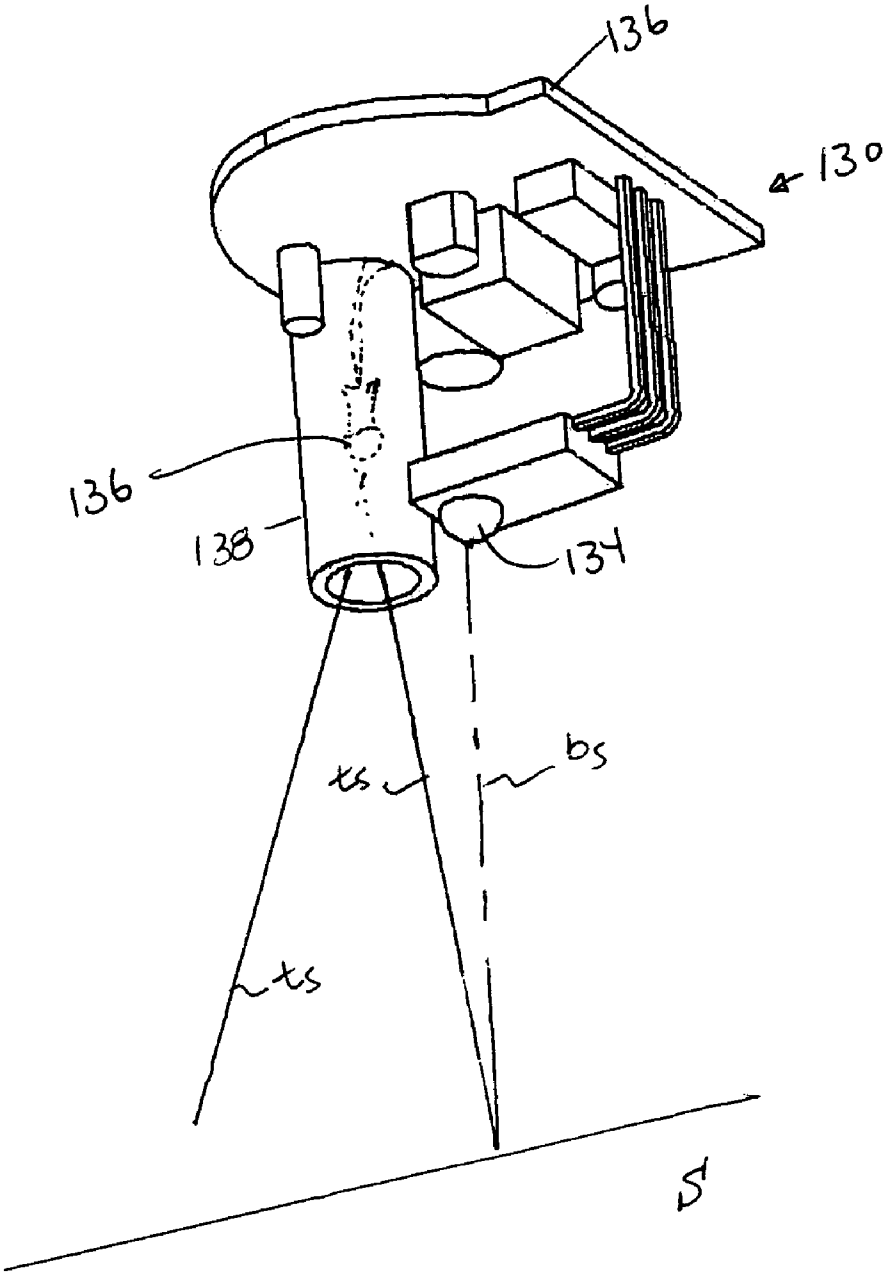


Figure 3C

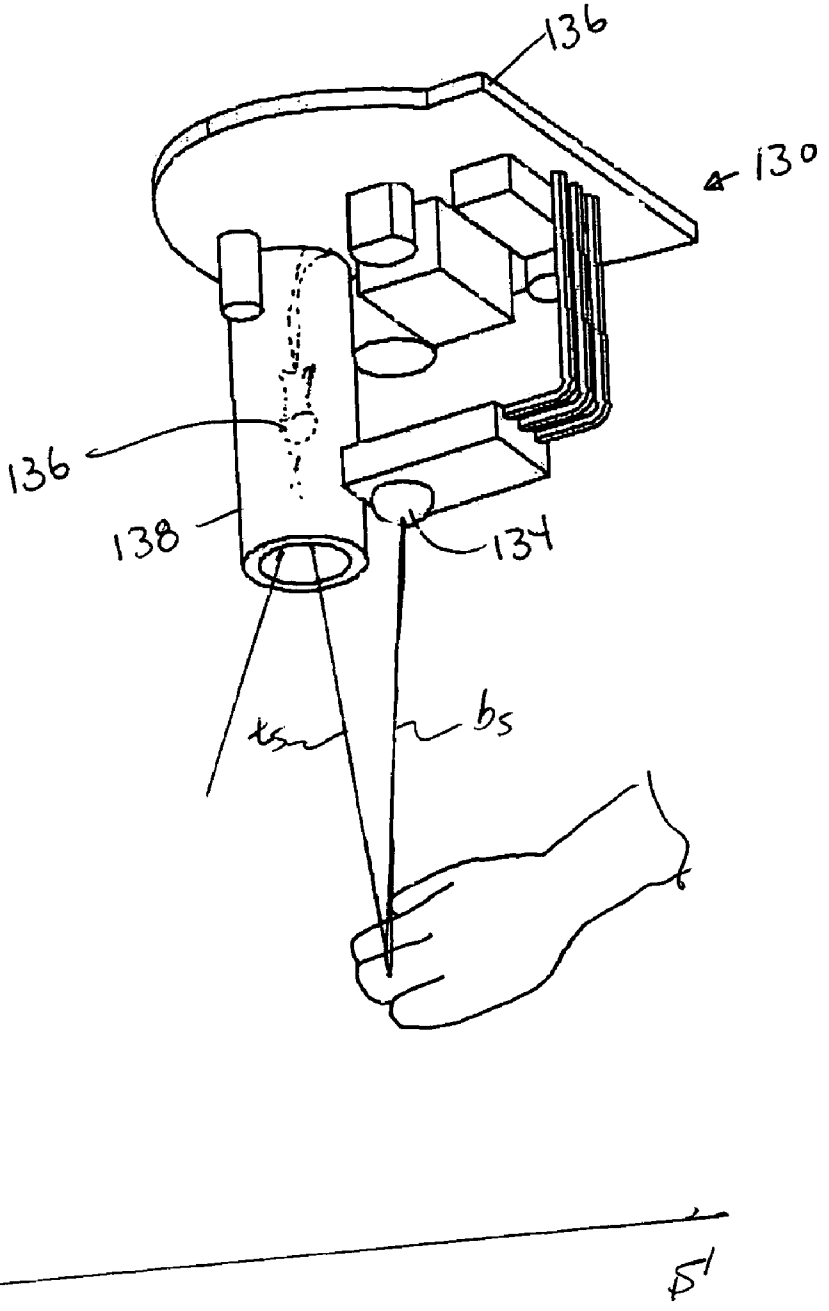


Figure 4

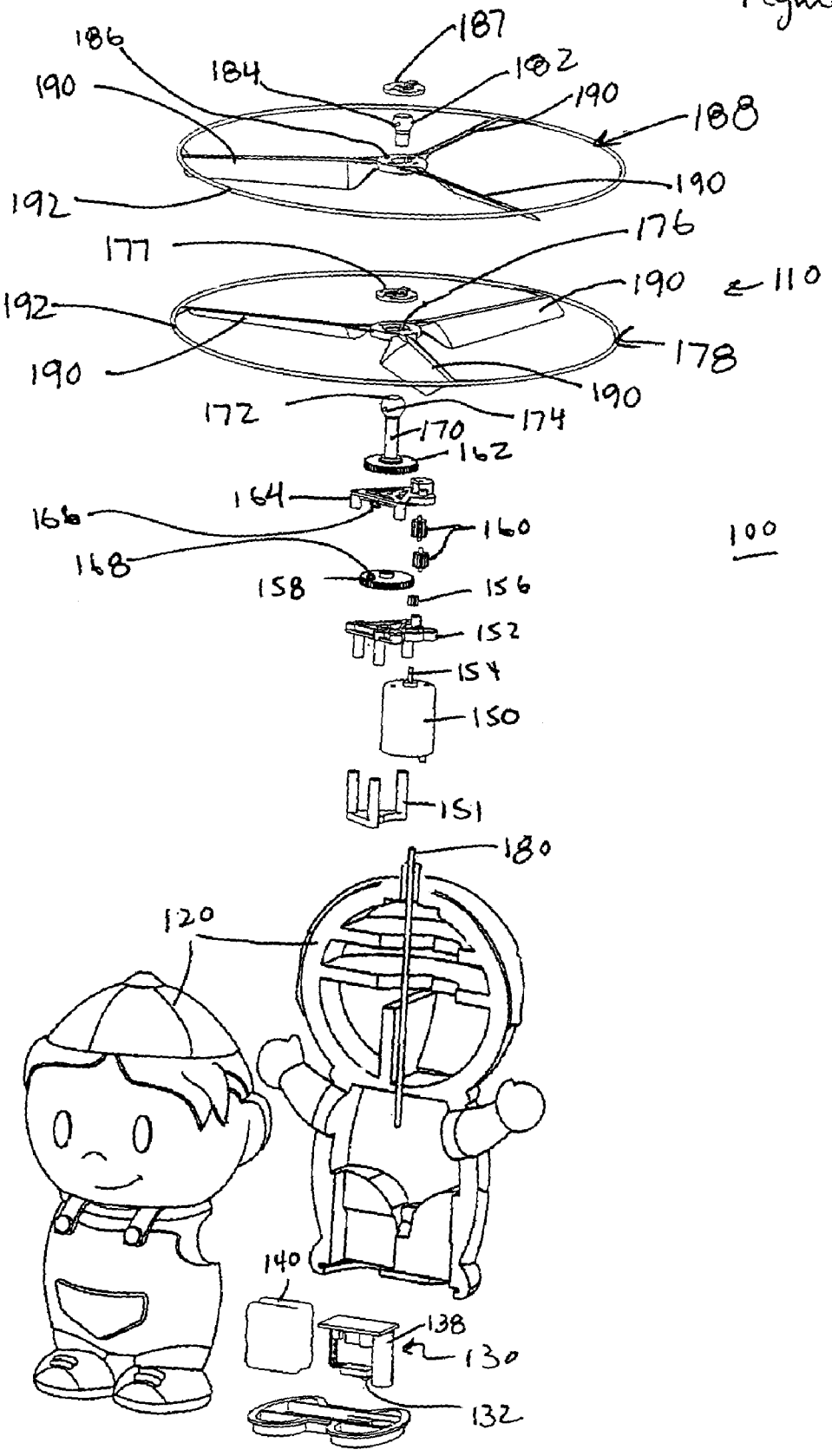

