LIGHT-UP TABLE TENNIS PADDLE AND METHOD

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ABSTRACT

A table tennis blade for playing table tennis with a ball includes a handle, a paddle extending from the handle having a generally circular configuration, one or more sources of light mounted to the handle or the paddle and/or a sensor mounted to the handle and/or the paddle. The sensor may be in communication with the light and may be configured to illuminate the light when the paddle strikes the ball.
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CROSS-REFERENCE TO RELATED APPLICATION

[0001] This application claims the benefit of priority from Provisional U.S. Application Ser. No. 61/760,206, filed Feb. 4, 2013 which is hereby incorporated by reference in its entirety.

BACKGROUND

[0002] Table tennis is a well known amusement game wherein a table tennis ball is volleyed back and forth over a net on a table tennis table. Table tennis blades are used by players to strike the ball and return it to their opponent’s side of the table. The table tennis blade includes a handle and a paddle attached to the handle. The paddle generally includes a rubber pad on two flat sides that provides options for control and striking of the ball. It would be desirable to construct and implement a blade that increases the excitement of the table tennis game for a typical player.

SUMMARY

[0003] In certain aspects, embodiments of present invention provide a table tennis blade comprising one or more light sources. Light sources in embodiments of the present invention may include, but are not limited to, light bulbs, liquid crystal displays (LCDs), light emitting diodes (LEDs), and/or fiber optic strands and/or fibers. Light sources may be mounted in and/or on a table tennis blade.

[0004] In another aspect, embodiments of the present invention comprise a sensor that can detect a triggering event. Such a sensor may include, but is not limited to an audio sensor, piezoelectric sensor, vibration sensor, gyroscope, and/or accelerometer. Sensors may detect events such as movement and/or acceleration of the table tennis blade and/or contact between a table tennis blade and a ball. In one aspect, one or more sensors may be mounted in or on the table tennis blade handle and/or one or more sensors may be mounted in or on the table tennis blade.

[0005] In another aspect, digital or analog circuits are used in embodiments of the present invention. Such circuits may comprise one or more microcontrollers, one or more batteries, switches, and/or one or more sources of light.

[0006] In another aspect, one or more light sources may be illuminated continuously, intermittently, and/or in a pattern. In one aspect one or more light sources are illuminated to create a pattern, design, or image on the table tennis blade. In one aspect, a light source is illuminated at, near, or adjacent the location where a table tennis ball impacts the table tennis blade.

[0007] In a further aspect, one or more light sources may be comprised of one or more LED or LCD displays.

[0008] The foregoing and still further aspects and embodiments of the present disclosure will become apparent from the following detailed description and accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The foregoing summary, as well as the following detailed description of the invention, will be better understood when read in conjunction with the appended drawings. For the purpose of illustrating the invention, there are shown in the drawings certain embodiments. It should be understood, however, that the invention is not limited to the precise arrangements and instrumentalities shown.

[0010] In the drawings:

[0011] FIG. 1 is a side perspective view of a table tennis blade in accordance with one embodiment of the present invention.

[0012] FIG. 2 is a side perspective view of a table tennis blade in accordance with one embodiment of the present invention comprising a LCD or LED screen.

DETAILED DESCRIPTION

[0013] Reference will now be made to certain embodiments and specific language will be used to describe the same. It will nevertheless be understood that no limitation of the scope of the invention is thereby intended, such alterations and further modifications, and such further applications of the principles of the embodiments as described herein being contemplated as would normally occur to one skilled in the art to which the descriptions relate.

[0014] Certain terminology is used in the following description for convenience only and is not limiting. Unless specifically set forth herein, the terms “a,” “an” and “the” are not limited to one element but instead should be read as meaning “at least one”.

[0015] The words “right,” “left,” “lower,” and “upper” designate directions in the drawings to which reference is made. The words “inwardly” or “distally” and “outwardly” or “proximally” refer to directions toward and away from, respectively, the geometric center or orientation of the device and instruments and related parts thereof. The terminology includes the above-listed words, derivatives thereof and words of similar import.

