

DEVICE AND METHOD FOR DETERRING A FLYING ANIMAL

Field of Invention

The present invention relates to a device for deterring a flying animal, a method of manufacturing the same and a method of using the same.

5 Background Art

The following discussion of the background to the invention is intended to facilitate an understanding of the present invention only. It should be appreciated that the discussion is not an acknowledgement or admission that any of the material referred to was published, known or part of the common general knowledge of the person
10 skilled in the art in any jurisdiction as at the priority date of the invention.

The presence of flying animals such as birds can be undesirable. For instance, birds may land on a table which is situated outside a restaurant. As such, the table may be soiled by bird droppings and need to be cleaned before the table can be used.
15 Alternatively, if food is found on the table, birds may be attracted to the food and contact the food, thereby making the food undesirable for human consumption. Consequently, there is a need to deter birds from landing on the table or moving towards the table, particularly when food is present on the table.

20 There are various devices and methods for deterring birds from landing on a structure, such as a table. Depending on the type of bird to be deterred and/or site of installation, the design of such devices may vary. For example, bird spikes can be used to prevent birds from perching and roosting on the structure. However, bird spikes may be impractical, unsightly or cannot be removed or replaced easily. Furthermore, bird
25 spikes may be dangerous to children because of some spikes.

Alternatively, solar powered bird repelling devices may be employed. However, such devices may suffer from various disadvantages such as, a larger form factor because of the amount of space occupied by the device, higher cost and the need for solar
30 energy.

In light of the above, there exists a need to develop a device for deterring birds that ameliorates or overcomes the above disadvantages.

5 The present invention seeks to provide a device for deterring birds, a method of manufacturing the device and a method of using the device that addresses the aforementioned need at least in part.

Summary of the Invention

10 In an aspect of the invention, there is provided a device for deterring a flying animal, the device comprising: a main support structure; a spinner connected to the main support structure; wherein the spinner comprises an arm; and wherein the ratio of the length of the arm to the length of the main support structure is less than 1.

Preferably, the ratio of the length of the arm to the length of the main support structure is 29:30.

15 Preferably, the main support structure comprises a base and a stand connected to the base, wherein the spinner is configured to rotate the arm at an angle relative to the stand.

Preferably, the angle is about 45 degrees.

Preferably, the arm comprises a first portion and a second portion connected to the first portion, wherein the first portion is made of a substantially rigid material and wherein the second portion is made of a substantially flexible material.

20 Preferably, the substantially rigid material is a substantially rigid plastic and the substantially flexible material is steel.

Preferably, the arm further comprises a weight attached to a free end of the arm.

Preferably, the arm consists essentially of one portion that is made of a substantially flexible material.

25 Preferably, the stand is a tubular stand.

Preferably, the device further comprises a motor for rotating the spinner, wherein the motor is contained inside the stand.

Preferably, the device further comprises at least one battery as the only power source.

Preferably, the at least one battery is contained inside the stand.

- 5 Preferably, the device further comprises a switch component contained inside the stand, wherein the switch component is adapted to complete the circuit.

Preferably, the motor and the at least one battery are stacked on each other.

Preferably, the device further comprises a hollow compartment located between the motor and the at least one battery.

- 10 Preferably, the at least one battery is positioned directly above the base.

Preferably, the stand has a diameter and the base has a diameter, and wherein the ratio of the diameter of the base to the diameter of the stand is 3:1 or 1:1.

Preferably, the spinner is configured to rotate the arm at a speed of between 120 revolutions per minute (rpm) and 200 rpm, preferably 120 rpm.

- 15 Preferably, the spinner is configured to rotate the arm between a resting position and an extended position.

- In another aspect of the invention, there is provided a method of manufacturing a device for deterring a flying animal, the method comprising: connecting a spinner comprising an arm to a main support structure; and configuring the ratio of the length
20 of the arm to the length of the main support structure such that it is less than 1.

Preferably, the ratio of the length of the arm to the length of the main support structure is 29:30.

- Preferably, the main support structure comprises a base and a stand connected to the base, and the method further comprises adapting the stand to contain at least one
25 battery and a motor.

Preferably, the method further comprises adapting the stand such that the at least one battery is positioned directly above the base.

Preferably, the method further comprises configuring the spinner so that it rotates the arm at a speed of between 120 rpm to 200 rpm.

- 5 In another aspect of the invention, there is provided a method of using a device for deterring a flying animal, the method comprising: providing a device as described above on a structure or an area.

Other aspects of the invention will become apparent to those of ordinary skilled in the art upon review of the following description of specific embodiments of the invention
10 in conjunction with the accompanying drawings.