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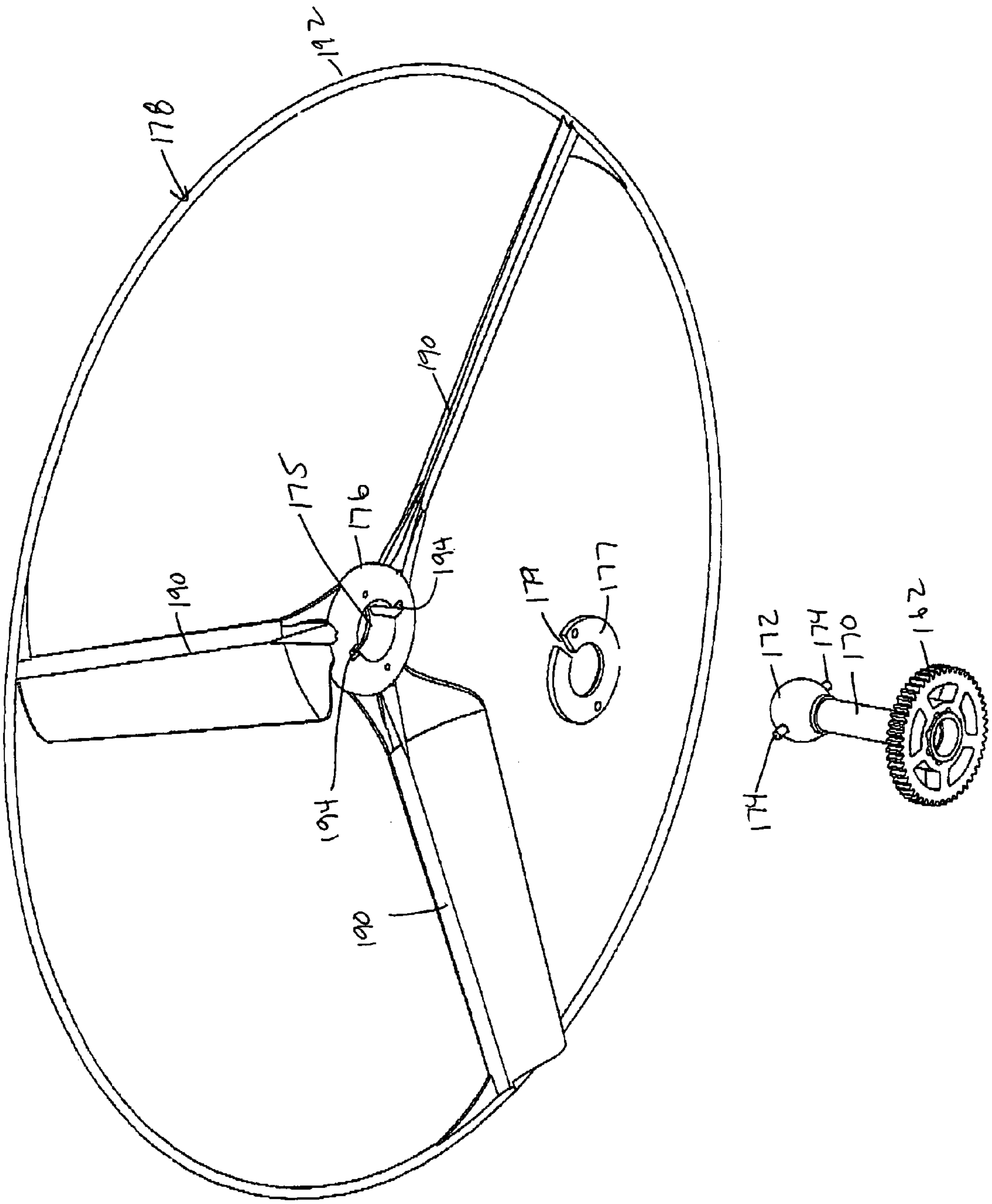
Figure 5a