[0016] Table tennis blades, commonly called rackets, bats, and/or paddles are used to strike a table tennis ball and volley a ball across a table tennis table to an opponent. Table tennis blades commonly comprise a handle and a paddle attached to the handle, although other configurations are possible. The paddle generally includes a rubber pad on two flat sides that provides options for control and striking of the ball. Table tennis paddles are commonly constructed out of wood, although other materials may be used, including but not limited to, metals, plastics, rubbers, and/or composite materials such as carbon fiber. In one embodiment, layers of materials may be used to construct the paddle and/or handle of a table tennis blade.

[0017] A sheet of rubber is commonly affixed to the paddle of a table tennis blade. The use of a rubber sheet provides the player with an ability to customize the blade to suit his preferences. For example, one rubber sheet may provide more or less friction between the blade and the table tennis ball; one rubber sheet may impart more or less spin to the table tennis ball; one rubber sheet may have a higher or lower Shore A hardness value; and/or one rubber sheet may impart a faster or slower speed to the table tennis ball when struck. Different sheets of rubber may be used on different sides of the table tennis blade. Certain sheets of rubber may be textured and/or pimpled on the surface of the rubber. In some embodiments, a sponge layer may be placed between a sheet of rubber and a paddle of a table tennis blade. A rubber, sponge, or other layer may be affixed to the paddle of a table tennis blade by adhesive, epoxy, glue, and/or any other appropriate means. In certain embodiments of the present invention, rubber, sponge,
adhesive, epoxy, glue, and/or other materials affixed to the paddle of a table tennis blade are preferably transparent to wavelengths of light.

[0018] In one embodiment of the present invention, the shape of the paddle of a table tennis blade may be generally circular in shape. However, other shapes may be used, including but not limited to oval shapes, square, rectangular, trapezoidal, and/or any other geometrical shapes.

[0019] In one embodiment of the present invention, the shape of the handle of a table tennis paddle may be shaped or molded into various shapes including, but not limited to flared, anatomic, straight, and/or penhold handles.

[0020] Embodiments of the present invention employ one or more light sources affixed on or to a table tennis paddle. These light sources may be light bulbs, LEDs, fiber optic cables and/or strands, or other components capable of producing and/or directing electromagnetic radiation in the ultraviolet, visible, or infrared spectrum. In one embodiment the light source comprises a single bulb or LED. In another embodiment the light source comprises a plurality of bulbs or LEDs. In one embodiment, a plurality of three bulbs or LEDs may be used as the one or more light sources. In another embodiment the plurality of bulbs or LEDs comprise a red, green, and/or blue bulb or LED. In still another embodiment, each of the plurality of bulbs or LEDs may be individually controlled to produce the appearance of one color at one instant, and another color at another instant. In yet another embodiment, the bulb or LED is manufactured or arranged to emit electromagnetic radiation at a fixed wavelength and/or wavelength. In still another embodiment, a pixel of a chromatic and/or monochromatic LCD is employed as a light source.

[0021] The one or more light sources may be positioned in various locations on or in a table tennis blade. In one embodiment, for example, a light source is placed on or below the surface of the table tennis paddle blade. The one or more light sources may protrude, lie flush, and/or be recessed from the surface of the table tennis blade. In one embodiment, the one or more light sources may be placed along the edge of a table tennis paddle blade. In still another embodiment, the one or more light sources may be positioned throughout the entire surface of the table tennis paddle blade, for example where the blade comprises a LCD and/or LCD screen.