Brief Description of the Drawings

The present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

- Figure 1 illustrates a perspective view of a device in accordance with an embodiment
15 of the invention;
Figure 2 illustrates another perspective view of the device of Figure 1;
Figure 3 illustrates a side view of the device of Figure 1;
Figure 4 is a photograph of a device in accordance with another embodiment of the invention;
20 Figure 5A is a cross-sectional view of the device of Figure 1;
Figure 5B is a cross-sectional view of a device in accordance with another embodiment of the invention;
Figure 5C is another cross-sectional view of the device of Figure 5B;
Figure 6 is a top view of the device of Figure 1;
25 Figure 7 is a bottom view of the device of Figure 1;
Figure 8 is an enlarged view of the spinner (made up of the flywheel and the arm) in accordance with an embodiment of the invention;
Figure 9A illustrates a perspective view of an assembly (or spinner assembly) comprising a flywheel and an arm connected to the flywheel via a hinge; and
30 Figure 9B illustrates another perspective view of the assembly of Figure 9A.

Other arrangements of the invention are possible and, consequently, the accompanying drawings are not to be understood as superseding the generality of the preceding description of the invention.

Description of Embodiments of the Invention

- 5 Particular embodiments of the present invention will now be described with reference to the accompanying drawings. The terminology used herein is for the purpose of describing particular embodiments only and is not intended to limit the scope of the present invention. Other definitions for selected terms used herein may be found within the detailed description of the invention and apply throughout the description.
- 10 Additionally, unless defined otherwise, all technical and scientific terms used herein have the same meanings as commonly understood by one of ordinary skill in the art to which this invention belongs. Where possible, the same reference numerals are used throughout the figures for clarity and consistency.

- Throughout the specification, unless the context requires otherwise, the word
- 15 “comprise” or variations such as “comprises” or “comprising”, will be understood to imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

- Furthermore, throughout the specification, unless the context requires otherwise, the word “include” or variations such as “includes” or “including”, will be understood to
- 20 imply the inclusion of a stated integer or group of integers but not the exclusion of any other integer or group of integers.

- As used herein, the term “about” typically means +/- 5% of the stated value, more typically +/- 4% of the stated value, more typically +/- 3% of the stated value, more typically +/- 2% of the stated value, even more typically +/- 1% of the stated value, and
- 25 even more typically +/- 0.5% of the stated value.

As used herein, the term “connected” is intended to include both a direct connection (in which two components or a part thereof are connected to each other contact each other) and indirect connection (in which at least one additional component is located between the two components or a part thereof).

As used herein, the term “collapsible” refers to the ability of the spinner or a part thereof (such as an arm 42) to move between an extended position and a resting position (such as a stationary position). In other words, the spinner or a part thereof is capable of moving from a resting position towards an extended position and/or from the extended position towards the resting position. For instance, the spinner may comprise the flywheel 40 and the arm 42, and the spinner may be configured such that a centrifugal force generated by movement (such as rotation) of the flywheel 40 causes the arm 42 to extend outwards, and when the centrifugal force is reduced or removed, the arm 42 moves inwards (or towards) the main support structure or a part thereof (such as a stand 20). In other words, the arm 42 is operable to move between an extended position, which is a position when the centrifugal force is present, and a resting position, which is a position when the centrifugal force is absent.

As used herein, the term “diameter” when used in the context of a base or a stand refers to a measurement of the base or the stand from one side of the base or the stand to its other side. For example and as illustrated in Figure 3, the diameter of the base 30 is the measurement between D1 and D1', which represents the measurement of one side of the base 30 to the other side. For example and as illustrated in Figure 3, the diameter of the stand 20 is the measurement between D2 and D2', which represents the measurement of one side of the stand 20 to the other side.

As used herein, the term “flywheel” refers to a mechanical component capable of efficiently storing rotational energy. In various embodiments, the amount of rotational energy stored in a flywheel may be proportional to the square of its rotational speed.

As used herein, the term “length” when used in the context of an arm or a main support structure refers to a measurement of the arm or the main support structure along a longitudinal axis. For example and as illustrated in Figure 3, the length of the main support structure is the combined length of the stand 20 and the base 30, which is denoted by the measurement between L1 and L1'. For example and as illustrated in Figure 3, the length of the arm 42 is denoted by the measurement between L2 and L2', which represents the measurement of one end of the arm 42 (such as a first end connected to a flywheel 40) to the other end (such as a second end connected to a weight 50).

As used herein, the term “outwards” refers to a direction which is away from the main support structure or a part thereof, such as the stand 20. In various embodiments, the direction is also towards a plane that is parallel to the base 30. Consequently, the deterrence coverage may be comparable, increased or maximized compared to prior art device(s).