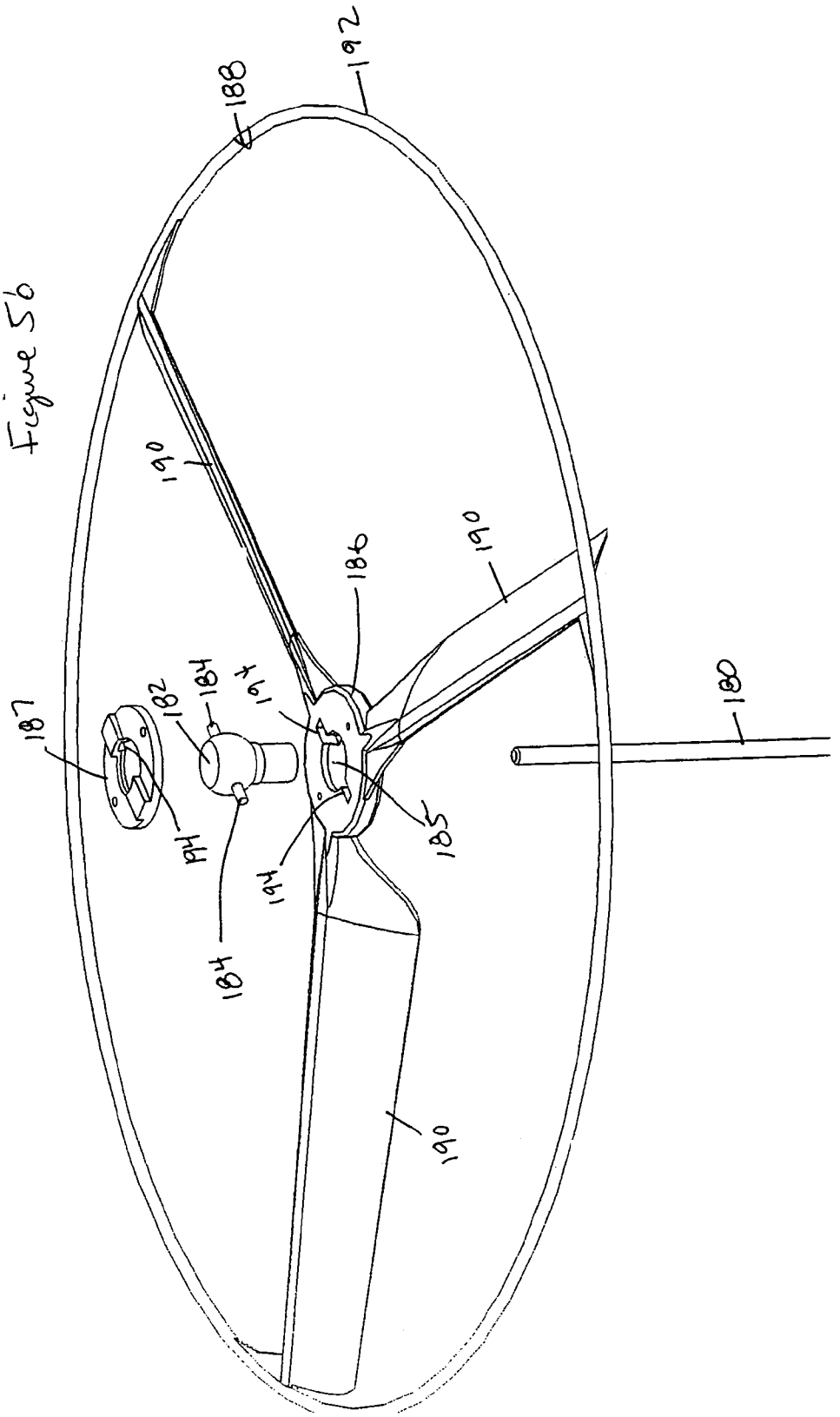


Figure 5b
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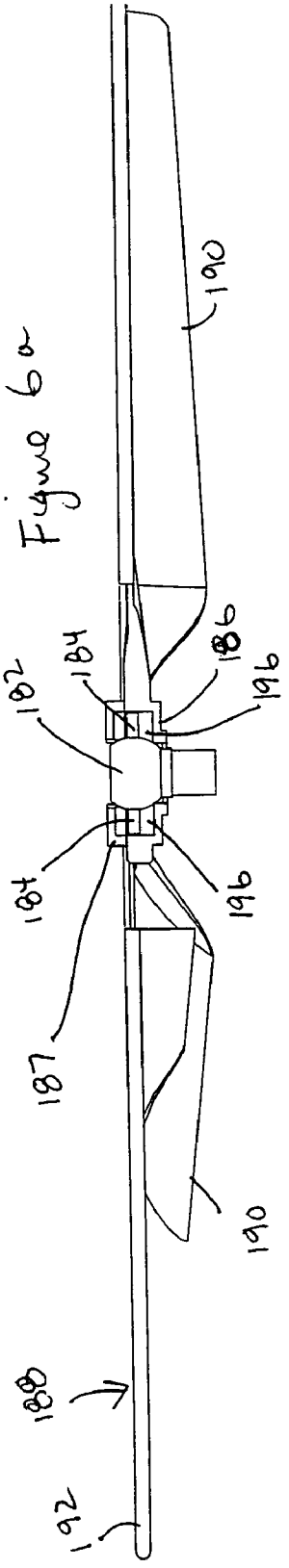


Figure 6a

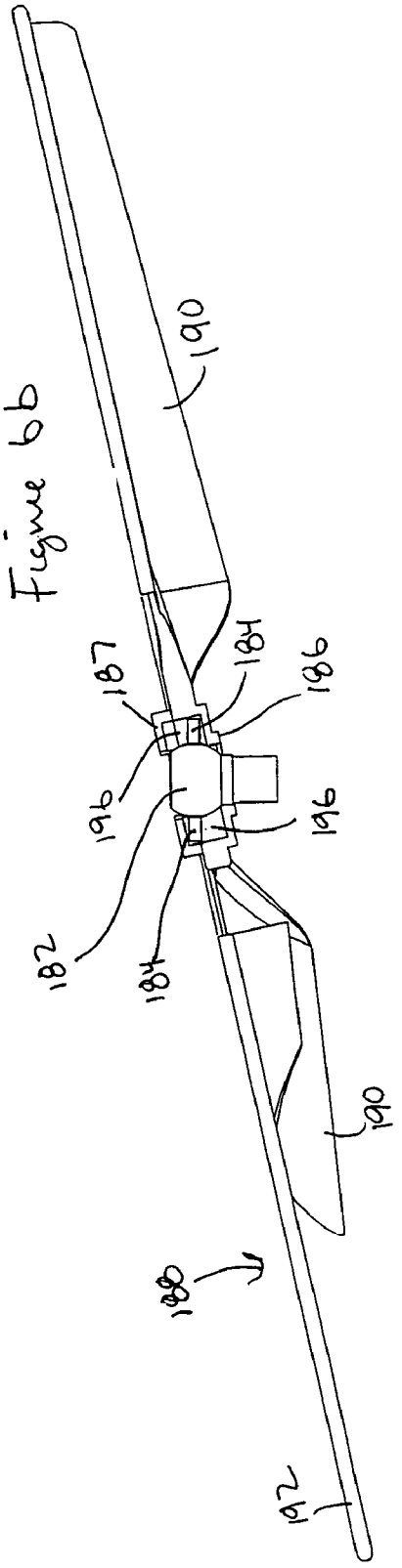
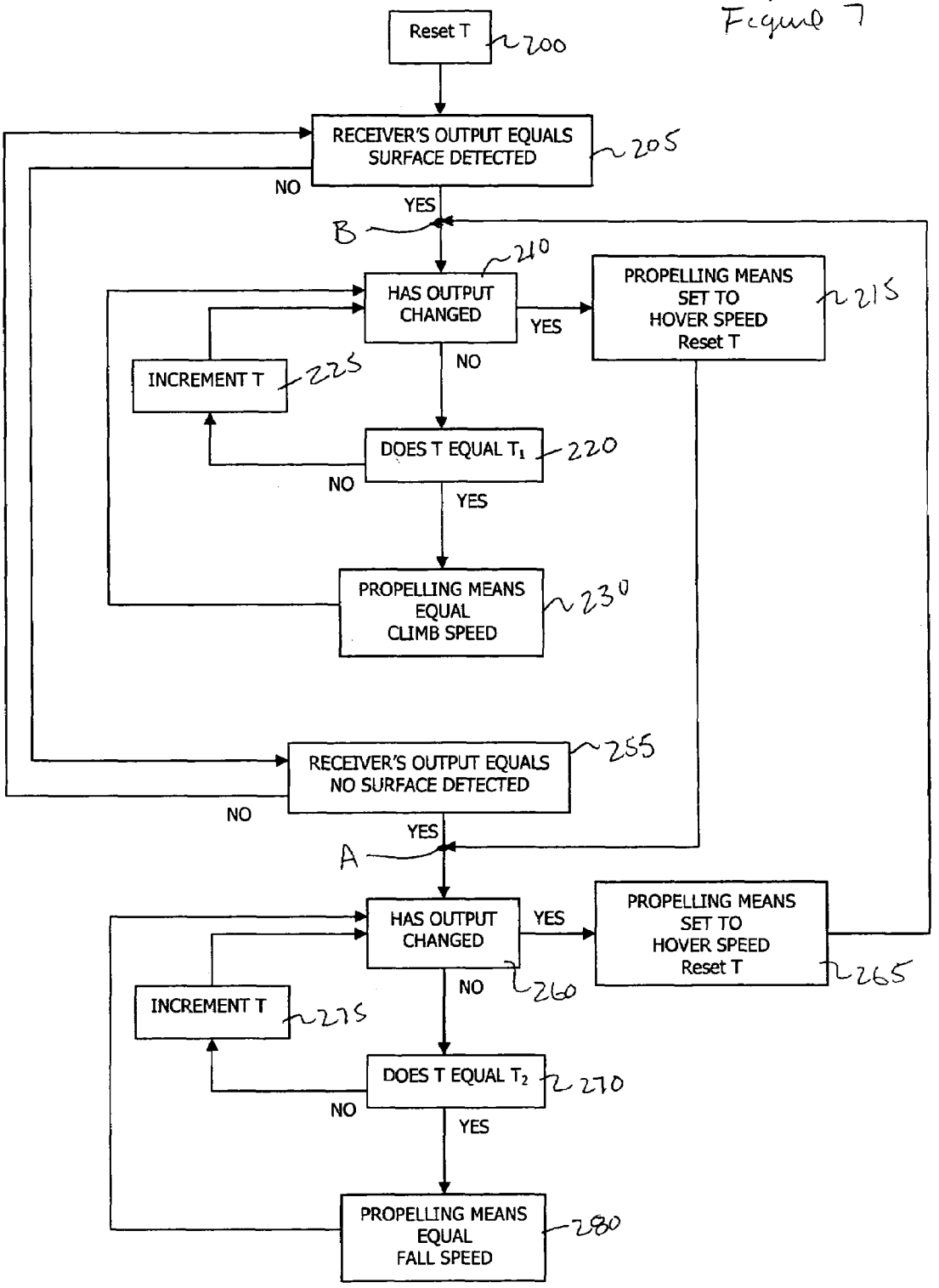


