Core Removal Assembly and Core Removal Machine

Technical Field

The present application relates to, but is not limited to, the technical field of food processing machinery, and particularly to, but is not limited to, a core removal assembly and a core removal machine.

Background

Many kinds of fruits in the market need to be treated with core removal, and most of them are treated with core removal manually, which makes it require a lot of labor for core removal. In some cases, the core removal machine includes a core removal mold for carrying a fruit, and a cutter of the core removal machine can remove a core of the fruit carried on the core removal mold. If there is a deviation in an alignment between the cutter and the fruit during removing the core, it will result in poor core removal effect of the fruit, and even the core removal cannot be carried out.

Summary

The following is a summary of the subject matter described in detail herein. This summary is not intended to limit the protection scope of the claims.

A core removal assembly is used for a core removal machine and the core removal assembly includes a core removal module and a core removal mold. The core removal module includes a cutter and a first positioning structure spaced apart from the cutter. The core removal mold is disposed below the core removal module, the core removal mold is formed with an accommodating hole, the core removal mold is provided with a second positioning structure, and the first positioning structure cooperates with the second positioning structure to align the cutter with the accommodating hole.

A core removal machine includes a bracket and the core removal assembly in the aforementioned embodiment, and both the core removal module and the core removal mold are

installed to the bracket.

Other aspects will become apparent after reading and understanding the drawings and detailed description.

Brief Description of Drawings

Accompanying drawings are used for providing a further understanding of technical solutions of the present application, and constitute a part of the specification. They are used together with embodiments of the present application to explain the technical solutions of the present application, and do not constitute a restriction on the technical solutions of the present application.

FIG. 1 is a schematic diagram of a three-dimensional structure of a core removal machine according to an embodiment of the present application.

FIG. 2 is a schematic view of an exploded structure of a core removal machine according to an embodiment of the present application.

FIG. 3 is a schematic diagram of a three-dimensional structure of an internal structure of a core removal machine according to an embodiment of the present application.

FIG. 4 is a schematic view of a cross-sectional structure of a core removal machine according to an embodiment of the present application.

FIG. 5 is a schematic diagram of a three-dimensional structure of a core removal module according to an embodiment of the present application.

FIG. 6 is a schematic enlarged structural diagram of the core removal machine of FIG. 4 at VI.

FIG. 7 is a schematic structural diagram of an auxiliary positioning structure in an embodiment of the present application.

FIG. 8 is another schematic view of a cross-sectional structure of a core removal machine according to an embodiment of the present application.

FIG. 9 is another schematic diagram of a three-dimensional structure of an internal

structure of a core removal machine according to an embodiment of the present application.

FIG. 10 is a schematic diagram of a three-dimensional structure of a core removal mold according to an embodiment of the present application.

Reference numbers:

1000- core removal machine;

100- core removal module, 10- upper plate, 11- handle, 20- lower plate, 21- first through hole, 22- lower surface, 30- cutter, 40- first elastic member, 50- mounting post, 60- first positioning structure, 61- positioning post;

200- bracket, 210- upright rod, 220- connecting member, 221- mounting plate, 2211- clamping slot, 222- fastening member, 223- chute, 230- joint, 240- partition plate, 260- locking member, 261- locking part, 2611- pressing sheet, 2612- operating ring, 262- rotating shaft, 270- triggering electrical device, 280- fixing plate, 2800- core hole, 281- stopper, 282- guide member, 283- guide slot;

300- core removal mold, 310- accommodating hole, 311- fruit trough, 312- cutter hole, 320- magnetic member, 330- flange, 340- handgrip, 350- abutment member, 351- second through hole, 360- second positioning structure, 361- positioning hole;

400- driving mechanism, 410- driving part, 420- telescopic rod;

500- auxiliary positioning structure, 510- fixing part, 520- elastic assembly, 521- second elastic member, 522- terminal;

800- collection box.

Detailed Description

A clear and complete description of technical solutions of embodiments of the present application will be given below in conjunction with the accompanying drawings in the embodiments of the present application, and it will be apparent that the described embodiments are only part of the embodiments of the present application, not all of the embodiments of the present application. Based on the embodiments of the present application, all of the other embodiments obtained by those of ordinary skills in the art without making creative efforts fall

within the scope of protection of the present application.

In addition, the technical solutions in various embodiments of the present application may be combined with each other, but which needs to be on the basis that those of ordinary skill in the art can realize. When the combination of technical solutions is contradictory or cannot be realized, it should be considered that the combination of technical solutions does not exist and is not within the protection scope of the present application.

In the description of the present application, it needs to be understood that orientations or positional relationships indicated by the terms “center”, “longitudinal”, “transverse”, “length”, “width”, “thickness”, “upper”, “lower”, “front”, “rear”, “left”, “right”, “vertical”, “horizontal”, “top”, “bottom”, “inner”, “outer”, “clockwise”, “counterclockwise” and the like are based on orientations or positional relationships shown in drawings, which are only intended for ease of description of the present application and simplification of the description and are not intended to indicate or imply that the referred device or element must have a particular orientation, or is constructed and operated in a particular orientation and therefore cannot be construed as a limitation on the present application. Furthermore, the terms “first” or “second” are used for descriptive purposes only and cannot be understood as indicating or implying relative importance or implying the number of technical features indicated. Thus, features defined by “first” or “second” may explicitly or implicitly include one or more of said features. In the description of the present application, “multiple/a plurality of” means two or more, unless defined otherwise explicitly and specifically.