Exemplary, non-limiting embodiments of a device for deterring a flying animal such as a bird or an insect will now be disclosed using device 10 as an illustration. Furthermore, food will be used as a non-limiting example of an object which is to be protected from the flying animal, i.e. a protected object. As will be explained in greater detail below, various embodiments of the device 10 may advantageously play a role in achieving a relatively small form factor (or smaller form factor), comparable or more effective bird deterring ability, relatively low cost of production and maintenance, and portability.

In an aspect of the invention, there is provided a device for deterring a flying animal, the device comprising: a main support structure, a spinner (or rotatable means) connected to the main support structure, wherein the spinner comprises an arm, and wherein the ratio of the length of the arm to the length of the main support structure is less than 1. In accordance with an embodiment of the invention and as shown in Figures 1 to 8, 9A and 9B, there is a device 10 for deterring a flying animal, the device 10 comprising a stand 20 extending from a base 30; a flywheel 40 connected to the stand 20; and an arm 42 connected to the flywheel 40. In various embodiments, the stand 20 and the base 30 form the main support structure. In various embodiments, the flywheel 40 and the arm 42 form the spinner. In various embodiments, the ratio of the length of the arm 42 to the length of the main support structure is less than 1. In other words, the arm 42 comprises a length slightly shorter than a length of the main support structure.

In various embodiments, there is an assembly (or spinner assembly) comprising a flywheel 40 and an arm 42 connected to the flywheel 40 via a hinge 46. In various embodiments, the flywheel 40 and the arm 42 form the spinner, wherein the spinner is self-collapsible (i.e. a collapsible spinner). The spinner is configured such that the centrifugal force generated by the flywheel 40 (when in operation) causes the arm 42 to extend outwards, and when the centrifugal force is reduced or removed, the arm 42 collapses towards the main support structure by virtue of its weight. In other words,

the spinner is configured such that a centrifugal force generated by movement (such as rotation) of the flywheel 40 causes the arm 42 to extend outwards, and when the centrifugal force is reduced or removed, the arm 42 moves inwards (or towards) the stand 20. Consequently, the arm 42 moves towards an extended position when the centrifugal force is present and moves towards a resting position when the centrifugal force is reduced or removed. Movement between the extended position and the resting position may therefore be achieved without the need for a user to manually extend the arm 42 during installation. In contrast, prior art devices may require a user to manually extend at least one arm during installation. More advantageously, the arm 42 is capable of moving towards a plane that is parallel to the base 30. Consequently, the deterrence coverage of the device 10 may be at least comparable to a prior art device.

In various embodiments, the spinner is connected to the main support structure. In various embodiments, the flywheel 40 is rotationally connected to the stand 20 via a connecting means 22. In various embodiments and as illustrated in Figure 9A and 9B, the flywheel 40 may further comprise a ring 44 adapted to allow the flywheel 40 to rotate. In various embodiments, the arm 42 is connected to the flywheel 40 via the hinge 46. In various embodiments and as illustrated in Figure 8, the hinge 46 comprises two loops 46a extending from a surface of the flywheel 40, wherein the two loops 46a are adapted to receive a pin 46b. In various embodiments, the arm 42 comprises a first end 42a and a second end 42b, wherein the first end 42a is located nearer to the flywheel 40 and the first end 42a is adapted to receive the pin 46b. For instance, and as illustrated in Figure 8, the first end 42a comprises a loop that is adapted to receive the pin 46b. As such, the pin 46b may be inserted through the two loops 46a and the loop at the first end 42a to form the hinge 46. Consequently, the spinner is configured such that the centrifugal force generated by rotation of the flywheel 40 results in the movement of the arm 42 towards the extended position, and when the centrifugal force is reduced or removed, the arm 42 moves towards the resting position. As such, the flywheel 40 may rotate about the connecting means 22, thereby causing the arm 42 to rotate at an angle α measured from the stand 20 (i.e. the length of the stand 20 is at 0 degrees). In other words, the arm 42 is at the extended position. In various embodiments, when the arm 42 is not rotated, the arm 42 is at the resting position. As such, the arm 42 does not extend outwards at all times, such as at an angle α of about 90 degrees, particularly when not in use. Consequently, the

device 10 may take up less space than prior art devices that have at least one arm that is extended outwards at all times, such as at an angle α of about 90 degrees, even when not in use. Advantageously, a centrifugal force may be generated due to the rotating motion (or spinning) of the arm 42. Consequently, the centrifugal force may cause the arm 42 to extend outwards. In various embodiments, if an object such as a bird or a cup is present, the arm 42 may move downwards (or drop) upon contacting the object, and subsequently pick up speed and return to its initial speed until it contacts another object. This ensures that no object will completely halt or stop the spinning of the arm 42. Advantageously, the rotation of the arm 42 may be capable of scaring birds away from a structure, such as but not limited to, a table. Alternatively or in addition, the rotation of the arm 42 may be capable of scaring birds away from an area in which the presence of birds is not desired, such as but not limited to, a piece of land where crops are grown such as a cultivated area, an outdoor dining area such as a part of a restaurant or a backyard, and an area with birds habituated to feeding on leftover food. Furthermore, the rotation of the arm 42 may generate a stream of wind which may have a cooling effect. Such a cooling effect may be advantageous when the temperature at the structure and/or the area is relatively high.

