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Juicer

Abstract

A juicer is disclosed. The juicer includes: a juice-extraction drum crushing and squeezing a juicing target and receiving a screw therein; a hopper coupled to the juice-extraction drum to define a predetermined space receiving the juicing target therein, and comprising an inner protrusion protruding from an inner surface of the hopper toward a central axis of the hopper; and a blade coupled to the hopper to be rotated about the central axis of the hopper and cutting the juicing target before the juicing target reaches the screw, wherein the blade includes: a lower blade rotated in a state of closely contacting a bottom surface of the hopper; and an upper blade bent to cover the inner protrusion of the hopper from above, wherein the upper blade crushes the juicing target in cooperation with the inner protrusion of the hopper.

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References Cited

U.S. PATENT DOCUMENTS

Patent No.	Issued Date	Patentee Name	U.S. Cl.	CPC
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FOREIGN PATENT DOCUMENTS

Patent No.	Application Date	Country	CPC
212020000284	12/2020	DE	A23N 1/02
20150094102	12/2014	KR	N/A
20160111739	12/2015	KR	N/A
10-2020-0005626	12/2019	KR	N/A
20200005626	12/2019	KR	A47J 19/02
20-2021-0000946	12/2020	KR	N/A
WO 2006070980	12/2005	WO	N/A

OTHER PUBLICATIONS

Translation of DE-212020000284. cited by examiner

Translation of KR-20200005626. cited by examiner

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Background/Summary

TECHNICAL FIELD

(1) The present disclosure relates to a juicer.

BACKGROUND

(2) This section provides background information related to the present disclosure which is not necessarily prior art.

(3) A conventional juicer extracts a juice from a juicing target by putting the juicing target into a hopper and crushing the juicing target using a blade rotating at high speed. However, such a juicer has problems in that a juicing target can lose its unique taste and nutrients during high-speed crushing and, in the case of a juicing target such as vegetables, it is difficult to extract a juice from stems or leaves of the juicing target. In addition, such a juicer has difficulty in extracting a juice from viscous fruits such as mango and is ineffective in making soy milk from soybeans.

(4) In order to solve these problems, there has been released a juicer which crushes a juicing target

using a mesh and a low-speed screw disposed inside the mesh. Such a juicer is capable of extracting a juice from viscous fruits as well as making soy milk from soybeans.

(5) However, this low-speed juicer has requirements related to the size of a juicing target depending on the size of the screw. Accordingly, a user needs to cut a juicing target to an appropriate size before putting the juicing target into an inlet of the juicer.

SUMMARY

(6) Embodiments of the present invention are conceived to solve such problems in the art and provide a juicer which includes a blade divided into an upper blade and a lower blade and disposed inside a hopper disposed at an upper end of a juice-extraction drum, such that a juicing target can be cut by the upper blade and the lower blade before reaching a screw, thereby eliminating the need for a user to cut the juicing target to a small size before putting the juicing target into the hopper.

(7) Embodiments of the present invention provide a juicer in which a rotating upper blade can efficiently cut a juicing target in cooperation with an inner protrusion formed on an inner wall of the hopper.

(8) Embodiments of the present invention provide a juicer in which the inner protrusion of the hopper has a downward slope to prevent a cut juicing target from remaining on the inner protrusion.

(9) In accordance with one aspect of the present invention, a juicer includes: a juice-extraction drum crushing and squeezing a juicing target and receiving a screw therein; a hopper coupled to the juice-extraction drum to define a predetermined space receiving the juicing target therein, and including an inner protrusion protruding from an inner surface of the hopper toward a central axis of the hopper; and a blade coupled to the hopper to be rotated about the central axis of the hopper and cutting the juicing target before the juicing target reaches the screw, wherein the blade includes: a lower blade rotated in a state of closely contacting a bottom surface of the hopper; and an upper blade bent to cover the inner protrusion of the hopper from above, wherein the upper blade crushes the juicing target in cooperation with the inner protrusion of the hopper.

(10) According to embodiments of the present invention, even when a user does not cut a juicing target to a small size before putting the juicing target into the hopper, the juicing target can be cut by the upper blade and the lower blade before reaching the screw to be juiced by the screw and a mesh, thereby providing improved juice extraction efficiency.

(11) According to embodiments of the present invention, a juicing target can be efficiently cut through cooperation between the rotating upper blade and the inner protrusion formed on the inner wall of the hopper.