Figure 6b

Figure 7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CONTROL SYSTEM FOR A FLYING VEHICLE

FIELD OF THE INVENTION

This invention relates generally to a flying vehicle and more specifically to a hovering vehicle that includes a control system to automatically control the height of the vehicle above a surface or another object.

BACKGROUND OF THE INVENTION

While the present invention is related in part to vehicles developed in the toy and hobby industry, there are many types of vehicles that use propellers as a source of lift or as a means for propulsion for which the present invention is applicable. The more common types of these vehicles, which use propellers as a source of propulsion or lift, are air/space based vehicles such as airplanes, helicopters, or unconventional aircraft.

For example, U.S. Pat. No. 5,609,312 is directed to a model helicopter that describes an improved fuselage with a structure that supports radio-control components, and drive train components in an attempt to provide a simple structure; U.S. Pat. No. 5,836,545 is directed to a rotary wing model aircraft that includes a power distribution system that efficiently distributes engine power to the rotary wings and tail rotor system; U.S. Pat. No. 5,879,131 is directed to a main propeller system for model helicopters, which are capable of surviving repeated crashes; and U.S. Pat. No. 4,604,075 is directed to a toy helicopter that includes a removable control unit, which a user may plug into the toy helicopter.

In addition, the ability to maintain a stable flight or hover is difficult to implement without the user constantly adjusting the speed of the propellers. A self-hovering vehicle would be capable of adjusting itself to a predetermined height above another a surface or object, even when the object changes the distance between itself and the hovering vehicle.

SUMMARY OF THE INVENTION

A vehicle is provided with a self-hovering control mechanism to control the height of the vehicle above a surface or another object. The vehicle includes a means for propelling the vehicle in a horizontal direction. A transmitter positioned on the bottom of the vehicle transmits a signal from the vehicle downwardly away from the vehicle. A receiver is also positioned on the bottom of the vehicle for receiving the signal as it is bounced off of a surface. A control system is provided that automatically sets a speed of the propelling means in response to the receiver. The control system sets the speed of the propelling means to a first speed when the receiver receives the bounced signal and the control system sets the speed of the propelling means to a second speed when the receiver does not receive the bounced signal. The first speed being predefined as a speed that causes the vehicle to gain altitude and the second speed being predefined as a speed that causes the vehicle to lose altitude. The vehicle will position itself at a predetermined distance away from the object, by toggling between the two speeds when the bounced signal becomes intermittent.

In another embodiment the vehicle includes a horizontal stabilizing counter rotating propeller assembly secured to the vehicle. The counter rotating propeller assembly includes a pair of stacked rotor assemblies. Each rotor assembly includes a centered propeller mount with blades extending from the centered propeller mount. A ball joint with pins extending from the ball joint is also provided. A cap is secured to the centered propeller mount for capturing the ball joint between the cap and the centered propeller mount. The centered propeller mount and the cap include channels when assembled for receipt of the pins of the ball joint. When a rotor assembly begins to pitch, the pins of the ball joint contact interior walls defined by the channels to limit the pitch of the rotor assembly.

In yet another embodiment, a process of controlling an altitude of a flying vehicle having a vertical propelling means in a vertical direction is provided. The process includes providing a hover speed of the propelling means that has a tendency to maintain the vehicle at a substantially constant altitude. Transmitting a signal downwardly away from the vehicle and providing a means for receiving the signal as it is bounced off of a surface. The process monitors the receiving means and adjusts the propelling means in response to the following conditions. First, when the receiving means does not receive the bounced signal for a predetermined time, the propelling means is adjusted to a speed lower than the hover speed. Second, when the receiving means receives the bounced signal for a predetermined time, the propelling means is adjusted to a speed higher than the hover speed. Third, the propelling means is adjusting to the hover speed when the receiving means changes from receiving the bounced signal to not receiving the bounced signal and visa versa.

Numerous advantages and features of the invention will become readily apparent from the following detailed description of the invention and the embodiments thereof, and from the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

A fuller understanding of the foregoing may be had by reference to the accompanying drawings, wherein:

FIG. **1** is a perspective view of a figure with a counter-rotating propelling means and a automatic hovering control system;

FIG. **2** is a partially exploded view of FIG. **1**;

FIG. **3***a* is an enlarged view of the hovering control system;

FIG. **3***b* is the hovering control system of FIG. **3***a* illustrating an intermittent signal;

FIG. **3***c* is the hovering control system of FIG. **3***a* illustrating the signal being bounced off of the surface of an object;

FIG. **4** is an exploded view of FIG. **1**;

FIG. **5***a* is an exploded enlarged view of the lower rotor assembly;

FIG. **5***b* is an exploded enlarged view of the upper rotor assembly;

FIG. **6***a* is a sectional view of the upper rotor assembly;

FIG. **6***b* illustrates the upper rotor assembly from FIG. **6***a* showing the pitch limiting means; and

FIG. **7** is a control system diagram of the hovering control system.

DETAILED DESCRIPTION OF THE INVENTION

While the invention is susceptible to embodiments in many different forms, there are shown in the drawings and will be described herein, in detail, the preferred embodiments of the present invention. It should be understood, however, that the present disclosure is to be considered an

exemplification of the principles of the invention and is not intended to limit the spirit or scope of the invention and/or the embodiments illustrated.

Referring now to FIGS. **1** and **2** a vehicle **100** is provided with a system to control the height or distance of the vehicle away from a surface or another object. The vehicle **100** includes a means for propelling **110** the vehicle **100** in a specified direction, an airframe or body **120**, the control system **130**, and a power supply **140**.

In the present invention the propelling means **110** is a counter-rotating propeller assembly. However, the propelling means may be replaced with a single rotor assembly and a separate counter-torque assembly such as but not limited to a tail rotor if such was being implemented in a helicopter. Alternatively, a single rotor assembly may be used by itself if the vehicle was completely rotating such as a flying saucer.

Referring now to FIG. **3***a*, the control system **130** includes a transmitter **132** and a receiver **134** in communication with a circuit board **136** which is further in communication with and control of the propelling means **110**. The transmitter and receiver pair are preferably an infra-red pair, however other transmitter/receiver pairs may be incorporated. One important aspect of the present invention is that the receiver must be kept blind to the transmitter, such that the receiver is unable to register a transmission signal t_s from the transmitter as it is being transmitted there from. The receiver will therefore only receive the transmission signal t_s when the signal is bounced off of a surface S or object referred to as a bounced signal b_s. In the present invention the receiver **134** is kept blind from the transmission signal t_s by placing the transmitter **132** within a black tube **138** that is positioned adjacent to the receiver **134**. Other means of blinding the receiver may be incorporated without effecting the scope of the invention.

The control system **130** may either be a closed loop system or an open loop system. In the closed loop system, the control system also monitors the speed of the propelling means (discussed in greater detail below). By monitoring the propelling means the control system can maintain a preset speed of the propelling means throughout the battery life, ensuring that the loss of battery power does not effect the speed of the propelling means and the hovering of the vehicle. In an open loop system, the control system does not monitor the speed of the propelling means but compensates for the power drain by slightly increasing the speeds over time. This can be accomplished by including a compensation timer on the circuit board that increases the speed of the propelling means as time increases.