In various embodiments and as illustrated in Figure 1, the angle α is between 0 degrees and about 90 degrees, such as about 40 degrees, about 45 degrees, about 50 degrees, or about 90 degrees. In various embodiments, the arm 42 may be rotated such that it is almost horizontal relative (or substantially parallel) to the base 30. In various embodiments, the angle α may be an acute angle, such that the angle is less than 90 degrees. Advantageously, the angle α allows the arm 42 to more effectively deter a bird compared to a prior art device which has at least one arm that is configured to rotate at a right angle (i.e. 90 degrees) to a stand. This may be because the bird may move in a manner which allows it to go below the arm, thereby avoiding contact with the arm.

In various embodiments, the ratio of the length of the arm 42 to the length of the main support structure is less than 1. In various embodiments, the ratio of the length of the arm 42 to the length of the main support structure is about 30:30 (i.e. about 1:1 or almost 1:1). In various embodiments, the ratio of the length of the arm 42 to the length of the main support structure is about 30:30, such as 29:30, 28:30, 27:30, 26:30 or

25:30. In various embodiments, the ratio of the length of the arm 42 to the length of the main support structure is 29:30. Advantageously, when the ratio of the length of the arm 42 to the length of the main support structure approximately 30:30, maximum deterrence coverage may be achieved with a relatively small form factor. In various
5 embodiments, the main support structure comprises the stand 20 and the base 30. Advantageously, the long arm 42 relative to the main support structure may maximise the deterrence coverage over the structure or the area. As used herein, the term “deterrence coverage” refers to the ability of a component of the device 10 to discourage a bird from landing or moving towards the structure or the area. For
10 instance, a relatively long arm 42 compared to the main support structure may discourage a bird from landing or moving towards a larger extent (or larger proportion) of the structure or the area. More advantageously, the arm 42 does not have a greater length than the main support structure. As such, the device 10 may have a relatively small form factor and still be able to effectively deter birds.

15 In various embodiments, the arm 42 may be modified such that the angle α is selectively adjusted for deterring a particular size of bird. In various embodiments, the arm 42 may be modified so that it is made of at least one material such as plastic, plastic composite, metal, metal alloy or fabric.

In various embodiments, the arm 42 may be modified such that it further comprises a
20 weight 50 attached to an end of the arm 42. This is illustrated in Figure 2, wherein the weight 50 is attached to the second end 42b of the arm 42. Advantageously, the weight 50 may exert a downward force so that the arm 42 may extend outwards when rotating and therefore maximise the deterrence coverage over the structure or the area. Furthermore, the angle α may be smaller and within the range described above,
25 thereby making the device 10 more effective for deterring smaller birds which would otherwise be able to move under the arm 42 if the angle α were greater than the range described above. Alternatively, the weight 50 may be absent.

In various embodiments, the arm 42 may be modified such that the arm 42 may have a different width and weight along the entire length of the arm 42 or the arm 42 may
30 have a different width and weight at (or near) the two ends (42a, 42b) of the arm 42. For instance, the width of the second end 42b may be greater than the width of the first end 42a, thereby making the weight of the second end 42b greater than the weight

of the first end 42a. When the weight of the second end 42b is greater than the first end 42a, the angle α may be smaller and within the range described above, thereby making the device 10 more effective for deterring smaller birds which would otherwise be able to move under the arm 42 if the angle α were greater than the range described above. In various embodiments, the arm 42 may have the same width and weight along the entire length of the arm 42.

In various embodiments, the arm 42 may be modified such that it comprises a first portion and a second portion connected to the first portion. As such, the first portion is positioned between the flywheel 40 and the second portion.