(12) According to embodiments of the present invention, a cut juicing target can be prevented from remaining on the inner protrusion of the hopper by virtue of the downward slope formed on the inner protrusion.

Description

BRIEF DESCRIPTION OF THE DRAWINGS

(1) The above and other aspects, features, and advantages of embodiments of the present invention will become apparent from the following detailed description in conjunction with the accompanying drawings:

(2) FIG. 1 is a sectional view of a hopper according to one embodiment of the present invention;

(3) FIG. 2 is a side view of a blade according to one embodiment of the present invention;

(4) FIG. 3 is a top view of the blade of FIG. 2;

(5) FIG. 4 is a top perspective view of the blade of FIG. 2;

(6) FIG. 5 is a bottom perspective view of the blade of FIG. 2;

(7) FIG. 6 is a view of an inner surface of the hopper of FIG. 1;

- (8) FIG. 7 is a view illustrating a state in which a bottom surface of the hopper of FIG. 1 is coupled to a mesh;
- (9) FIG. 8 is a plan view of the bottom surface of the hopper of FIG. 1;
- (10) FIG. 9 is a plan view of a juice-extraction drum coupled with a main body according to one embodiment of the present invention;
- (11) FIG. 10 is a sectional view of a lower inner surface of the hopper of FIG. 1;
- (12) FIG. 11 is a perspective view of a juicer according to one embodiment of the present invention; and
- (13) FIG. 12 is a side sectional view of the juicer of FIG. 11.

DETAILED DESCRIPTION OF EMBODIMENTS

(14) Hereinafter, embodiments of the present invention will be described with reference to the accompanying drawings. It should be noted that like components will be denoted by like reference numerals throughout the specification and the accompanying drawings. In addition, descriptions of known functions and constructions which may unnecessarily obscure the subject matter of the present invention will be omitted.

(15) It will be understood that, although the terms “first”, “second”, “i”, “ii”, “a”, “b”, etc. may be used herein to describe various elements, components, regions, layers and/or sections, these elements, components, regions, layers and/or sections should not be limited by these terms. These terms are only used to distinguish one element, component, region, layer or section from another element, component, region, layer or section. In addition, it will be understood that the terms “includes”, “comprises”, “including” and/or “comprising”, when used in this specification, specify the presence of stated features, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, steps, operations, elements, components, and/or groups.

(16) Referring to FIG. 1 to FIG. 12, a juicer 10 according to one embodiment of the present invention includes all or some of the following components: a blade 100, a hopper 200, a juice-extraction drum 300, and a main body 400.

(17) Referring to FIG. 2 to FIG. 4, the blade 100 includes an upper blade 110, a lower blade 120, and a blade securing member 130.

(18) The blade 100 is secured to a bottom surface of the hopper 200 by the blade securing member 130 and is rotated about a central axis of the hopper. Here, the central axis is indicated by the dotted line in FIG. 2. The blade 100 cuts a juicing target introduced into the hopper 200 through an inlet 220 of the hopper 200 before the juicing target reaches a screw 320. Accordingly, even when a user does not cut a juicing target into a small size before putting the juicing target into the inlet, the juicing target is primarily cut by the blade 100 before reaching the screw 320, thereby helping the user avoid the hassle of needing to cut the juicing target personally.

(19) The upper blade 110 includes a first upper blade 112 and a second upper blade 114.

(20) The first upper blade 112 extends in a vertically upward direction with respect to the bottom surface of the hopper 200. The first upper blade 112 may be spaced a predetermined distance apart from the central axis and may be formed to a height sufficient to allow the second upper blade 114 to cover an upper end of a hopper inner protrusion 250 during rotation.

(21) As described above, the first upper blade 112 is spaced a certain distance apart from the central axis. Here, the certain distance means a distance that allows the second upper blade 114 to cut a juicing target in cooperation with the hopper inner protrusion 250. For example, when the first upper blade 112 is at a long distance from the central axis, the hopper inner protrusion 250 has a relatively small length and, when the first upper blade 112 is at a short distance from the central axis, the hopper inner protrusion 250 has a relatively large length. That is, the first upper blade 112 is spaced apart from the central axis by a distance that allows the upper blade 110 to cut a juicing target in cooperation with the hopper inner protrusion 250.