[0022] When an LCD and/or LCD screen is employed, the screen preferably has a resolution greater or equal to 5 pixels per inch. In another embodiment, the screen preferably has a resolution greater or equal to 10, 100, 200, or 300 pixels per inch. In another embodiment, one or more light sources may be located on the handle of a table tennis paddle. When a LCD and/or LCD screen is employed, a digital image and/or video may be displayed on the surface of the table tennis paddle. In another embodiment when a LCD and/or LED screen is employed, a counter may be displayed to show the number of contacts between a table tennis ball and a table tennis blade, and such a counter may be incremented each time a contact is detected between a table tennis ball and table tennis blade is detected.

[0023] The one or more light sources may be illuminated for any time period, and in any pattern. In one embodiment, the pattern of illumination may be controlled, programmed, or otherwise selected to a desired pattern. In one embodiment a switch is used to select between one or more preprogrammed or programmable patterns. In one embodiment, the switch is an electrical switch, including, but not limited to a DIP switch. In another embodiment, the one or more light sources are illuminated in intervals to create a blinking pattern. In another embodiment, the one or more light sources are illuminated in intervals to create a chase pattern between the light sources. In another embodiment, the one or more light sources may be illuminated so as to create a pattern of lights, for example, but not limited to illuminating every other light source or every third light source in a line of light sources. In another embodiment, the one or more light sources are illuminated so as to display a digital image and/or video on the surface of the table tennis paddle blade. In still another embodiment, one or more light sources may be illuminated to show the location or approximate location of where the table tennis ball struck the table tennis paddle blade.

[0024] Any suitable analog or digital circuitry may be used in embodiments of the present invention. In one embodiment, one or more digital microcontrollers may be used to control the illumination of one or more light sources. Suitable microcontrollers include, but are not limited to microcontrollers produced by Texas Instruments and/or Atmel. Microcontrollers may include, but are not limited to, Atmega328 microcontrollers, and/or MSP430 microcontrollers. Microcontrollers may comprise or be connected to storage, for example, but not limited to random access memory (RAM) and/or non-volatile memory, for the storage of files including, but not limited to files, digital photographs, and/or videos. Microcontrollers may be programmed in any suitable manner, and in any suitable programming language. For example, a microcontroller may be programmed and/or reprogrammed via a serial interface such as a universal serial bus (USB). A USB connector may be included in the table tennis blade, located for example but not limited to the handle of the table tennis blade. The table tennis blade may, for example be connected to a host computer to facilitate programming and/or reprogramming.

[0025] One embodiment of a table tennis paddle may comprise an ON/OFF switch that can power on and/or power off the table tennis paddle. In another embodiment, the microcontroller or circuit of the present invention contains an automatic ON/OFF switch that can automatically power on and/or power off the table tennis blade of the present invention after a specified period of time and/or a period of inactivity.

[0027] In certain embodiments of the present invention, a battery is used to provide an electrical current and/or voltage to one or more lights, one or more microcontrollers, and/or one or more sensors and/or detectors. In one embodiment a single electrochemical cell is used. In another embodiment, more than one electrochemical cell is employed. In one embodiment a lithium ion battery is used. In another embodiment, a Zinc-Carbon, Alkaline, Li-FeS₂, NiCd, NMH, and/or NiZn cell is used. The battery used may be rechargeable, or may be non-rechargeable. In yet another embodiment a “button” battery, for example, CR2025 battery is employed. In one embodiment, a battery such as an AA, AAA, and/or 9V battery may be used.

[0028] One embodiment of the present invention a sensor or detector is used to detect the motion and/or contact between a table tennis blade and a table tennis ball. In such an embodiment, a light source may be illuminated when motion and/or contact is detected. Alternatively, a light source may be illuminated after motion and/or contact is detected, including, but not limited to a 1 millisecond delay, a 5 millisecond delay, or greater or equal to a 10 millisecond delay. In one embodiment,
ment, an audio sensor is used to detect sound waves produced when a table tennis blade strikes a table tennis ball. In another embodiment, an accelerometer is used to detect motion of the table tennis blade. In another embodiment, a piezoelectric sensor and/or detector is used to detect contact between a table tennis blade and a table tennis ball. In still another embodiment a capacitive sensor is used to detect contact between a table tennis blade and a table tennis ball. In yet another embodiment, a vibration sensor is employed to detect contact between a table tennis blade and a table tennis ball. In one embodiment, one or more sensors or detectors are employed to detect the location and/or approximate location of the contact between the table tennis blade and the table tennis ball.