In various embodiments, the first portion is made of a substantially rigid material and the second portion is made of a substantially flexible material. Consequently, the second portion of the arm 42 may bend (or curve) and/or move downwards (or drop) upon contacting an object, and subsequently pick up speed and return to its initial speed. In addition, the second portion of the arm 42 may revert to its original form (such as a substantially straight form) instead of remaining bent (or curved), thereby maintaining the deterrence coverage and preventing it from coiling around the object. As used herein, the term “substantially rigid” refers to the ability of the material to retain its original shape and size under application of an external force, such as a centrifugal force which may be generated when the arm 42 rotates. In various embodiments, the substantially rigid material may be at least one of plastic, plastic composite, metal or metal alloy. As used herein, the term “flexible” refers to the ability of the material to fold or bend upon contact with an object and/or under application of an external force, such as a centrifugal force which may be generated when the arm 42 rotates, and subsequently picking up speed and returning to its initial speed. In various embodiments, the substantially flexible material may be at least one of plastic, plastic composite, metal, metal alloy or fabric. In various embodiments, the second portion may be made of a different material from the first portion. For instance, the second portion may be made of a metal alloy such as steel and the first portion may be made of a substantially rigid plastic. Advantageously, the second portion may have a thickness of about 0.5 mm. Alternatively, the second portion may be made of a substantially flexible plastic while the first portion may be made of a substantially rigid plastic. In various embodiments, the substantially rigid plastic may be high-density

polyethylene or polypropylene. In various embodiments, the substantially flexible plastic may be low density polyethylene or polyvinyl chloride. In various embodiments, additives may be used to make the plastic substantially rigid or substantially flexible.

In various embodiments, the arm 42 consists essentially of one portion. In various
5 embodiments, the one portion of the arm 42 is made of a substantially flexible material. In various embodiments, the substantially flexible material may be at least one of plastic, plastic composite, metal, metal alloy or fabric. In various embodiments, the arm 42 consists essentially of one portion that is made predominantly or completely of flexible plastic. Advantageously, the arm 42 may be flexible and have the ability to
10 recover its initial speed after contact with an object.

In various embodiments, the arm 42 is made of a substantially flexible material that is also lightweight. As such, the arm 42 may be relatively lighter (or have a relatively small weight). Consequently, the arm 42 may be collapsible and may achieve a relatively small form factor. In various embodiments, the arm 42 may have minimal
15 weight so that the arm 42 may be collapsible and may achieve a relatively small form factor.

In various embodiments, the device 10 further comprises a motor (such as a motor 26) for rotating the spinner. In various embodiments, the motor 26 is adapted to rotate the flywheel 40. In various embodiments, the motor 26 is connected to the flywheel 40
20 via the connecting means 22. In various embodiments and as illustrated in Figures 5A, 5B and 5C, the motor 26 is positioned below the flywheel 40. In various embodiments, the device 10 further comprises a switch component 25 which completes the circuit. In various embodiments, the flywheel 40 consists of one arm 42. Advantageously, one arm 42 is sufficient to effectively deter birds because of the synergistic effect of various
25 embodiments of the device 10. For instance, the angle α , the relatively long arm 42 and the speed of rotation of the arm 42 may lead to a device 10 having a relatively small form factor, comparable or more effective bird deterring ability and portability. However, there may be more than one arm, such as two arms or three arms. In various embodiments, when a device 10' comprises more than one arm 42', a stronger motor
30 26' may be required to achieve the same speed of rotation and/or same angle α because the combined weight of the more than one arm 42' may have a relatively greater weight compared to a device 10 having one arm 42. In contrast, if each arm

42' of the device 10' were made using a more lightweight material or each arm 42' were made thinner i.e. smaller width which corresponds to smaller weight, the arm 42' may be brittle and break when the device 10' is in operation, or have a negligible effect upon contact with a bird due to the lesser force of each arm 42'. Consequently, the device 10' may not be able to effectively deter birds.

In various embodiments, the spinner and/or the flywheel 40 is configured to rotate the arm 42 at a speed of about 120 revolutions per minute (rpm) to about 200 rpm. In various embodiments, the speed of rotating the arm 42 is about 120 rpm. Advantageously, the speed of rotating the arm 42 affects the bird deterring ability of the device 10 and may result in comparable or more effective bird deterring ability compared to prior art devices. This is because the speed of rotating the arm 42 may affect the angle α . As mentioned above, when the arm 42 is not rotated (i.e. at a resting position), the arm 42 is positioned downwards relative to the top of the stand 20. As such, the arm 42 does not extend outwards at all times, thereby taking up less space than prior art devices, particularly when not in use. Depending on the speed of rotating the arm 42, the arm 42 may moves upward during the rotation. As such, the angle α may be between 0 degrees and about 90 degrees, such as about 40 degrees, about 45 degrees, about 50 degrees or about 90 degrees. In various embodiments, the arm 42 may be rotated such that it is substantially parallel to the base 30. In various embodiments, the angle α may be an acute angle, such that the angle is less than 90 degrees. In various embodiments, the relatively fast rpm in comparison to prior devices would have a stronger deterrence effect because birds may have more difficulty retrieving food that is located within the deterrence coverage without being contacted by the arm 42.

