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Gardening trimmer

Abstract

A cam member includes an intermediate disk, a first eccentric cam disposed on an upper surface of the intermediate disk and connected to a first blade and a second eccentric cam disposed on a lower surface of the intermediate disk and connected to a second blade. A center of gravity of the first eccentric is positioned in a first direction from a rotation axis of the cam member. A center of gravity of the second eccentric cam is positioned in a second direction opposite to the first direction from the rotation axis. A center of gravity of an upper half of the intermediate disk is positioned in the second direction from the rotation axis. A center of gravity of lower half of the intermediate disk is positioned in the first direction from the rotation axis.

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Background/Summary

CROSS REFERENCE TO RELATED APPLICATIONS

(1) This application is a National Stage of International Application No. PCT/JP2020/026613 filed on Jul. 7, 2020, claiming priority based on Japanese Patent Application No. 2019-146335 filed on Aug. 8, 2019.

TECHNICAL FIELD

(2) The disclosure herein relates to gardening trimmers such as hedge trimmers and lawn mowers.

BACKGROUND

(3) Various types of gardening trimmers such as hedge trimmers and lawn mowers are known. In general, a gardening trimmer has a prime mover (such as an engine or a motor), a cam member configured to be rotated by the prime mover, and a pair of blades connected to the cam member. The pair of blades is configured to reciprocate in opposite phases to each other in accordance with rotation of the cam member. For example, Japanese Patent Application Publication No. 116-17434 describes an example of such a gardening trimmer.

SUMMARY

(4) The cam member includes a first eccentric cam connected to a first blade and a second eccentric cam connected to a second blade. The first and second eccentric cams are arranged along a rotation axis of the cam member, and are offset in opposite directions from each other with respect to the rotation axis of the cam member. With such a configuration, couple imbalance is inevitably present in the cam member, as a result of which unnecessary vibration and noise are generated

accompanying rotation of the cam member.
(5) In view of the aforementioned circumstance, the disclosure herein provides art to reduce couple imbalance in a cam member.
(6) An aspect of the art disclosed herein provides a gardening trimmer. This gardening trimmer comprises: a prime mover; a cam member configured to be rotated by the prime mover; and a first blade and a second blade connected to the cam member, the first blade and the second blade being configured to reciprocate in opposite phases to each other in accordance with rotation of the cam member. The cam member comprises: an intermediate disk: a first eccentric cam disposed on an upper surface of the intermediate disk and connected to the first blade; and a second eccentric cam disposed on a lower surface of the intermediate disk and connected to the second blade. A center of gravity of the first eccentric cam is positioned in a first direction from a rotation axis of the cam member, and a center of gravity of the second eccentric cam is positioned in a second direction opposite to the first direction from the rotation axis of the cam member. A center of gravity of an upper half of the intermediate disk proximate to the first eccentric cam is positioned in the second direction from the rotation axis of the cam member, and a center of gravity of a lower half of the intermediate disk proximate to the second eccentric cam is positioned in the first direction from the rotation axis of the cam member. Here, the upper and lower halves of the intermediate disk are assumed as having a dimension (that is, thickness) being the same as each other in a direction parallel to the rotation axis.
(7) In the aforementioned configuration, couple imbalance is deliberately given to the intermediate disk of the cam member, and couple imbalance caused by the first and second eccentric cams is at least partly cancelled by this couple imbalance given to the intermediate disk. Due to this, couple imbalance of the cam member as a whole is thereby reduced, and unnecessary vibration and noise accompanying rotation of the cam member can be reduced.

Description

BRIEF DESCRIPTION OF DRAWINGS
(1) FIG. **1** is a perspective view showing an outer appearance of a gardening trimmer **10** of an embodiment.
(2) FIG. **2** is a perspective view showing an internal mechanism of the gardening trimmer **10**.
(3) FIG. **3** is a perspective view showing the internal mechanism of the gardening trimmer **10** in a disassembled state.
(4) FIG. **4** is a side view showing a cam member **40** and a pair of blades **14**, **16**.
(5) FIG. **5** is a plan view of the cam member **40** and shows an upper surface **42***x* of an intermediate disk **42** and a first eccentric cam **44**.
(6) FIG. **6** is a bottom view of the cam member **40** and shows a lower surface **42***y* of the intermediate disk **42** and a second eccentric cam **46**.
(7) FIG. **7** is a cross-sectional view of the cam member **40**.
(8) FIG. **8** is a cross-sectional view of a cam member **40**A of a variant.
(9) FIG. **9** is a cross-sectional view of a cam member **40**B of another variant.
EMBODIMENTS
(10) In an embodiment of the art disclosed herein, the intermediate disk of the cam member may comprise at least one blind hole defined in a thickness direction of the intermediate disk (that is, a direction parallel to the rotation axis of the cam member). By defining such a blind hole in the intermediate disk, desired couple balance can be given to the intermediate disk. Here, the blind hole may be defined at where the first eccentric cam or the second eccentric cam is, or may be defined at a position separated away from the first eccentric cam and the second eccentric cam.
(11) In the aforementioned embodiment, the at least one blind hole may include a first blind hole