[0029] The one or more sensors and/or detectors may be located in or on the table tennis paddle blade and/or located on or in the table tennis paddle handle.

[0030] Referring now to FIG. 1, a table tennis blade, generally designated 10, for playing table tennis with a ball 12 includes a handle 14, a paddle 16 extending from the handle 14 and at least one light source, generally designated 18, mounted to the handle 14 or the paddle 16. In one embodiment, the paddle 16 has a generally circular configuration with a first generally flat side 16a and a second generally flat side 16b. One or more sensors 20 may be mounted to the handle 14 or the paddle 16 of blade 10. The sensor 20 is in communication with the light source 18 and may be configured to illuminate the light source 18 when, for example, the paddle 16 strikes the ball 12. In one embodiment, the sensor 20 is an audio sensor that detects sound waves.

[0031] In one embodiment, the blade 10 also includes a first sheet of rubber 22 mounted to the first side 16a of the paddle 16 and a second sheet of rubber 24 mounted to the second side 16b of the paddle 16. The sensor 20 may be configured to illuminate the light 18 when a ball strikes the first sheet of rubber 22 or the second sheet of rubber 24 and/or configured to illuminate the light 18 upon detection of other appropriate stimuli. Accordingly, the sensor 20 is preferably configured such that when the ball 12 strikes the first or second sheet of rubber 22, 24 during play, it results in a signal being sent to light source 18 to illuminate. The light 18 may pulse, flash, remain illuminated, or otherwise be programmed to react upon receiving a signal and/or power from the sensor 20 that the event of the ball 12 striking the first or second sheets of rubber 22, 24 or the blade 10 generally is detected. The programming and control of the signals from the sensor 20 and to the light 18 may be controlled by a controller, for example, but not limited to a digital or analog microcontroller or other digital or analog circuitry.

[0032] The light source 18 may be comprised of a LED or a plurality of LEDs. In one embodiment, The light source 18 may also be comprised of nearly any element that is able to illuminate upon receiving a signal to illuminate and is generally able to withstand the normal operating conditions and functions of the light source 18. The light source 18 or plurality of light sources 18 may be mounted nearly anywhere on the blade 10 that is preferably visible to a user or player when the light source 18 is illuminated. In another embodiment, the light source 18 or plurality of light sources 18 are mounted over the entire surface of blade 10. By mounting light source 18 over the entire surface of blade 10, a design, pattern, and/or image may be displayed on blade 10. FIG. 2 shows one embodiment of this arrangement.

[0033] In certain embodiments, a first semi-transparent sheet may be located in place of the first rubber sheet 22, and/or may be mounted to the first side 16a of the paddle 16 and a second semi-transparent sheet, which may be located in place of the second rubber sheet 24, may be mounted to the second side 16b of the paddle 16. Light 18 may be mounted beneath the first and second semi-transparent sheets such that light is transmitted through the semi-transparent sheets during game play.

[0034] In one embodiment, light source 18 may be comprised of a plurality of light emitting diodes. A first portion of the plurality of light emitting diodes may be mounted beneath the first semi-transparent sheet and a second portion of the plurality of light emitting diodes may be mounted beneath the second semi-transparent sheet. Accordingly, when the light-emitting diodes are illuminated or powered by a signal from the sensor 20 or the controller, the semi-transparent sheets are illuminated. In addition, the sensor 20 and/or the controller may be configured such that only the one or more light sources 18 on the side of the paddle 16 that strikes the ball 12 are illuminated, but this feature is not limiting. In another embodiment, the one or more light sources 18 on the opposite side of the paddle 16 that strikes the ball 12 are illuminated. In still another embodiment, the one or more light sources 18 on both sides of the paddle 16 are illuminated regardless of which side of the paddle 16 that strikes the ball 12.