In various embodiments, the device 10 does not make use of solar energy. Instead, the device 10 may be direct current (DC) powered. As such, the device 10 may be used in all weather conditions, such as in the absence of sunlight, and may be placed under a structure such as an umbrella. Furthermore, the device 10 may be relatively cheaper to produce because the use of expensive solar/photovoltaic cells is avoided.

In addition, solar/photovoltaic cells may require maintenance and/or may have low efficiency. Advantageously, the device 10 may have a relatively small form factor due to the lack of solar/photovoltaic cells. In particular, devices making use of solar energy

may require a solar panel or equivalent means to obtain solar energy. Due to the significant size of the solar panel or equivalent means required to generate sufficient solar energy, the form factor of solar-powered devices may be larger than device 10.

In various embodiments, the main support structure is adapted to contain at least one battery 28. In various embodiments, the at least one battery 28 is the only power source and may be a rechargeable battery, an alkaline battery, a lithium battery or the like. For instance, the stand 20 is adapted to contain the at least one battery 28. Alternatively, the base 30 is adapted to contain the at least one battery 28.

In various embodiments, the main support structure is adapted to contain the motor 26. For instance, the stand 20 is adapted to contain the motor 26. Alternatively, the base 30 is adapted to contain the motor 26.

In various embodiments, the stand 20 may be a housing which is substantially hollow so as to define a compartment 24. Consequently, the compartment 24 may be adapted to contain the motor 26, a switch component 25, and/or at least one battery 28 (28a, 28b) for driving the motor 26. In various embodiments, the switch component 25, the motor 26 and/or the at least one battery 28 are stacked on each other such that they are contained inside (or within) the stand 20. In various embodiments, the switch 25, the motor 26 and the at least one battery 28 may be stacked on each other. In various embodiments, the motor 26 is positioned on top of the switch 25 and the at least one battery 28. Consequently, the motor 26 may be in contact with the flywheel 40 to drive the same. In various embodiments, the position of the switch 25 and the at least one battery 28 may be interchanged such that either the switch 25 or the at least one battery 28 is directly next to (or adjacent) the motor 26. In other words, the motor 26 may be in contact with the switch 25 or the at least one battery 28. Consequently, the switch component 25, the motor 26 and/or the at least one battery 28 are arranged in parallel with each other and along the same axis. In various embodiments, the stand 20 is a tubular stand. As such, when the switch component 25, the motor 26 and/or the at least one battery 28 are stacked on each other within the stand, the device 10 may have a relatively small form factor and greater portability compared to prior art devices. Furthermore, the device 10 makes use of a more reliable power source compared to prior art devices that may make use of wind or solar energy.

In various embodiments and as illustrated in Figure 5A, the at least one battery 28, the switch component 25 and the motor 26 are contained inside (or within) the stand 20 and the at least one battery 28a, 28b is arranged such that battery 28a is positioned directly above the switch component 25, battery 28b is positioned directly above battery 28a and the motor 26 is positioned directly above battery 28b. In other words, the switch component 25 is adjacent to the battery 28a, the battery 28b is adjacent to the battery 28a and the motor 26 is adjacent to the battery 28b. In various embodiments, the motor 26 is positioned below the flywheel 40. In other words, the motor 26 is adjacent to the flywheel 40. As such, the device 10 may have a relatively small form factor and greater portability compared to prior art devices. Furthermore, the device 10 makes use of a more reliable power source compared to prior art devices that may make use of wind or solar energy.

In various embodiments and as illustrated in Figures 5B and 5C, the at least one battery 28, the switch component 25 and the motor 26 are contained inside (or within) the stand 20 and the at least one battery 28a, 28b is arranged such that battery 28a is positioned directly above the base 30, battery 28b is positioned directly above battery 28a, a hollow compartment 32 is positioned directly above battery 28b, the switch component 25 is positioned directly above the hollow compartment 32, and the motor 26 is positioned directly above the switch component 25. In other words, the battery 28b is adjacent to the battery 28a, the hollow compartment 32 is adjacent to the battery 28b, the switch component 25 is adjacent to the hollow compartment 32 and the motor 26 is adjacent to the hollow compartment 32. In various embodiments, the motor 26 is positioned below the flywheel 40. In other words, the motor 26 is adjacent to the flywheel 40. In various embodiments, the hollow compartment 32 is adapted to contain wiring between the at least one battery 28 and the switch component 25. As such, the device 10 may have a relatively small form factor and greater portability compared to prior art devices. Furthermore, the device 10 makes use of a more reliable power source compared to prior art devices that may make use of wind or solar energy. In addition, when the at least one battery 28 is positioned nearer to the base 30, the device 10 may have greater stability because the center of mass of the device 10 is shifted to the lower half of the device 10. Furthermore, it may be easier to replace the at least one battery 28. In some embodiments, the bottom of

device 10 may include a flap or cover which can be arranged to be opened or closed for removal of the at least one battery 28.