(22) The first upper blade 112 may extend in a vertically upward direction or in an obliquely

upward direction with respect to the bottom surface of the hopper **200**. Herein, it is assumed that the first upper blade **112** extends in a vertically upward direction with respect to the bottom surface of the hopper **200**.

(23) When the first upper blade **112** extends in the vertically upward direction, the first upper blade **112** extends to a location corresponding to the hopper inner protrusion **250**. That is, the first upper blade **112** has one end placed on the bottom surface of the hopper **200** and the other end placed at a location corresponding to the hopper inner protrusion **250**. In other words, the other end of the first upper blade **112** is at a height corresponding to the hopper inner protrusion **250**.

(24) The second upper blade **114** extends from the other end of the first upper blade **112** to be inclined toward an inner surface of the hopper **200**. The second upper blade **114** is bent to cover the hopper inner protrusion **250** from above. Here, it is desirable that the second upper blade **114** be spaced a certain distance apart from the hopper inner protrusion **250** rather than directly contacting the hopper inner protrusion **250**.

(25) In the juicer **10** according to one embodiment of the present invention, the upper blade **110** of the blade **100** cooperates with the hopper inner protrusion **250** during rotation. A juicing target is primarily cut through cooperation between the upper blade **110** and the hopper inner protrusion **250** and then is cut once more by the lower blade **120**. Here, since the second upper blade **114** of the upper blade **110** cuts a juicing target while passing over the upper end of the hopper inner protrusion, the cut juicing target falls naturally.

(26) Since both the second upper blade **114** and the hopper inner protrusion **250** are inclined toward the central axis, a cut juicing target falls naturally. In addition, since both the second upper blade **114** and the hopper inner protrusion **250** are inclined toward the central axis, juicing targets can be gathered at the center of the hopper rather than being pushed outwards.

(27) In addition, the second upper blade **114** has a shape tapered to a point. This is the same reason that the hopper inner protrusion **250** is tapered to a point. When the second upper blade **114** is tapered to a point, the hopper inner protrusion **250** and the upper blade **110** cooperate more efficiently, thereby ensuring better cutting of a juicing target.

(28) In other words, since the second upper blade **114** and the hopper inner protrusion **250** correspond in shape to each other, a juice target can be cut better.

(29) In addition, a lower surface of the second upper blade **114**, that is, a surface of the second upper blade **114** facing the bottom surface of the hopper **200** forms a V-shaped edge. That is, the sharp V-shaped edge increases cutting efficiency. In addition, since the hopper inner protrusion has an upper surface tapered to a sharp edge and the lower surface of the second upper blade **114** forms the sharp V-shaped edge, a cut juicing target falls without remaining on the second upper blade **114** or on the hopper inner protrusion **250**. Here, since the lower surface of the second upper blade **114** is tapered to a sharp edge, a cut juicing target falls along the lower surface of the second upper blade **114**. In addition, a juicing target remaining on the hopper inner protrusion **250** also falls along the upper surface of the hopper inner protrusion **250**. That is, since the hopper inner protrusion **250** has a pair of slopes **252** corresponding to the lower surface of the second upper blade **114**, the hopper inner protrusion **250** has a contact surface tapered to a point toward an upper end thereof. In addition, the hopper inner protrusion **250** is tapered to a point from the inner surface of the hopper toward the central axis.

(30) A juicing target cut by the upper blade **110** and the lower blade **120** falls into a communication hole **240** formed through the bottom surface of the hopper **200** to be moved to a mesh **310**.

(31) The lower blade **120** is rotated in a state of closely contacting the bottom surface of the hopper **200**. The lower blade **120** cuts a juicing target cut by the upper blade **110** once more while moving the juicing target to the communication hole **240**.

(32) The lower blade **120** is tapered to a point toward the inner surface of the hopper **200**. In addition, the lower blade **120** is tapered to a sharp edge toward an upper end thereof.

(33) The blade securing member **130** secures the upper blade **110** and the lower blade **120** to the

central axis. Accordingly, the upper blade **110** and the lower blade **120** are rotated rapidly about the central axis.

(34) The hopper **200** includes all or some of the following components: a lid **210**, an inlet **220**, a handle **230**, a communication hole **240**, a hopper inner protrusion **250**, and a hopper auxiliary inner protrusion **260**.

(35) The hopper **200** is disposed at an upper end of the juice-extraction drum **300**. The hopper **200** defines a space into which a juicing target is introduced, and allows the juicing target to be cut in the space and moved to the screw **320**.