In one embodiment, a hover speed is predetermined. The hover speed is determined by a number of factors such as the rotor assembly design, rotation of the propelling means, and weight of the entire vehicle. The hover speed will lift the vehicle off of a surface, such that when the speed of the rotating propelling means (referred to as rotor speed) is decreased slightly from the hover speed, the vehicle will decrease altitude or not lift off of the ground. Once the hover speed is determined the control system is given an upper range and lower range of rotor speeds. These include, in the least, a speed higher than hover speed to provide a climbing speed and a speed lower than hover speed to provide a fall speed. However, a range could also be established, for example, 5% above the hover speed for a climbing speed and 2% below the hover speed for fall speed.

Once the vehicle is activated, through a remote control or an on switch, the circuit board sends the vehicle into a climbing phase, by increasing the rotor speed to the climbing speed. In addition, the circuit board begins transmitting a signal. When the vehicle is close to a surface or object, the receiver will receive the transmission signal that is bounced off of the surface. As long as the receiver receives the signal, the circuit board maintains a climbing phase (FIG. **3***a*). As the vehicle moves further from the surface, the receiver will eventually lose the signal that is bounced off of the surface. At the moment the receiver loses the signal, the circuit board will switch to the fall speed and enter a deceleration phase. The control system may also decrement to the deceleration speed in steps, so the movement of the vehicle is not too severe. As the receiver regains the signal connection, the circuit board switches back to the climbing phase (again the control system may increment from the deceleration speed to the climbing speed to control the movement of the vehicle). Eventually, the vehicle will toggle back and forth between the deceleration and climbing phase as the signal strength rests on the fringe of being received and not received.

In the preferred embodiment, the transmitter transmits an infra-red frequency signal t_s. The circuit board monitors the receiver's output, in that upon detecting the signal bounced off of a surface the receiver's output is off (referred to as surface detected) and upon not detecting the signal the receiver's output is on (referred to as no surface detected). When the surface is detected for a predetermined time the propelling means is set to the climb speed and when the surface is not detected for a predetermined time the propelling means is set to the fall speed. Moreover, whenever there is a change in the receiver's output (from surface detected to surface not detected or visa versa) the propelling means is set to the hover speed.

FIG. **7** illustrates a process of controlling the vehicle. The process initially resets a timer, Step **200**. The timer is used to time how long the receiver's output has been in a particular state. The receiver's output is monitored and checked to determine if a surface is detected, Step **205**. If the receiver's output does not indicate a surface is detected, then the process goes to Step **255**, where the output must be no surface detected.

Continuing from Step **205**, the receiver's output is continually monitored to determine if there has been a change, Step **210**. If there has been a changed, the propelling means **110** is set to hover speed and the timer is reset, Step **215**. Since the receiver's output changed from surface detected to no surface detected, the process moves from Step **215** (out of the surface detected section) to Point A (into the no surface detected section, discussed in further detail below).

From Step **210**, if the receiver's output has not changed, the process checks to see if the time is equal to a predetermined set time, Step **220**. If the timer is not equal to the predetermined set time, then the process increments the timer, Step **225**, and moves back to Step **210**. If the timer is equal to the predetermined set time, then the propelling means **110** is set to the climb speed, Step **230**.

Following Step **255** or Point A, when the receiver's output equals no surface detected, the receiver's output is checked to determine if there has been a change **260**. If there has been a change in the output, the propelling means is set to hover speed and the timer is reset, Step **265**. Since the receiver's output changed from no surface detected to surface detected, the process moves from Step **265** (out of the surface detected section) to Point B (into the surface detected section).

From Step **260**, if the receiver's output has not changed, the process checks to see if the time is equal to a predetermined set time, Step **270**. If the timer is not equal to the predetermined set time, then the process increments the

timer, Step **275**, and moves back to Step **260**. If the timer is equal to the predetermined set time, then the propelling means **110** is set to the fall speed, Step **280**. The process then goes back to Step **260** to monitor the output.

In the preferred embodiment, the two predetermined times T_1 and T_2 described on FIG. **7**, may be the same time, such as 0.2 seconds. However, these times may also be different. By adjusting these two timers the size and position of all three speed ranges can be altered, relative to the maximum sensing distance.

From the hover state, as soon as the receiver's output detects the surface, the timer is started and if the receiver's output detects the surface for a first predetermined time (i.e. 0.2 seconds) the propelling means is set to climb speed. As long as the receiver's output is maintained to surface detected, the propelling means will remain set to the climb speed. As soon as the receiver's output is changed, the propelling means will be set to hover and the timer reset. If the receiver does not detects the surface for a second predetermined time (i.e. 0.2 seconds) the propelling means is set to fall speed. The propelling means will not change from a hover speed unless the receiver's output is maintained for at least the predetermined time. If the receiver's output is interrupted (meaning the receiver's output toggles or changes) within the predetermined time, the timer is reset.

Once the vehicle is in a hover position, if the user places an object between the surface and the bottom of the vehicle (for example, the user's hand, FIG. **3***c*), the vehicle will sense the transmission being bounced off of the object and enter into a climbing phase until the vehicle is the predetermined distance from the object. Similarly, if the vehicle is hovering above the object and the object changes its altitude, the vehicle will adjust itself accordingly, by entering the deceleration or climbing phase, depending upon whether the object moved closer to or further away from the vehicle.

In another aspect of the present invention the control system can adjust the speed of the propeller means **110** depending upon the signal strength received by the receiver **132**. At that point, the vehicle will hover at a predetermined distance from the surface (FIG. **3***b*). The predetermined distance from the surface is determined mostly by the signal strength. A strong transmission signal will cause the vehicle to move further away from the surface until the bounced signal becomes too faint or weak such that the control system toggles between the deceleration and climbing phases.

In a broad aspect of the invention the control system moves or flies a vehicle. A transmitter/receiver pair is positioned on the vehicle and the transmitter transmits a signal from the vehicle in a specified direction. When the signal is bounced off of a surface (including a surface of an object) and received back by the receiver, the control system flies the vehicle in a direction opposite to the specified direction. In addition, when the receiver does not receive the signal, the control system flies the vehicle in the specified direction. For the example discussed above, the direction in downwardly, such that the control system will hover the vehicle above a surface. However, if the vehicle had directional controls, the control system could be positioned on the side of the vehicle such that the vehicle would be capable of keeping a predetermined distance away from a wall or a surface of a wall (including any objects positioned along the wall).

Referring again to FIG. **1**, to assist in the vehicles stability in the hover, the propelling means **110** includes a means of stabilizing the vehicle **100** in a horizontal position. The propelling means **110** is secured to the top portion **105** of the vehicle body **120**. In the embodiment illustrated, the body **120** is a character or figure. The propelling means **110** is a counter rotating propeller mechanism, since the body **120** does not include additional means to counter the torque of a motor included thererin and this specific embodiment does not call for the rotation of the body.

Turning now to FIGS. **4** through **7**, the propelling means **110** includes a motor **150** attached to a body mount **151** and secured to a lower gear housing **152**. The motor **150** drives a motor shaft **154** that has a drive gear **156** attached thereto. The drive gear **156** is meshed to a first spur **158** and idler gears **160**. The idler gears **160** do not effect the gear ratio but will change the direction such that a second spur **162** meshed to the idler gears **160** is rotating in the opposite direction as the first spur **158**. The second spur **162** is mounted above an upper gear housing **164**.

In the present embodiment, the control system is a closed loop system requiring the control system to monitor the speed of the rotor. The monitoring of the speed is accomplished by including a hall effect sensor **166** mounted to the upper gear housing **164** and a magnet **168** is mounted to the first spur **158**. As the first spur **158** rotates, the revolutions per second are calculated providing the ability to calculate speed.

Secured to the second spur **162** is a rod **170** that has a lower ball joint **172** secured on its end. The lower ball joint **172** includes a pair of pins **174** extending outwardly therefrom. The lower ball joint **172** is secured to a lower propeller mount **176**. The lower propeller mount **176** pivotally attaches a lower rotor assembly **178** to the lower ball joint **172**.