In various embodiments, the device 10 may be activated by pushing the flywheel 40 in a downward direction (or pressing), thereby locking the flywheel 40 in a position closer to the motor 26 and completing the contact between the at least one battery 28 and the motor 26. In addition, pressing the flywheel 40 again may disconnect or remove the contact between the at least one battery 28 and the motor 26. Consequently, the flywheel 40 will move in an upward direction and rise to its original position. Advantageously, activation of the device 10 in the manner described may be easy for a user to understand and may increase convenience for a user, which adds to the attractiveness of the device 10 as an easy and convenient way to deter birds from an area with minimal effort and technical knowledge on the part of the user..

In various embodiments, the device 10 may further comprise a timer configured to control the switch, thereby extending the battery life of the at least one battery 28. The timer may be configured to turn off device 10 after a period of time, such as but not limited to 20 minutes, 30 minutes, 1 hour, 5 hours, 10 hours, 24 hours. As such, the timer may allow a user to schedule the operating time of the device 10.

In various embodiments, the stand 20 has a diameter and the base 30 has a diameter, and wherein the ratio of the diameter of the base 30 to the diameter of the stand 20 is 3:1. Consequently, the device 10 is not easily knocked over due to the relatively larger base 30. In various embodiments, the ratio of the diameter of the base 30 to the diameter of the stand 20 is about 1:1 (or almost 1:1). For instance, the ratio of the diameter of the base 30 to the diameter of the stand 20 is about 1:1 when the device 10 is secured to a surface of a structure, such as a table top. In various embodiments, when the ratio of the diameter of the base 30 to the diameter of the stand 20 is about 1:1, the diameter of the base 30 is almost identical to that of the stand 20, thereby allowing more space for placement of food. In various embodiments, the base 30 may be made of a weighted metal plate. In various embodiments, an adhesive means such as double sided tape may be used to adhere the base 30 to the structure or the area.

In various embodiments, the device 10 may further comprise a lock (or catch) for securing the device 10 to the structure or the area. Advantageously, the catch may

prevent the device 10 from being moved or stolen. In various embodiments, the catch may comprise a lockable catch that may be incorporated into a removable base (not shown), wherein the removable base may be connected to the base 30. In various embodiments, the lockable catch may be locked or unlocked using a key.

- 5 In various embodiments, each component of the device 10 may be made from a material that is independent of each other. Such a material may comprise at least one of plastic, plastic composite, metal, metal alloy, wood, leather or fabric. For instance, the stand 20 may be made of plastic, metal or metal alloy. Depending on the material used for the particular component, the component may have desirable characteristics
- 10 such as being lightweight, substantially rigid, substantially flexible, durable and/or stiff. Advantageously, as one or more components of the device 10 may be lightweight, the device 10 may be portable and carried by a human being with average strength. For instance, when plastic is used to make one or more components of the device 10, the device 10 may be lightweight and portable.
- 15 In various embodiments, one or more components of the device 10 may be easily replaced at a low cost. As such, the device 10 may have a relatively low cost of maintenance.

In another aspect of the invention, there is provided a method of manufacturing a device 10 for deterring a flying animal, the method comprising: connecting a spinner

20 comprising an arm 42 and a flywheel 40 to a main support structure; and configuring the ratio of the length of the arm 42 to the length of the main support structure such that it is less than 1.

In various embodiments, the main support structure comprises a stand 20 and a base 30. As such, the method further comprises connecting the stand 20 to the base 30. In

25 various embodiments, the method further comprises connecting the flywheel 40 to the stand 20. In various embodiments, the method further comprises connecting the arm 42 to the flywheel 40.

In various embodiments, the ratio of the length of the arm 42 to the length of the main support structure is as described above.

In various embodiments, the method further comprises attaching a weight 50 to a free end of the arm 42.

In various embodiments, the device 10 does not make use of solar energy.

5 In various embodiments, the method further comprises installing at least one battery 28 as the only power source. In various embodiments, the method further comprises adapting the main support structure, such as the stand 20, so that it can contain at least one battery 28 for driving a motor 26 as described above. In various
10 embodiments, the method further comprises adapting the main support structure, such as the stand 20, to contain a switch component 25, at least one battery 28 and/or a motor 26 so that they are arranged in the manner described above.