(36) The lid **210** is disposed at an upper end of the hopper and is secured to the hopper via a hinge to be opened or closed by external force applied by a user.

(37) The inlet **220** is formed at a center of the lid **210** and allows a juicing target to be introduced into the hopper **200** therethrough. Accordingly, when a user puts a juicing target having a size sufficient to pass through the inlet **220** into the inlet **220**, the juicing target can be cut and juiced by the juicer **10**.

(38) The handle **230** is disposed on an outer surface of the hopper and allows a user to conveniently separate the hopper **200** from the juicer.

(39) The communication hole **240** is formed inside the hopper **200**, more specifically on the bottom surface of the hopper **200**. The communication hole **240** may be a fan-shaped opening formed through a portion of the bottom surface. Accordingly, a juicing target cut by the upper blade **110** or the lower blade **120** reaches the screw **320** through the communication hole **240**.

(40) The communication hole **240** may be formed at a location where a juicing target cut by the blade **100** falls to the juice-extraction drum **300**. For example, when the hopper inner protrusion **250** is located directly above the communication hole **240**, a juicing target cut by the upper blade **110** falls to the communication hole **240**.

(41) The hopper inner protrusion **250** cuts and crushes a juicing target in cooperation with the blade **100**. More specifically, the hopper inner protrusion **250** cuts a juicing target in cooperation with the upper blade **110**.

(42) The hopper inner protrusion **250** protrudes from the inner surface of the hopper **200** toward the central axis and may be formed at a height corresponding to the first upper blade **112**. The hopper inner protrusion **250** extends by a length inversely proportional to the distance between the first upper blade **112** and the central axis. For example, when the first upper blade **112** is at a long distance from the central axis, the hopper inner protrusion **250** has a relatively small length. That is, the length of the hopper inner protrusion **250** is set to be inversely proportional to the distance between the first upper blade **112** and the central axis.

(43) The hopper inner protrusion **250** has a shape corresponding to the second upper blade **114** and is tapered to a point at an upper portion thereof. Accordingly, a cut juicing target falls along the slope **252** of the hopper inner protrusion **250**.

(44) In addition, the hopper inner protrusion **250** is tapered to a point both in the direction of the central axis and in the direction of the bottom surface of the hopper. Thus, the hopper inner protrusion **250** has pointed tips in the direction of the central axis and in the direction of the bottom surface of the hopper, respectively, thereby ensuring efficient cutting and falling of a juicing target.

(45) In addition, at least one hopper inner protrusion **250** may be formed on the inner surface of the hopper **200**. When the number of hopper inner protrusions increases, a juicing target is likely to remain on the hopper inner protrusion **250** although more efficient cutting of the juicing target can be achieved. Accordingly, it is desirable that an appropriated number of hopper inner protrusions be formed on the inner surface of the hopper **200**.

(46) In addition, since the hopper inner protrusion **250** is formed below the second upper blade **114** of the blade **100**, the second upper blade **114** covers the hopper inner protrusion **250** during rotation. Positioning the hopper inner protrusion **250** below the second upper blade **114** is effective in allowing a juicing target cut by the upper blade **110** to fall to the bottom surface of the hopper.

(47) If the hopper inner protrusion **250** is located above the second upper blade **114**, a juicing target falling from the inlet **220** contacts the hopper inner protrusion **250** first before contacting the blade **100** and thus is cut by the upper blade **110** rotating below the hopper inner protrusion **250**, resulting in inefficient cutting of the juicing target. The juicer **10** according to the present invention has the hopper inner protrusion **250** located below the second upper blade **114**, thereby ensuring efficient cutting of a juicing target while allowing the cut juicing target to naturally fall to the bottom surface of the hopper **200**. That is, a juicing target falling from the inlet meets the rotating upper blade **110** before being cut through cooperation between the hopper inner protrusion **250** and the upper blade **110** and then naturally falls along the lower surface of the second upper blade **114** and the slope **252** of the hopper inner protrusion **250**.

(48) In addition, referring to FIG. **6**, a vertical surface **254** is formed at an end of the slope **252** in a direction perpendicular to the bottom surface of the hopper, such that a juicing target moved down along the slope **252** meets the vertical surface **254** and falls to the bottom surface of the hopper **200**.

(49) The hopper auxiliary inner protrusion **260** is formed on a lower inner surface of the hopper **200** and cuts a juicing target in cooperation with the lower blade **120**.