The rod **170** and the lower ball joint **172** are bored there-through to permit the passage of a drive shaft **180** that is secured to the first spur **158**, such that the drive shaft rotates along with and in the same direction of the rotation of the first spur **158** without effecting the opposite rotation of the second spur **162**. The drive shaft **180** traverses through the lower propeller mount **176** and has an upper ball joint **182** with pins **184** secured on its end. The upper ball joint **182** is secured to an upper propeller mount **186**. The upper propeller mount **186** pivotally attaches an upper rotor assembly **188** to the upper ball joint **182**.

Both the lower and upper rotor assemblies include a plurality of blades **190** extending from its respective propeller mount. The ends of each blade are further connected to a safety ring **192**. Each propeller mount further includes a cap. In FIG. **5***a* the lower cap **177** includes a notch **179** to permit the lower cap **177** to fit around the rod **170**. The lower cap **177** is secured to the lower propeller mount **176** capturing lower ball joint **172** in an aperture **175** defined in the center of the lower propeller mount **176**, with the pins **174** positioned in channels **194**. In FIG. **5***b*, an upper cap **187** is secured to the upper propeller mount **186** capturing the upper ball joint **182** in an aperture **185** defined on the upper propeller mount **186**. The pins **184** on the upper ball joint **182** are positioned in channels **194** defined on the upper propeller mount **186**.

While each rotor assembly works in the same manner, FIGS. **6***a* and **6***b* only reference numerals to the upper rotor assembly **188**, while the following discussion pertains to both the upper rotor assembly **188** and the lower rotor assembly, only numerals to the upper rotor assembly are made. This is not done to limit the scope of the invention.

The ball joints **182** are unique because when the ball joints **182** rotate, the pins **184** extending into the channels **194** to drive the rotor assemblies **188**. However, the channels **194** are sized such if the rotor assembly **188** pitches slightly or

the body **120** of the vehicle **100** moves, the pins **184** have clearance to permit the ball joint **182** to move in any plane perpendicular to the plane of the rotor assembly **188**. This free movement of the ball joint **182** aids in horizontally stabilizing the rotor assembly **188** while maintaining a vertically aligned body.

The ball joint **182** is a simple pivot that allows the rotor assembly **188** to include more than two blades **190**. If only two blades **190** were included opposed from one another, then the rotor assembly **188** would need to pivot in just one axis (parallel to the blades) to level out. But the ball joint **182** allows the rotor assembly **188** to pivot in a number of different directions and thus allows for any number of blade **190** configurations, by creating a pivoting plane about each blade **190**. If the rotor assembly **188** begins to pitch, the blades **190** and safety ring **192** will begin to move off of a horizontal plane. The ball joint **182** permits the rotor assembly to freely pivot about the rod or drive shaft independently from the body of the vehicle, wherein when the rotor assembly is rotating and begins to pitch, the rotating rotor assembly having a centrifugal force created by the rotation thereof will tend to pivot about the ball joint in a manner that offsets the pitch such that the vehicle remains in a substantially horizontal position. As such the ball joint **182** and the rotor assembly **188** horizontally stabilize the rotating rotor assembly.

The ball joint **182** also keeps the body of the body **120** vertically straight during flight. The ball joint **182** and the weight of the body **120** will automatically pull the body **120** back to a straight vertical position because of gravity. If the body **120** touched something and the rotor assembly **188** was rigidly attached to the body, then the resulting tilt of the center axis would cause the whole vehicle to propel itself at that angle instead of straight upwards.

Lastly, while the rotor assembly **188** is pitching, the pins **184** extending from the ball joint **182** move inside the channels **194** until the pins **184** come into contact with the interior walls of the channels **194** (FIG. **6***b*). This pitch limiting means prevents the pitch of the rotor assembly **188** becoming too extreme, which could happen with a large gust of wind. In addition, if the counter rotating rotor assemblies did not have safety rings, it would be possible for a blade from the lower rotor assembly to contact and entangle with a blade from the upper rotor assembly which would be detrimental to the flying vehicle. The pitch limiting means defined and described above would prevent the rotor assemblies from colliding.

From the foregoing and as mentioned above, it will be observed that numerous variations and modifications may be effected without departing from the spirit and scope of the novel concept of the invention. It is to be understood that no limitation with respect to the specific methods and apparatus illustrated herein is intended or should be inferred.

We claim:

1. A vehicle having a means for propelling in a vertical direction, further comprising:

a transmitter positioned on the bottom of said vehicle for transmitting a signal from the vehicle downwardly away from said vehicle;

a receiver positioned on the bottom of said vehicle for receiving said signal as it is bounced off of a surface, defined as a bounced signal; and

a control system that automatically sets a speed of the propelling means in response to the receiver, said control system having a first means to set the speed of the propelling means to a first speed when the receiver receives the bounced signal and the control system having a second means to set the speed of the propelling means to a second speed when the receiver does not receive the bounced signal, the first speed being predefined as a speed that causes the vehicle to gain altitude and the second speed being predefined as a speed that causes the vehicle to lose altitude.

2. The vehicle of claim **1**, wherein the receiver is positioned such that the receiver is blind to the signal transmitted from the transmitter and is only capable of receiving said bounced signal.

3. The vehicle of claim **2**, wherein the transmitter is recessed in a tube.

4. The vehicle of claim **1**, wherein the control system further monitors the speed of the propelling means by incorporating a hall effect sensor mounted to the vehicle used in conjunction with a magnet mounted to a rotating propeller defined by the propelling means, wherein by monitoring the speed of the propelling means, the control system can maintain the speed of the propelling means as defined by the first speed and the second speed.

5. The vehicle of claim **1**, wherein the control system further includes a means to increment the first speed and second speed as functions of time.

6. A flying vehicle comprising: of claim **1** comprising:

a body;

said propelling means comprising:

a rotating propeller assembly secured to a top portion defined by the body, the propeller assembly includes a centered propeller mount with at least one blade extending from said centered propeller mount, the centered propeller mount includes an aperture and a channel extending away from the aperture; and a ball joint driven by a motor mechanism, the ball joint is received in said aperture and the ball joint has a pin extending therefrom into the channel, such that when the ball joint is rotating, the pin contacts an interior portion of the channel driving the propeller assembly, and wherein the ball joint and the centered propeller mount permit the rotor assembly to freely pivot about the ball joint independently from the body of the vehicle, wherein when the rotor assembly is rotating and begins to pitch, the rotating rotor assembly having a centrifugal force created by the rotation thereof will tend to pivot about the ball joint in a manner that offsets the pitch such that the vehicle remains in a substantially horizontal position.

7. The vehicle of claim **6** wherein when the rotor assembly begins to pitch, the pin of the ball joint contacts an interior portion of the channel to limit the pitch of the rotor assembly.

8. The vehicle of claim **6** wherein the propeller assembly includes an odd number of blades, and wherein the ball joint and the propeller mount permit the propeller assembly to pivot in any plane perpendicular to the blades.

9. The vehicle of claim **6**, wherein the rotating propeller assembly is defined by having stacked counter rotating rotor assemblies and wherein the channels defined on each of said counter rotating rotor assemblies are sized to prevent blades defined by each counter rotating rotor assemblies from contacting one and other.

10. A system to control a direction of movement of a flying vehicle, the control system comprising:

a transmitter/receiver pair positioned on the vehicle, the transmitter transmitting a signal from the vehicle in a predetermined direction;

a means to fly said vehicle in a direction opposite of said predetermined direction when said signal is bounced off of a surface and received back by the receiver; and

a means to fly said vehicle in a direction similar to said predetermined direction when said receiver does not receive said signal.

11. The system of claim **10**, wherein the receiver is positioned such that the receiver is blind to the signal transmitted from the transmitter and is capable of receiving said signal when bounced off of the surface.

12. The system of claim **11**, wherein the transmitter/receiver pair is orientated such that the signal is transmitted downwardly away from the vehicle.

13. The system of claim **6** further comprising a means for propelling the vehicle in a horizontal direction.

14. The system of claim **13** further comprising a means to monitor a speed of propelling means.

15. The system of claim **13** further comprising a means to increase a speed of the propelling means as a function of time.

16. A process of controlling an altitude of a flying vehicle having a vertical propelling means in a vertical direction comprising:

providing a hover speed of said propelling means that has a tendency to maintain the vehicle at a substantially constant altitude;

transmitting a signal downwardly away from said vehicle;

providing a means for receiving said signal as it is bounced off of a surface,

monitoring said receiving means and adjusting said propelling means in response to the following:

when said receiving means does not receive said bounced signal adjusting, said propelling means to a speed lower than said hover speed, and

when said receiving means receives said bounced signal, adjusting said propelling means to a speed higher than said hover speed.