that passes through the first eccentric cam and extends to the intermediate disk. According to such a configuration, a mass of the first eccentric cam is reduced, by which couple imbalance caused by the first eccentric cam can be reduced.
(12) In addition to the above or as an alternative thereto, the at least one blind hole may include a second blind hole that passes through the second eccentric cam and extends to the intermediate disk. According to such a configuration, a mass of the second eccentric cam is reduced, by which couple imbalance caused by the second eccentric cam can be reduced.
(13) In an embodiment of the art disclosed herein, the at least one blind hole may be at least partially filled with a filler member that has a smaller density than a material of the intermediate disk. According to such a configuration, for example, fine adjustment may be made to couple imbalance of the intermediate disk, and rigidity of the cam member may be increased.
(14) In an embodiment of the art disclosed herein, the intermediate disk of the cam member may be constituted of at least two materials having different densities. According to such a configuration as well, the desired couple imbalance may be given to the intermediate disk of the cam member regardless of presence/absence the aforementioned blind hole.
(15) In an embodiment of the art disclosed herein, a center of gravity of the intermediate disk of the cam member may be positioned on the rotation axis of the cam member. However, as another embodiment, the center of gravity of the intermediate disk of the cam member may not necessarily be positioned on the rotation axis of the cam member.
(16) In an embodiment of the art disclosed herein, a diameter of the first eccentric cam may be equal to a diameter of the second eccentric cam. However, as another embodiment, the diameter of the first eccentric cam may not necessarily be equal to the diameter of the second eccentric cam.
(17) In an embodiment of the art disclosed herein, a distance from the rotation axis of the cam member to the center of gravity of the first eccentric cam may be equal to a distance from the rotation axis of the cam member to the center of gravity of the second eccentric cam. However, as another embodiment, the distance from the rotation axis of the cam member to the center of gravity of the first eccentric cam may not necessarily be equal to the distance from the rotation axis of the cam member to the center of gravity of the second eccentric cam.
(18) In an embodiment of the art disclosed herein, at least one of the first eccentric cam and the second eccentric cam may be connected to a corresponding one of the first blade and the second blade via at least one link. Alternatively, as another embodiment, at least one of the first eccentric cam and the second eccentric cam may be connected directly to its corresponding one of the first blade and the second blade.
(19) In an embodiment of the art disclosed herein, an entirety of the first eccentric cam may be disposed on the upper surface of the intermediate disk. In addition, an entirety of the second eccentric cam may be disposed on the lower surface of the intermediate disk. However, as another embodiment, at least one of the first eccentric cam and the second eccentric cam may radially stick out beyond the intermediate disk.
(20) Representative, non-limiting examples of the present disclosure will now be described in further detail with reference to the attached drawings. This detailed description is merely intended to teach a person of skill in the art further details for practicing aspects of the present teachings and is not intended to limit the scope of the present disclosure. Furthermore, each of the additional features and teachings disclosed below may be utilized separately or in conjunction with other features and teachings to provide improved gardening trimmers, as well as methods for using and manufacturing the same.
(21) Moreover, combinations of features and steps disclosed in the following detailed description may not be necessary to practice the present disclosure in the broadest sense, and are instead taught merely to particularly describe representative examples of the present disclosure.
(22) Furthermore, various features of the above-described and below-described representative examples, as well as the various independent and dependent claims, may be combined in ways that

are not specifically and explicitly enumerated in order to provide additional useful embodiments of the present teachings.