[0035] In one embodiment, a battery is mounted in the handle 14. The battery is preferably in communication with the sensor 20 and microcontroller and may provide power to the sensor 20 and the light 18 to facilitate illumination of the light 18. In one embodiment, the sensor 20 is mounted to the paddle 16, but is not so limited and may be mounted to the handle 14, to another portion of the blade 10 or remote from the blade 10. If the sensor 20 is mounted remotely from the blade 10, the sensor 20 may be able to send wired and/or wireless signals to the controller and/or light 18 to facilitate lighting or powering of the light 18 when the appropriate trigger is detected by the sensor 20. If signals and/or power is sent via electrical connection, such connection may be made by a wire, integrated circuit board, and/or combination of wires and circuit boards. Such a wire and/or circuit board may be integral to the table tennis paddle, or may be mounted on and/or within the table tennis paddle.

[0036] In operation, the blade 10 may function such that the light 18 illuminates upon impact of the ball 12 with the blade 10. When an audio sensor is used as sensor 20, the audio sensor preferably recognizes a distinct sound event when the ball 12 hits one of the rubber sheets 22, 24. When the sensor 20 detects an event it then illuminates the one or more light sources 18, which may be comprised of the LED or plurality of LEDs 18. The LEDs may pulse on for a predetermined length of time and then automatically are powered off, but are not so limited. The LEDs can be made to shine on “light grids” or fiber-optic strands which can create a glowing effect from blade 10. The light source 18 may be colored white, or may be another color for example, but not limited to, red, orange, yellow, green, blue, or violet. One or more lights may be illuminated in series or simultaneously. In another embodiment, light source 18 comprises a plurality of one or more lights comprising one or more colors, for example, but not limited to red, green, and/or blue. When light source 18 comprises a plurality of lights, the individual lights may be illuminated at various intensities to appear as various colors. By mixing the colors from a red, green and/or blue light, any
color of the color spectrum may be produced. The electronics, such as the sensor 20, the light source 18, the battery, the controller and related electronics components, can be housed within the handle 14 and/or the paddle 16 of the blade 10. When a plurality of lights comprise light source 18, the plurality of lights are preferably LEDs. The sensor 20 is preferably an audio sensor, as an audio sensor may provide a more accurate detection mechanism than a pressure sensor or vibration sensor, although a pressure sensor, vibration sensor, force sensor, accelerometer, light sensor including, but not limited to, a sensor of visible or infrared light, or any other variety of sensor may be utilized with a blade, as long as the sensor is able to detect an event including, but not limited to, contact between the ball 12 and the blade 10 during typical usage. In another embodiment, the sensor detects acceleration during an event, including, but not limited to contact between the ball 12 and the blade 10 or during the swinging motion of a table tennis player. In still another embodiment, a piezoelectric sensor detects an event including, but not limited to contact between the ball 12 and the blade 10.

Referring to FIG. 2, a table tennis blade may comprise a LCD or LED screen where individual pixels of the screen may be considered a light source generally designated 18. In one embodiment the LCD or LED screen may be chromatic or monochromatic. In another embodiment, each pixel or light source of the screen may be comprised of a source of red, green, and/or blue light. When a red, green, and/or blue light source comprise light source 18, the red, green, and/or blue light may be combined to produce additional colors of light as perceived by the eye.

The uses of the terms “a” and “an” and “the” and similar references in the context of describing the invention (especially in the context of the following claims) are to be construed to cover both the singular and the plural, unless otherwise indicated herein or clearly contradicted by context. Recitation of ranges of values herein are merely intended to serve as a shorthand method of referring individually to each separate value falling within the range, unless otherwise indicated herein, and each separate value is incorporated into the specification as if it were individually recited herein. All methods described herein can be performed in any suitable order unless otherwise indicated herein or otherwise clearly contradicted by context. The use of any and all examples, or exemplary language (e.g., “such as”) provided herein, is intended merely to better illustrate the invention and does not pose a limitation on the scope of the invention unless otherwise claimed. No language in the specification should be construed as indicating any non-claimed element as essential to the practice of the invention.