17. The process of claim **16** further comprising:

monitoring said receiving means and adjusting said propelling means in response to the following:

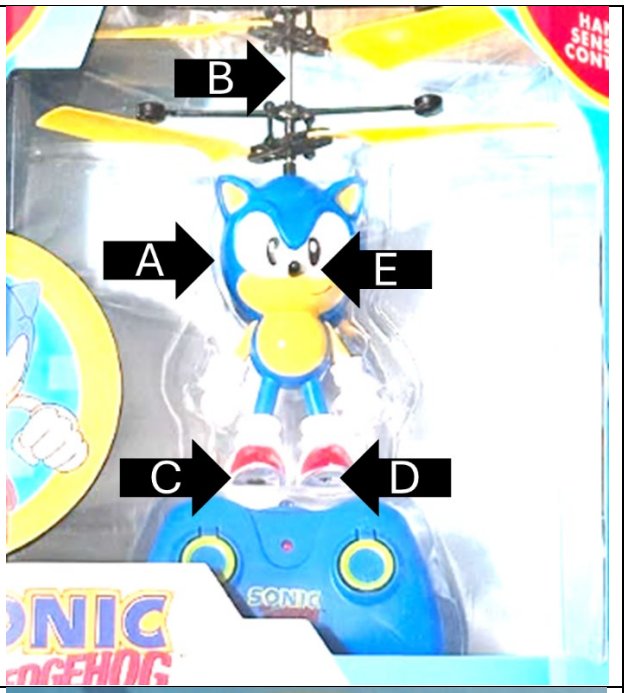
when said receiving means does not receive said bounced signal for a first predetermined time adjusting said propelling means to a speed lower than said hover speed,

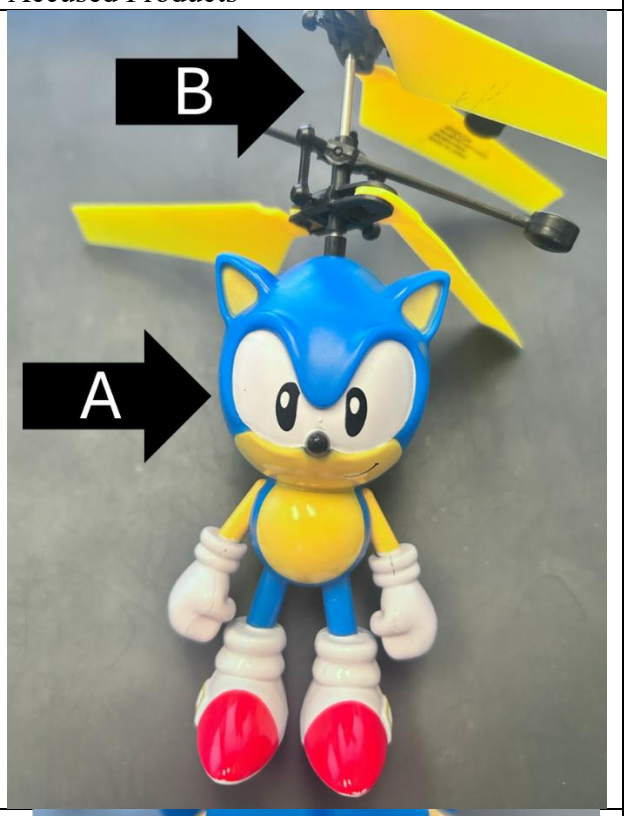
when said receiving means receives said bounced signal for a second predetermined time adjusting said propelling means to a speed higher than said hover speed, and

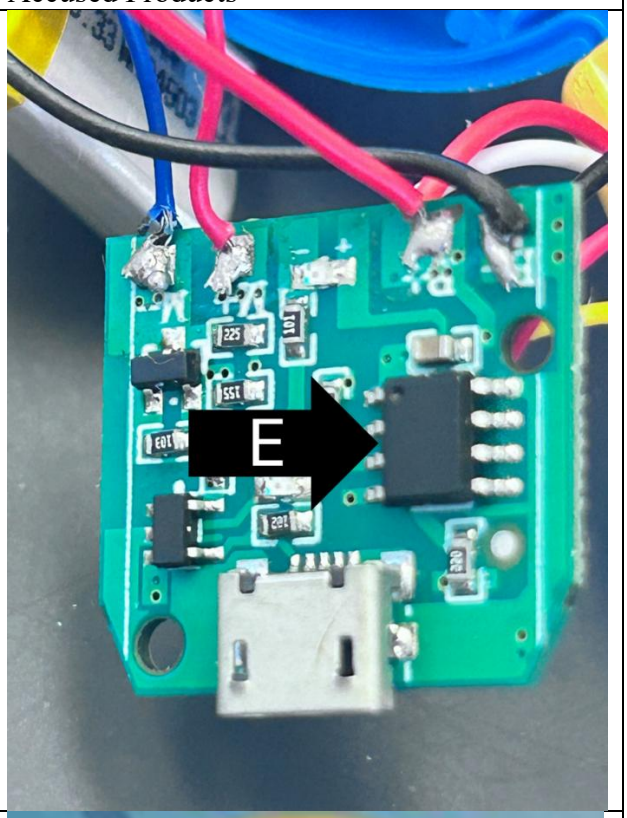
adjusting said propelling means to the hover speed when said receiving means changes for receiving said bounced signal to not receiving said bounced signal and visa versa.

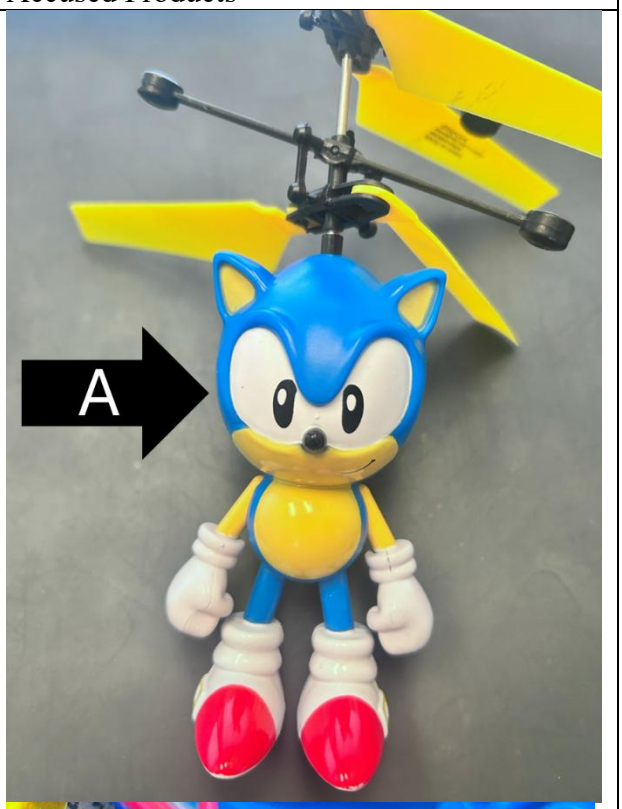
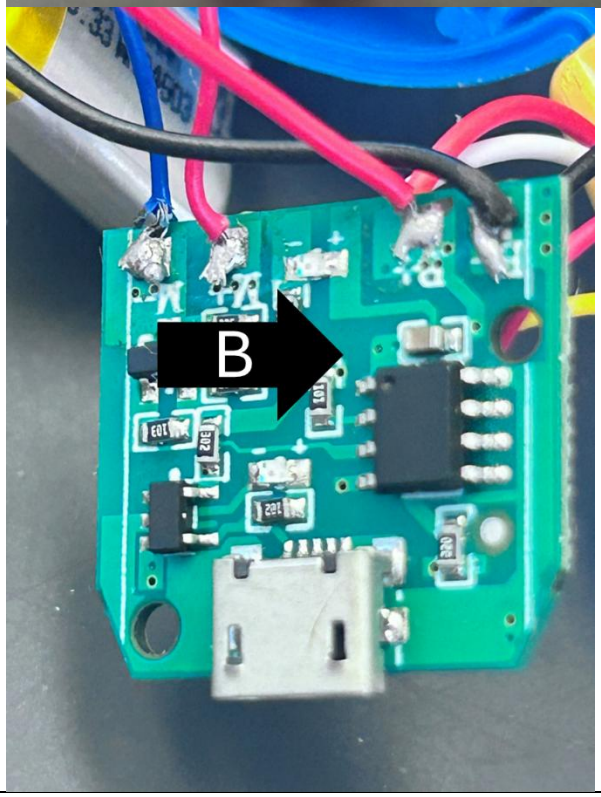
* * * * *