(23) All features disclosed in the description and/or the claims are intended to be disclosed separately and independently from each other for the purpose of original written disclosure, as well as for the purpose of restricting the claimed subject matter, independent of the compositions of the features in the embodiments and/or the claims. In addition, all value ranges or indications of groups of entities are intended to disclose every possible intermediate value or intermediate entity for the purpose of original written disclosure, as well as for the purpose of restricting the claimed subject matter.

(24) A gardening trimmer **10** of an embodiment will be described with reference to the drawings. The gardening trimmer **10** is a gardening tool that is primarily used for trimming hedges and trees, and is also called a hedge trimmer. As shown in FIG. **1**, the gardening trimmer **10** comprises a body **12** and a pair of blades **14**, **16** extending frontward from the body **12**. The pair of blades **14**, **16** is supported by a guide bar **18** fixed to the body **12**. The guide bar **18** extends frontward from the body **12** along the pair of blades **14**, **16**. The gardening trimmer **10** is configured to trim branches and leaves of hedges and trees by reciprocating the pair of blades **14**, **16** in opposite phases to each other.

(25) The pair of blades **14**, **16** includes a first blade **14** and a second blade **16**. The first blade **14** includes a plurality of cutting edges **14***a* along a front-rear direction. Each of the cutting edges **14***a* protrudes leftward or rightward from the first blade **14**. Similarly, the second blade **16** includes a plurality of cutting edges **16***a* along the front-rear direction. Each of the cutting edges **16***a* protrudes leftward or rightward from the second blade **16**. When the first blade **14** and the second blade **16** reciprocate in opposite phases, the cutting edges **14***a* of the first blade **14** and the cutting edges **16***a* of the second blade **16** repeatedly slide across each other. Due to this, branches and leaves of hedges for example are trimmed.

(26) The body **12** is configured to removably receive a battery pack **2**. That is, the gardening trimmer **10** of the present embodiment is a cordless power tool that uses the battery pack **2** as its power source. Here, the number of the battery pack **2** is not limited to one, and the gardening trimmer **10** may be configured to use two or more battery packs **2**. As another embodiment, the gardening trimmer **10** may be a power tool that is to be connected to an external AC or DC power source via a cable. Alternatively, the gardening trimmer **10** may be an engine-driven tool.

(27) As shown in FIGS. **1** and **2**, the body **12** includes a housing **20**, a cam casing **38** fixed to the housing **20**, and a motor **22** fixed to the cam casing **38** inside the housing **20**. The motor **22** is a prime mover for driving the pair of blades **14**, **16** and is configured to operate by power supplied from the battery pack **2**. A front grip **30** and a rear grip **32** are disposed on the housing **20**. These grips **30**, **32** are configured to be gripped by a user. Normally, the user grips the front grip **30** with his/her left hand and the rear grip **32** with his/her right hand to operate the gardening trimmer **10**.

(28) A drive switch **34** and an unlock switch **36** are disposed on the rear grip **32**. When the user operates the drive switch **34**, power is supplied from the battery pack **2** to the motor **22** and the motor **22** thereby drives the pair of blades **14**, **16**. However, in its normal state, the drive switch **34** is mechanically locked inside the housing **20**, and the mechanical lock of the drive switch **34** is released only when the unlock switch **36** is being operated. Due to this, the pair of blades **14**, **16** is prevented from being driven unintentionally by an erroneous operation on the drive switch **34**.

(29) As shown in FIGS. **3** and **4**, the gardening trimmer **10** comprises a cam member **40**. The cam member **40** is constituted of, but not particularly limited to, metal. The cam member **40** is positioned inside the cam casing **38** and is rotatably held by the cam casing **38**. The cam member **40** is connected to the motor **22** and is rotated by the motor **22**. The cam member **40** comprises an intermediate disk **42**, a first eccentric cam **44**, and a second eccentric cam **46**. The first eccentric cam **44** and the second eccentric cam **46** are fixed to the intermediate disk **42** and are configured to rotate integrally with the intermediate disk **42**. Although this is merely an example, in the cam

member **40** of the present embodiment, the first eccentric cam **44** and the second eccentric cam **46** are integral with the intermediate disk **42**.