In the description of the present application, unless otherwise expressly specified and limited, the terms “mounting”, “connection” and “connecting” should be understood in a broad sense. For example, they may be a fixed connection, may be a detachable connection, or may be an integral connection; they may be mechanical connection, electrical connection, or mutual communication; they may be direct connection, or they may be indirect connection through an intermediate medium, or they may be an internal communication between two elements, or they may be an interaction between two elements. For those of ordinary skills in the art, specific meanings of the above terms in the present application can be understood according to specific situations.

In the present application, a first feature “above” or “below” a second feature may include direct contact of the first feature and the second feature, or may include that the first feature and the second feature do not contact directly but the first feature and the second feature contact through an additional feature therebetween, unless otherwise expressly specified and defined. Also, the first feature “above”, “on”, or “at top of” the second feature includes the first feature being directly above and obliquely above the second feature, or simply indicates that a horizontal height of the first feature is larger than that of the second feature. A first feature “below”, “under” or “beneath” the second feature includes the first feature being directly below and obliquely below the second feature, or simply indicates that a horizontal height of the first feature is less than that of the second feature.

The following disclosure provides many different embodiments or examples for implementing different constructions of the present application. In order to simplify the disclosure of the present application, components and arrangements of specific examples are described below. Of course, they are only examples and are not intended to limit the present application. Further, reference numbers and/or reference letters may be repeated in different examples of the present application for the purposes of simplicity and clarity, which does not per se indicate the relationship between the various embodiments and/or arrangements discussed. In addition, examples of various specific processes and materials are provided in the present application, but those of ordinary skill in the art will be aware of the application of other processes and/or the use of other materials.

Referring to FIGS. 1-4, a core removal machine 1000 according to an embodiment of the present application includes a bracket 200 and a core removal module 100. The core removal module 100 includes an upper plate 10 and a cutter 30. One end of the cutter 30 is fixed to the upper plate 10, and the upper plate 10 is detachably disposed on the bracket 200, so that the core removal module 100 is detachably disposed on the bracket 200 through the upper plate 10.

The core removal machine 1000 according to an embodiment of the present application is mainly used for core removal of some fruits (such as fruits which are difficult to removing core), such as oil oranges, olives, etc., instead of manual core removal, thus greatly improving the efficiency of core removal. The bracket 200 mainly supports and fixes multiple components and

parts of the core removal machine 1000. The core removal module 100 is detachably disposed on the bracket 200 through the upper plate 10, so that the core removal module 100 installed with different cutters 30 can be replaced to be suitable for the core removal of different fruits. Moreover, the detachability of the core removal module 100 facilitates cleaning and maintenance of the used cutters 30.

Referring to FIGS. 3-5, in some embodiments, the core removal module 100 further includes a lower plate 20 and a first elastic member 40. The lower plate 20 is provided opposite to the upper plate 10 and spaced apart from the upper plate 10. One end of the cutter 30 is fixed to the upper plate 10 and the other end of the cutter 30 is configured to be capable of passing through the lower plate 20. The first elastic member 40 connects the upper plate 10 and the lower plate 20 and is in a compressed state when the upper plate 10 moves close to the lower plate 20.

Thus, the first elastic member 40 is connected between the upper plate 10 and the lower plate 20 of the core removal module 100. When the upper plate 10 moves towards the lower plate 20 under an action of an external force, the first elastic member 40 is in a compressed state, and when the external force is removed, the first elastic member 40 can resume deformation from the compressed state, push the upper plate 10 to move away from the lower plate 20, thereby driving the cutter 30 to reset. The reset speed of the cutter 30 is faster, which is beneficial to the next stamping and core removal of the cutter 30 and improves the core removal efficiency of the core removal machine 1000.

The upper plate 10 and the lower plate 20 may be parallel to each other (i.e., an upper surface and a lower surface of the upper plate 10 and an upper surface and a lower surface of the lower plate 20 may be parallel) and are provided at intervals. The upper plate 10 and the lower plate 20 may be provided in a rectangular plate-like structure, thereby facilitating adjustment and connection between the core removal module 100 and the bracket 200. In addition, more cutters 30 can be installed on a plate surface of the rectangular structure, so that the core removal module 100 can remove more fruit cores at a time, and the core removal efficiency is improved. Alternatively, the upper plate 10 and the lower plate 20 may be provided in a circular shape, a polygonal shape or the like, and the shapes of the upper plate 10

and the lower plate 20 are not limited herein. The upper plate 10 and the lower plate 20 may be made of a material with greater rigidity so as to avoid deformation or breakage of the core removal module 100 during stamping and core removal, which may affect the core removal effect.