(50) The hopper auxiliary inner protrusion **260** is formed at a height corresponding to the height of the lower blade **120** and has a length inversely proportional to the length of the lower blade **120**. For example, when the length of the lower blade **120** is relatively large, the length of the hopper auxiliary inner protrusion **260** is relatively small. On the other hand, when the length of the lower blade **120** is relatively small, the length of the hopper auxiliary inner protrusion **260** is relatively large.

(51) Accordingly, the lower blade **120** cooperates with the hopper auxiliary inner protrusion **260** to secondarily cut a juicing target primarily cut by the upper blade **110** and then guides the secondarily cut juicing target to the mesh **310**.

(52) The hopper **200** may further include a hopper inner protruding bar **270** protruding from an inner wall of the hopper **200**, in which the hopper inner protruding bar **270** is located above the hopper inner protrusion **250**. More specifically, the hopper inner protrusion **250** is formed at a lower end of the hopper inner protruding bar **270**. Thus, the hopper inner protruding bar **270** is connected to the hopper inner protrusion **250**.

(53) The hopper inner protruding bar **270** performs similar functions to the hopper inner protrusion **250**. For example, when a juicing target rotating inside the hopper **200** meets the hopper inner protruding bar **270**, the juicing target is caught on the hopper inner protruding bar **270** to be cut by the upper blade **110**.

(54) The hopper inner protruding bar **270** extends long in a longitudinal direction of the hopper, and the hopper inner protrusion **250** formed at the lower end of the hopper inner protruding bar **270** extends toward the central axis. The hopper inner protruding bar **270** formed on the inner surface of the hopper **200** allows the hopper inner protrusion **250** and the upper blade **100** to cut a juicing target more effectively by stopping the juicing target rotating inside the hopper. For example, a long juicing target, such as carrot or celery, often spins with no traction in a state of lying sideways in an upper region of the hopper. The hopper inner protruding bar **270** formed on the inner surface of the hopper **200** is effective in preventing this phenomenon.

(55) The hopper **200** may further include a safety rod **280** vertically disposed on a cylindrical surface of the hopper **200**. The safety rod **280** may be disposed in a region of the cylindrical surface of the hopper, in which the hopper inner protruding bar **270** is formed. For example, the safety rod **280** may be inserted into an empty space formed inside the hopper inner protruding bar **270** which protrudes toward the central axis.

(56) The safety rod **280** is configured to be pressed down by a pressing portion **215** protruding from an end of the lid **210**. When the safety rod **280** is pressed down, an underlying safety switch (not shown) stops operation of a drive motor of the main body **400**.

(57) If the drive motor is operated with the lid **210** open, a user's hand is likely to be drawn into the hopper **200**, which can lead to accidents. With the safety rod **280** configured to be moved downwards when the lid **210** is opened, the juicer according to the present invention can prevent such accidents. More specifically, when the lid **210** is open, the pressing portion **215** presses the safety rod **280** down and, when the lid **210** is closed, the pressing unit **215** no longer presses the safety rod **280**. That is, by operatively connecting the drive motor to the lid **210** using the safety rod **280**, it is possible to ensure user safety in use. In other words, the juicer **10** according to the present invention uses the safety rod **280** to stop operation of the drive motor connected to the blade **100** when the lid **210** is open, thereby preventing accidents that threaten user safety.

(58) Referring to FIG. **9**, the juice-extraction drum **300** includes a mesh **310**, a screw **320**, a residue discharge port **330**, and a juice discharge port **340**.

(59) The juice-extraction drum **300** is detachably coupled to the main body **400**. In addition, the juice-extraction drum **300** includes the residue discharge port **330** formed at one side thereof and the juice discharge port **340** formed at the other side thereof.

(60) The residue discharge port **330** includes an upper base integrally formed with the juice-extraction drum **300** and a lower base detachably connected to the upper base. That is, the upper base and the lower base of the residue discharge port **330** are slidably coupled to each other to be detachable from each other.

(61) The juice discharge port **340** is inclined downwards to allow a juice extracted by the mesh **310** and the screw **320** to be smoothly discharged to an outside of the juicer. In addition, the juice discharge port **340** may further include a reclosable opening (not shown) configured to allow or prevent the juice from being discharged to the outside of the juicer.