(30) The first eccentric cam **44** is disposed on an upper surface **42***x* of the intermediate disk **42** and is offset in a first direction (rightward in FIG. **4**) from a rotation axis C of the cam member **40**. The first eccentric cam **44** is connected to the first blade **14** via a first link **60**. The first eccentric cam **44** may be directly connected to the first blade **14** without intervention of the first link **60**. The second eccentric cam **46** is disposed on a lower surface **42***y* of the intermediate disk **42** and is offset in a second direction (leftward in FIG. **4**) opposite to the first direction from the rotation axis C of the cam member **40**. The second eccentric cam **46** is connected to the second blade **16** via the second link **62**. The second eccentric cam **46** may also be directly connected to the second blade **16** without intervention of the second link **62**.

(31) With the above configuration, when the cam member **40** rotates by the motor **22**, the first eccentric cam **44** and the second eccentric cam **46** revolve about the rotation axis C of the cam member **40**. When the first eccentric cam **44** revolves, the first blade **14** connected to the first eccentric cam **44** reciprocates along the front-rear direction. Similarly, when the second eccentric cam **46** revolves, the second blade **16** connected to the second eccentric cam **46** reciprocates along the front-rear direction. In doing so, the first eccentric cam **44** and the second eccentric cam **46** revolve in opposite phases to each other, thus the first blade **14** and the second blade **16** also reciprocate in opposite phases to each other.

(32) Next, a detailed configuration of the cam member **40** will be described with reference to FIGS. **5**, **6**, and **7**. The intermediate disk **42** of the cam member **40** has a disk shape, and a center axis thereof matches the rotation axis C of the cam member **40**. A size of the intermediate disk **42** is sufficiently large such that an entirety of the first eccentric cam **44** is positioned on the upper surface **42***x* of the intermediate disk **42** and an entirety of the second eccentric cam **46** is positioned on the lower surface **42***y* of the intermediate disk **42**. A helical gear for engaging with the motor **22** is disposed on an outer circumferential surface **42***e* of the intermediate disk **42**. Further, the intermediate disk **42** has a plurality of through holes **43** defined therein for weight reduction of the cam member **40**. A center of gravity G**42** of the intermediate disk **42** is positioned on the rotation axis C of the cam member **40**.

(33) As aforementioned, the first eccentric cam **44** is offset in the first direction (rightward in FIG. **5**) from the rotation axis C of the cam member **40**. As such, a center of gravity G**44** of the first eccentric cam **44** is also positioned in the first direction from the rotation axis C of the cam member **40** (see FIG. **5**). On the other hand, the second eccentric cam **46** is offset in the second direction (leftward in FIG. **6**) from the rotation axis C of the cam member **40**. As such, a center of gravity G**46** of the second eccentric cam **46** is also positioned in the second direction from the rotation axis C of the cam member **40** (see FIG. **6**). Here, as shown in FIG. **7**, the center of gravity G**44** of the first eccentric cam **44** and the center of gravity G**46** of the second eccentric cam **46** are located at different positions from each other in a direction parallel to the rotation axis C of the cam member **40** (that is, in a thickness direction of the cam member **40**). Due to this, couple imbalance caused by the first eccentric cam **44** and the second eccentric cam **46** is present in the cam member **40**, and such couple imbalance becomes a factor that generates unnecessary vibration and noise accompanying rotation of the cam member **40**.

(34) In regard to the above problem, the cam member **40** of the present embodiment comprises a first blind hole **48** and a second blind hole **50**. The first blind hole **48** is defined in the first eccentric cam **44**. The first blind hole **48** has a depth by which it passes through the first eccentric cam **44** and reaches the intermediate disk **42**. However, the first blind hole **48** does not penetrate through the intermediate disk **42**. On the other hand, the second blind hole **50** is defined in the second eccentric cam **46**. The second blind hole **50** has a depth by which it passes through the second eccentric cam **46** and reaches the intermediate disk **42**. The second blind hole **50** does not penetrate through the intermediate disk **42**, either. According to such a configuration, a center of gravity

G**42***a* of an upper half **42***a* of the intermediate disk **42** proximate to the first eccentric cam **44** is positioned in the second direction (leftward in FIG. **7**) from the rotation axis C of the cam member **40**. Further, a center of gravity G**42***b* of a lower half **42***b* of the intermediate disk **42** proximate to the second eccentric cam **46** is positioned in the first direction (rightward in FIG. **7**) from the rotation axis C of the cam member **40**.