In various embodiments, the stand 20 has a diameter and the base 30 has a diameter, and wherein the ratio of the diameter of the base 30 to the diameter of the stand 20 is as described above.

15 In various embodiments, the method further comprises injection moulding. In various embodiments, injection moulding is used to manufacture at least one component of the device 10.

In various embodiments, the method further comprises 3D printing. In various embodiments, 3D printing is used to manufacture at least one component of the device 10.

20 In various embodiments, the method further comprises configuring the spinner and/or the flywheel 40 so that it rotates the arm 42 at a speed of between 120 rpm to 200 rpm. In various embodiments, the speed of rotating the arm 42 is about 120 rpm. Consequently, controlling the speed of rotating the arm 42 may affect the bird deterring ability of the device 10. Advantageously and as explained above, the device 10 may
25 have comparable or more effective bird deterring ability compared to prior art devices. Furthermore, the device 10 may avoid or minimize the need for intervention by a user because the user does not need to manually extend the arm 42 during installation of the device 10. As such, the assembly of the device 10 may be relatively faster, easier and straightforward compared to prior art devices.

In various embodiments, the method further comprises configuring the spinner or a part thereof so that the spinner is collapsible.

In another aspect of the invention, there is provided a method of using a device for deterring a flying animal, the method comprising: providing a device as described
5 above on a structure or an area.

In various embodiments, the rotation of the arm 42 may be capable of scaring birds away from the structure, such as but not limited to, a table. In various embodiments, the rotation of the arm 42 may be capable of scaring birds away from the area, such as but not limited to, a piece of land where crops are grown such as a cultivated area,
10 an outdoor dining area such as a part of a restaurant or a backyard, and an area with birds habituated to feeding on leftover food.

It will be apparent that various other modifications and adaptations of the invention will be apparent to the person skilled in the art after reading the foregoing disclosure without departing from the spirit and scope of the invention. It is intended that all such
15 modifications and adaptations come within the scope of the appended claims.

Further, it is to be appreciated that features from various embodiment(s), may be combined to form one or more additional embodiments.

Claims

1. A device for deterring a flying animal, the device comprising:
 - a main support structure;
 - 5 a spinner connected to the main support structure;
 - wherein the spinner comprises an arm; and
 - wherein the ratio of the length of the arm to the length of the main support structure is less than 1.
- 10 2. The device of claim 1, wherein the ratio of the length of the arm to the length of the main support structure is 29:30.
3. The device of claim 1 or 2, wherein the main support structure comprises a base and a stand connected to the base, and wherein the spinner is configured to rotate the arm at an angle relative to the stand.
4. The device of claim 3, wherein the angle is about 45 degrees.
- 15 5. The device of any one of the preceding claims, wherein the arm comprises a first portion and a second portion connected to the first portion, wherein the first portion is made of a substantially rigid material and wherein the second portion is made of a substantially flexible material.
- 20 6. The device of claim 5, wherein the substantially rigid material is a substantially rigid plastic and the substantially flexible material is steel.
7. The device of any one of the preceding claims, wherein the arm further comprises a weight attached to a free end of the arm.
8. The device of any one of claims 1 to 4, wherein the arm consists essentially of one portion that is made of a substantially flexible material.
- 25 9. The device of any one of claims 3 to 8, wherein the stand is a tubular stand.

10. The device of any one of claims 3 to 9, further comprising a motor for rotating the spinner, and wherein the motor is contained inside the stand.

11. The device of claim 10, further comprising at least one battery as the only power source.

5 12. The device of claim 11, wherein the at least one battery is contained inside the stand.

13. The device of claim 11 or 12, further comprising a switch component contained inside the stand, wherein the switch component is adapted to complete the circuit.

10 14. The device of claim 11, wherein the motor and the at least one battery are stacked on each other.

15. The device of claim 14, further comprising a hollow compartment located between the motor and the at least one battery.

16. The device of claim 14 or 15, wherein the at least one battery is positioned directly above the base.

15 17. The device of claim 3, wherein the stand has a diameter and the base has a diameter, and wherein the ratio of the diameter of the base to the diameter of the stand is 3:1 or 1:1.

20 18. The device of any one of the preceding claims, wherein the spinner is configured to rotate the arm at a speed of between 120 revolutions per minute (rpm) and 200 rpm, preferably 120 rpm.

19. The device of any preceding claims, wherein the spinner is configured to rotate the arm between a resting position and an extended position.

20. A method of manufacturing a device for deterring a flying animal, the method comprising:

25 connecting a spinner comprising an arm to a main support structure; and

configuring the ratio of the length of the arm to the length of the main support structure such that it is less than 1.

21. A method of using a device for deterring a flying animal, the method comprising:

providing a device of any one of claims 1 to 19 on a structure or an area.