(62) Referring to FIG. **11** and FIG. **12**, the main body **400** includes a drive motor as described above, wherein the drive motor is disposed under the juice-extraction drum **300**.

(63) Although some embodiments have been described herein, it should be understood that these embodiments are presented by way of example only and that various modifications, changes, alterations, and equivalent embodiments can be made by those skilled in the art without departing from the spirit and scope of the present invention. Therefore, it should be understood that these embodiments are provided for illustration only and are not to be construed in any way as limiting the present invention. The scope of the present invention should be defined by the appended claims and the claims and their equivalents are intended to cover such modifications and the like as would fall within the scope and spirit of the invention.

(64) This application claims priority to Korean Application No. 10-2022-0011234, filed Jan. 26, 2022, which is incorporated herein by reference in its entirety.

Claims

1. A juicer comprising: a juice-extraction drum crushing and squeezing a juicing target and receiving a screw therein; a hopper coupled to the juice-extraction drum to define a predetermined space receiving the juicing target therein and comprising an inner protrusion protruding from an inner surface of the hopper toward a central axis of the hopper; and a blade coupled to the hopper to be rotated about the central axis of the hopper and cutting the juicing target before the juicing target reaches the screw, wherein the blade comprises: a lower blade rotated in a state of closely contacting a bottom surface of the hopper; and an upper blade bent to cover the inner protrusion of the hopper from above, the upper blade crushing the juicing target in cooperation with the inner protrusion of the hopper.

2. The juicer according to claim 1, wherein the upper blade comprises: a first upper blade extending in a vertically upward direction with respect to the bottom surface of the hopper; and a second upper blade extending from the first upper blade to be inclined toward the inner surface of the hopper.

3. The juicer according to claim 2, wherein the inner protrusion of the hopper is located below the second upper blade.
 4. The juicer according to claim 2, wherein the inner protrusion of the hopper is formed at a height corresponding to the first upper blade to be inclined toward the central axis of the hopper.
 5. The juicer according to claim 2, wherein the inner protrusion of the hopper has a shape corresponding to the second upper blade and cuts the juicing target in cooperation with the second upper blade.
 6. The juicer according to claim 5, wherein the inner protrusion of the hopper has a pair of slopes formed at opposite lateral sides thereof and corresponding to the second upper blade.
 7. The juicer according to claim 6, wherein the inner protrusion of the hopper has a vertical surface formed at an end of each of the pair of slopes and extending in a perpendicular direction with respect to the bottom surface of the hopper.
 8. The juicer according to claim 1, wherein the inner protrusion of the hopper has a contact surface tapered to a point toward an upper end thereof.
 9. The juicer according to claim 1, wherein the inner protrusion of the hopper has a shape tapered to a point toward the central axis of the hopper.
 10. The juicer according to claim 1, wherein the hopper has a communication hole formed through the bottom surface thereof to allow the juicing target cut by the blade to fall into the juice-extraction drum through the communication hole, and the hopper inner protrusion is located directly above the communication hole.
 11. The juicer according to claim 2, wherein the second upper blade has a lower surface forming a V-shaped edge.
 12. The juicer according to claim 2, wherein the first upper blade is spaced apart from the central axis of the hopper.
 13. The juicer according to claim 2, wherein the hopper further comprises an auxiliary inner protrusion formed on a lower inner surface thereof, the auxiliary inner protrusion cutting the juicing target in cooperation with the lower blade.
 14. The juicer according to claim 13, wherein the auxiliary inner protrusion of the hopper is formed at a height corresponding to a height of the lower blade.
 15. The juicer according to claim 13, wherein the auxiliary inner protrusion of the hopper has a length inversely proportional to a length of the lower blade.
 16. The juicer according to claim 1, wherein the hopper further comprises an inner protruding bar protruding from an inner wall thereof and connected to the inner protrusion of the hopper.
 17. The juicer according to claim 16, wherein the inner protrusion of the hopper is located at a lower end of the hopper inner protruding bar.
 18. The juicer according to claim 1, wherein the hopper further comprises: a lid disposed on an upper end thereof; and a safety rod vertically movable in conjunction with opening/closing of the lid, and the safety rod stops operation of a drive motor connected to the blade when the lid is open and operates the drive motor when the lid is closed.
 19. The juicer according to claim 18, wherein the lid comprises a pressing portion protruding from an end thereof, the pressing portion pressing the safety rod down when the lid is open.
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