(35) Here, the upper half **42***a* and the lower half **42***a* of the intermediate disk **42** have a dimension (that is, thickness) being the same as each other in the direction parallel to the rotation axis C of the cam member **40**. That is, the upper half **42***a* and the lower half **42***a* of the intermediate disk **42** is provided by dividing the thickness of the intermediate disk **42** into two equal parts along a plane H perpendicular to the rotation axis C of the cam member **40**. The plane II shown in FIG. **7** is positioned at the center of the intermediate disk **42** in the thickness direction thereof, and matches a boundary between the upper half **42***a* and the lower half **42***a*.

(36) The center of gravity G**42***a* of the upper half **42***a* of the intermediate disk **42** and the center of gravity G**42***b* of the lower half **42***b* of the intermediate disk **42** are located at positions different from each other in the direction parallel to the rotation axis C of the cam member **40** (that is, in the thickness direction of the cam member **40**). Thus, couple imbalance is given deliberately to the intermediate disk **42** as well. As above, in the cam member **40** of the present embodiment, the couple imbalance is given deliberately to the intermediate disk **42** as well, and the couple imbalance caused by the first and second eccentric cams **44**, **46** is at least partly cancelled by the couple imbalance of the intermediate disk **42**. Due to this, couple imbalance of the cam member **40** as a whole is improved, and the unnecessary vibration and noise accompanying the rotation of the cam member **40** can be reduced.

(37) In the present embodiment, the first blind hole **48** passes through the upper half **42***a* of the intermediate disk **42** and reaches the lower half **42***b* of the intermediate disk **42**. However, the first blind hole **48** simply needs to reach the upper half **42***a* of the intermediate disk **42** at the least, and the depth thereof is not particularly limited so long as it does not penetrate through the intermediate disk **42**. Similarly, the second blind hole **50** also simply needs to reach to the lower half **42***b* of the intermediate disk **42** at the least, and the depth thereof is not particularly limited so long as it does not penetrate through the intermediate disk **42**.

(38) In the present embodiment, as shown in FIGS. **5** and **6**, the first blind hole **48** and the second blind hole **50** have the same shape and the center of gravity G**42** of the intermediate disk **42** is positioned on the rotation axis C of the cam member **40** (see FIGS. **5** and **6**). However, as another embodiment, the first blind hole **48** and the second blind hole **50** may have shapes different from each other, and in this case the center of gravity G**42** of the intermediate disk **42** may not be positioned on the rotation axis C of the cam member **40**.

(39) In the present embodiment, as shown in FIGS. **5** and **6**, a diameter D**44** of the first eccentric cam **44** is equal to a diameter D**46** of the second eccentric cam **46**. However, as another embodiment, the diameter D**44** of the first eccentric cam **44** may not necessarily be equal to the diameter D**46** of the second eccentric cam **46**. Further, in the present embodiment, a distance from the rotation axis C of the cam member **40** to the center of gravity G**44** of the first eccentric cam **44** is equal to a distance from the rotation axis C of the cam member **40** to the center of gravity G**46** of the second eccentric cam **46**. However, as another embodiment, the distance from the rotation axis C of the cam member **40** to the center of gravity G**44** of the first eccentric cam **44** may not necessarily be equal to the distance from the rotation axis C of the cam member **40** to the center of gravity G**46** of the second eccentric cam **46**.

(40) FIG. **8** shows a cam member **40**A of a variant. In this cam member **40**A, the first blind hole **48** and the second blind hole **50** are each at least partly filled by a filler member **70** having a smaller density than a material constituting the intermediate disk **42**. According to such a configuration, for example, line adjustment may be made to the couple imbalance of the intermediate disk **42**, and rigidity of the cam member **40** may be increased.