It will be appreciated by those skilled in the art that changes could be made to the embodiment described above without departing from the broad inventive concept thereof. While the invention has been illustrated and described in detail in the drawings and the foregoing description, the same is to be considered as illustrative and not restrictive in character, it being understood that only the preferred embodiment has been shown and described and that all changes and modifications that come within the spirit of the invention are desired to be protected. In addition, all references cited herein are indicative of the level of skill in the art and are hereby incorporated by reference in their entirety.

What is claimed is:

1. A table tennis blade for playing table tennis with a ball, the blade comprising:
   - a handle;
   - a paddle extending from said handle having a first side and a second side;
   - one or more light sources mounted to the handle or the paddle that can be illuminated; and
   - a sensor mounted to the handle or the paddle, said sensor in communication with the one or more light sources and configured to cause the light to illuminate upon sensing a triggering event.

2. The table tennis blade of claim 1, wherein said sensor is an audio sensor.

3. The table tennis blade of claim 1, wherein said sensor is a piezoelectric sensor.

4. The table tennis blade of claim 1, wherein said sensor is a vibration sensor.

5. The table tennis blade of claim 1, wherein said sensor is an accelerometer.

6. The table tennis blade of claim 1, wherein said triggering event comprises contact between said table tennis blade and the ball.

7. The table tennis blade of claim 1, wherein said triggering event comprises acceleration of the table tennis paddle.

8. The table tennis blade of claim 1, further comprising:
   - a first sheet of rubber mounted to the first side of the paddle;
   - and
   - a second sheet of rubber mounted to the second side of the paddle.

9. The table tennis blade of claim 1, wherein said one or more light sources comprise a light emitting diode.

10. The table tennis blade of claim 1, wherein said one or more light sources comprise a red, green, and blue light source.

11. The table tennis blade of claim 1, further comprising:
   - a first semi-transparent sheet mounted to a first side of the paddle, said one or more light sources mounted beneath the first semi-transparent sheet.

12. The table tennis blade of claim 11, further comprising:
   - a second semi-transparent sheet mounted to the second side of the paddle, the one or more light sources mounted beneath the second semi-transparent sheet.

13. The table tennis blade of claim 1, further comprising:
   - a battery mounted in the handle, said battery in communication with the sensor.

14. The table tennis blade of claim 1, further comprising:
   - a battery mounted in the handle, said battery in communication with the light.

15. The table tennis blade of claim 1, wherein the sensor is mounted to the handle.

16. The table tennis blade of claim 1, further comprising one or more fiber optic cables or strands.

17. The table tennis blade of claim 1, wherein said sensor can detect the location where the ball strikes the table tennis blade and one or more light sources are illuminated at or adjacent to the location where the ball strikes the table tennis blade.

18. A table tennis blade for playing table tennis with a ball, the blade comprising:
   - a handle;
   - a paddle extending from said handle having a first side and a second side; and
   - wherein said table tennis blade comprises at least one LED or LCD display.
19. The table tennis blade of claim 18, wherein the at least one LED or LCD display has a pixel density of greater than or equal to 5 pixels per inch.

20. A table tennis blade for playing table tennis with a ball, the blade comprising:
   a handle;
   a paddle extending from said handle having a first side and a second side;
   at least one light source mounted to the handle or the paddle that can be illuminated;
   a battery;
   one or more switches in communication with said battery and said one or more light sources; and
   a sensor mounted to the handle or the paddle, the sensor in communication with the light and configured to cause the light to illuminate when the paddle strikes the ball.

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