Exhibit B

A vehicle [A] having a means for propelling in a vertical direction [B], further comprising:	
a transmitter [C] positioned on the bottom of said vehicle for transmitting a signal from the vehicle downwardly away from said vehicle;	
a receiver [D] positioned on the bottom of said vehicle for receiving said signal as it is bounced off of a surface, defined as a bounced signal; and	
a control system [E] that automatically sets a speed of the propelling means in response to the receiver,	
said control system having a first means to set the speed of the propelling means to a first speed when the receiver receives the bounced signal and	
the control system having a second means to set the speed of the propelling means to a second speed when the receiver does not receive the bounced signal,	
the first speed being predefined as a speed that causes the vehicle to gain altitude and	
the second speed being predefined as a speed that causes the vehicle to lose altitude.	

'866 Patent Claim 1 Limitation	Accused Products
A vehicle [A] having a means for propelling in a vertical direction [B], further comprising:	
a transmitter [C] positioned on the bottom of said vehicle for transmitting a signal from the vehicle downwardly away from said vehicle; a receiver [D] positioned on the bottom of said vehicle for receiving said signal as it is bounced off of a surface, defined as a bounced signal; and	

‘866 Patent Claim 1 Limitation	Accused Products
a control system [E] that automatically sets a speed of the propelling means in response to the receiver,	
said control system having a first means to set the speed of the propelling means to a first speed when the receiver receives the bounced signal	
and the control system having a second means to set the speed of the propelling means to a second speed when the receiver does not receive the bounced signal	
the first speed being predefined as a speed that causes the vehicle to gain altitude and the second speed being predefined as a speed that causes the vehicle to lose altitude.	

'866 Patent Claim 10 Limitation	Accused Products
A system to control a direction of movement of a flying vehicle [A], the control system [B] comprising:	 

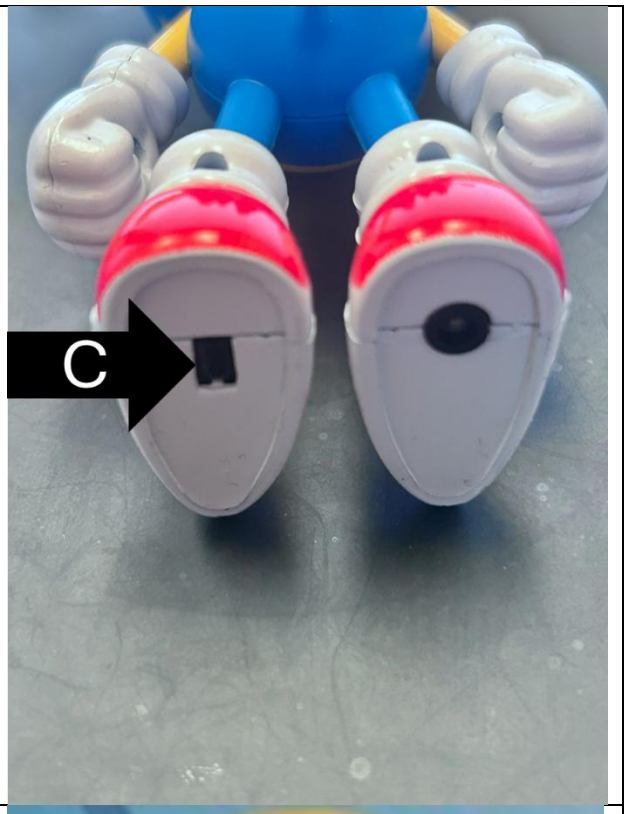
a transmitter/receiver pair [C] positioned on the vehicle, the transmitter transmitting a signal from the vehicle in a predetermined direction;	
a means to fly said vehicle in a direction opposite of said predetermined direction when said signal is bounced off of a surface and received back by the receiver; and a means to fly said vehicle in a direction similar to said predetermined direction when said receiver does not receive said signal.	

Exhibit C

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December 2, 2024

VIA FEDEX

Paul Tang
Executive Vice President and General Counsel
Burlington Coat Factory Warehouse Corporation
1830 Route 130
North Burlington, New Jersey 08016

Re: Notice of U.S. Patent 7,100,866 and Request to Cease Selling

Dear Mr. Tang,

This law firm represents Flying Heliball, LLC ("Heliball"). Heliball is the owner of US Patent No. 7,100,866 ("the '866 Patent"), a copy of which is enclosed for your convenience as **Exhibit A**. The purpose of this letter is to notify you of Burlington Coat Factory Warehouse Corporation and Burlington Store Inc.'s (collectively "Burlington") infringement of the '866 Patent and to invite Burlington cease selling this product and provide information about current sales.

It has come to our attention that Burlington sells a product called Sonic Heli Drone with an internal item number DRC10211NO. This product is a gesture controlled flying toy that looks like Sonic the Hedgehog ® manufactured by Sakar International Corporation ("Sakar") ("the Sonic Toy"). We have had a chance to compare the Sonic Toy against the '866 Patent and have determined that it is infringing. Attached as **Exhibit B** to this letter is a claim chart that illustrates how Sakar's Sonic Toy meets each limitation of certain representative claims of the '866 Patent.

The '866 Patent has been thoroughly litigated in the federal district courts through jury verdict *Rehco LLC v. Spin Master Ltd.*, Case No. 13-cv-2245 (N.D. Ill. Nov. 30, 2020). In some cases the parties agreed on a permanent injunction. *Flying Heliball, LLC v. Spin Copter, Inc.*, No. CV 23-1778-GW-KESx, 2023 U.S. Dist. LEXIS 81149 (C.D. Cal. May 9, 2023). In one case, an unfavorable claim construction was changed at the U.S. Court of Appeals for the Federal Circuit with a more favorable one *Rehco LLC v. Spin Master, Ltd.*, 759 F. App'x 944 (Fed. Cir. 2019). In every case brought by Heliball and its predecessors, the '866 Patent has been found valid and infringed where those matters required a decision on the merits. In some cases, that matter is simply stipulated. *See, e.g.*, *World Tech Toys, Inc. et al v. DGL Group LTD*, No. 1:23-cv-01367-

JCD dkt. 46 (N.D. Ill. Nov. 3, 2023). In most cases, the matter resolves before things get that far, and that is what Heliball hopes happens here.

Heliball has an exclusive licensee to produce new products – World Tech Toys, LLC ("WTT"). WTT and its predecessors have consistently labeled its products with markings noting that the '866 Patent is licensed to produce the product. The packaging for the Sonic Toy does not have these markings, and Sakar is not authorized to use the technology in the '866 Patent. Additionally, our law firm's experience is that it is extremely rare for a rightsholder like Sega to license the same character for two competing toys in the same market.

As a recognizable brand, I am certain that Burlington appreciates the need to protect and enforce its intellectual property rights as well as to honor and respect the intellectual property rights of others. Heliball desires an amicably resolution if possible and believes that can be achieved through Burlington's choice of authorized licensees of the '866 Patent. Hopefully, Burlington shares that desire. To begin a productive discussion, please provide me the number of all infringing products made, used, offered for sale, sold, or imported/extent of the infringing service's use and all proceeds therefrom at your earliest convenience. If so, please contact me at your earliest convenience to discuss next steps. In the unfortunate event that Burlington does not desire a working relationship with Heliball and its licensees or otherwise elects to ignore this notice, we have been instructed to proceed accordingly.

So that we may gain an understanding of Burlington's intentions, we respectfully request that Burlington respond to this letter no later than December 16, 2024.

* * * * *

The above is not an exhaustive statement of all the relevant facts and law. Flying Heliball expressly reserves all its legal and equitable rights and remedies, including the right to seek injunctive relief and to recover monetary damages.

Sincerely,

Michael J. O'Brien, Esq.

Enclosures:

Exhibit A: U.S. Patent 7,100,866
Exhibit B: Claim Chart

Copy:

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