(41) FIG. **9** shows a cam member **50**B of another variant. In this cam member **40**B, a first through hole **72** and a second through hole **74** are defined in the intermediate disk **42** instead of the first blind hole **48** and the second blind hole **50**. Further, a first balancer **73** that is positioned in the lower half **42***b* of the intermediate disk **42** is disposed in the first through hole **72**, and a second balancer **75** that is positioned in the upper half **42***a* of the intermediate disk **42** is disposed in the second through hole **74**. The first balancer **73** and the second balancer **75** are constituted of a material having a different density from the material constituting the intermediate disk **42**. As above, by combining two or more materials with different densities, the couple imbalance can be given to the cam member **40** without providing the first blind hole **48** and the second blind hole **50**.
(42) In the gardening trimmer **10** of the present embodiment, each of the first blade **14** and the second blade **16** is configured to reciprocate linearly. However, the art employed in this embodiment, especially a part of or all of the configuration employed in the cam member **40** may be employed in a gardening trimmer having blades configured to reciprocate in pivot motion.
(43) In the gardening trimmer **10** of the present embodiment, each of the blades **14**, **16** is of a so-called double-edge type having the cutting edges **14***a*, **16***a* on the both sides. However, each of the blades **14**, **16** may be of a so-called single-edge type having the cutting edges **14***a*, **16***a* only on one side. Further, as another embodiment, the gardening trimmer **10** may be a pole hedge trimmer having blades configured to reciprocate at an end of an elongate pole and configured to trim hedges in higher spaces, a ridge mower for cutting weeds on ridge slopes, or a scythe mower (scythe mower) having its blades arranged at a front portion of a walk-behind mower and configured to reciprocate laterally relative to a traveling direction.

Claims

1. A gardening trimmer comprising: a prime mover; a cam member configured to be rotated by the prime mover; and a first blade and a second blade connected to the cam member, the first blade and the second blade being configured to reciprocate in opposite phases to each other in accordance with rotation of the cam member, wherein the cam member comprises: an intermediate disk; a first eccentric cam disposed on an upper surface of the intermediate disk and connected to the first blade, a center of gravity of the first eccentric cam being offset in a first direction from a rotation axis of the cam member, the first direction being perpendicular to the rotation axis of the cam member; a second eccentric cam disposed on a lower surface of the intermediate disk and connected to the second blade, a center of gravity of the second eccentric cam being offset in a second direction opposite to the first direction from the rotation axis of the cam member; a first blind hole having a first opening defined on a surface of the first eccentric cam and a first bottom defined within the intermediate disk, the first blind hole extending from the first opening to the first bottom along the rotation axis of the cam member such that the first blind hole passes through the first eccentric cam; and a second blind hole having a second opening defined on a surface of the second eccentric cam and a second bottom defined within the intermediate disk, the second blind hole extending from the second opening to the second bottom along the rotation axis of the cam member such that the second blind hole passes through the second eccentric cam, wherein a center of gravity of an upper half of the intermediate disk proximate to the first eccentric cam is offset in the second direction from the rotation axis of the cam member, a center of gravity of a lower half of the intermediate disk proximate to the second eccentric cam is offset in the first direction from the rotation axis of the cam member, and the intermediate disk is divided equally into the upper half and the lower half by a boundary plane perpendicular to the rotation axis of the cam member, and the upper half and the lower half have a same thickness in a thickness direction parallel to the rotation axis of the cam member.
2. The gardening trimmer according to claim 1, wherein the first blind hole is at least partially filled with a filler member that has a smaller density than a material of the intermediate disk.

3. The gardening trimmer according to claim 1, wherein the intermediate disk of the cam member is constituted of at least two materials having different densities.
4. The gardening trimmer according to claim 1, wherein a center of gravity of the intermediate disk of the cam member is positioned on the rotation axis of the cam member.
5. The gardening trimmer according to claim 1, wherein a diameter of the first eccentric cam is equal to a diameter of the second eccentric cam.
6. The gardening trimmer according to claim 1, wherein a distance from the rotation axis of the cam member to the center of gravity of the first eccentric cam is equal to a distance from the rotation axis of the cam member to the center of gravity of the second eccentric cam.
7. The gardening trimmer according to claim 1, wherein at least one of the first eccentric cam and the second eccentric cam is connected to a corresponding one of the first blade and the second blade via at least one link.
8. The gardening trimmer according to claim 1, wherein the intermediate disk of the cam member is constituted of at least two materials having different densities, and a center of gravity of the intermediate disk of the cam member is positioned on the rotation axis of the cam member.
9. The gardening trimmer according to claim 8, wherein a diameter of the first eccentric cam is equal to a diameter of the second eccentric cam.
10. The gardening trimmer according to claim 8, wherein a distance from the rotation axis of the cam member to the center of gravity of the first eccentric cam is equal to a distance from the rotation axis of the cam member to the center of gravity of the second eccentric cam.
11. The gardening trimmer according to claim 8, wherein at least one of the first eccentric cam and the second eccentric cam is connected to a corresponding one of the first blade and the second blade via at least one link.