The cutter 30 may be made of a rigid material such as stainless steel so as to handle fruits with a relatively hard shell and prevent the cutter 30 from being damaged. The cutter 30 may be provided in a cylindrical structure whose diameter size may match a size of a core of fruit.

The upper plate 10 is mainly used for supporting the cutter 30, and a tail end of the cutter 30 is detachably connected with the upper plate 10, thereby facilitating the replacement of the cutter 30 to be suitable for fruits of different sizes. The cutter 30 may be provided perpendicularly with respect to the upper plate 10 (i.e., an axis of the cutter 30 is perpendicular to the upper surface and the lower surface of the upper plate 10) to facilitate a downward stamping of the cutter 30 for core removal.

The lower plate 20 may be provided with a first through hole 21, a head end (opposite to the tail end) of the cutter 30 corresponds to and can pass through the first through hole 21, and a size of the first through hole 21 matches a size of a diameter of the cutter 30.

Both ends of the first elastic member 40 are connected to the upper plate 10 and the lower plate 20, respectively, and the first elastic member 40 is perpendicular to the upper plate 10 and the lower plate 20 (i.e., the axis of the first elastic member 40 is perpendicular to the upper surfaces and the lower surfaces of the upper plate 10 and the lower plate 20). When the core removal module 100 moves downwardly under driving of an external force, the lower plate 20 abuts against the fruit to be core-removed or against a structural member above the fruit to be core-removed (such as an abutment member 350 described below), and the lower plate 20 stops moving downward. The upper plate 10 continues to move downwardly against an elastic force of the first elastic member 40, and the cutter 30 continues to move downwardly through the first through hole 21 under the pushing of the upper plate 10 to stamp and core-remove the fruit to be core-removed. After the core removal is finished, the external force is removed, and the upper plate 10 can move in a direction opposite to the lower plate 20 under the elastic force of the first elastic member 40 to drive the cutter 30 to quickly reset, so as to facilitate the next

stamping and core removal of the core removal module 100. The provision of the first elastic member 40 improves a reset speed of the core removal module 100, thereby improving the core removal efficiency of the core removal machine 1000.

In some embodiments, the first elastic member 40 includes a spring. The spring has a certain elastic potential energy, and when compressed, the spring has an elastic force to return to its original state in an opposite direction, so that the spring can be compressed when the upper plate 10 moves in a direction towards the lower plate 20, and after removing the external force, the spring applies an opposite acting force on the upper plate 10 to restore it to its original position, which is convenient for the next core removal.

Referring to FIGS. 3-5, in some embodiments, the core removal module 100 further includes a mounting post 50 connecting the upper plate 10 and the lower plate 20, and the spring is sleeved outside the mounting post 50.

Thus, the mounting post 50 can support the spring so as to prevent the spring from bending when the upper plate 10 compresses the spring, which cannot provide a driving force for the upper plate 10 to reset.

A cross section of the mounting post 50 may be set in a circular shape or in other shapes such as a square shape, which is not limited herein. The mounting post 50 is connected between the upper plate 10 and the lower plate 20. The mounting post 50 can be fixedly connected with the upper plate 10, and the mounting post 50 is slidably connected with the lower plate 20, so that when the upper plate 10 moves toward the lower plate 20, the mounting post 50 does not abut against the lower plate 20, which otherwise results in the upper plate 10 being unable to press down and the cutter 30 being unable to move downwardly to remove the core. The mounting post 50 may be disposed perpendicular to the upper plate 10 (i.e., an axis of the mounting post 50 may be perpendicular to the upper surface and the lower surface of the upper plate 10), and may be disposed parallel to the cutter 30 (i.e., the axis of the mounting post 50 may be parallel to an axis of the cutter 30), and the mounting post 50 and the cutter 30 are provided at intervals.

Multiple mounting posts 50 may be provided, and the multiple mounting posts 50 are connected to the upper plate 10 at intervals and are symmetrical with respect to the center of the

upper plate 10. For example, the number of the mounting posts 50 may be provided to be four. When there are four mounting posts 50, the four mounting posts 50 can be respectively installed at four corners of the upper plate 10, so that when the upper plate 10 moves downwardly, the upper plate 10 can be kept stable, and the deflection of the upper plate 10 can be prevented, which otherwise causes the cutter 30 to tilt and affects the core removal effect.

Referring to FIGS. 3-5, in some embodiments, the lower plate 20 includes a lower surface 22 facing away from the upper plate 10. An end of the cutter 30 away from the upper plate 10 is located above the lower surface 22 of the lower plate 20 when the first elastic member 40 is in a reset state.

Thus, when the first elastic member 40 is in the reset state (i.e., when the upper plate 10 moves away from the lower plate 20 to a second preset position), the head end of the cutter 30 can be hidden between the upper plate 10 and the lower plate 20 or in the first through hole 21 of the lower plate 20 to prevent the head of the cutter from being damaged. In other words, when the upper plate 10 is moved away from the lower plate 20 to the second preset position, the head end of the cutter 30 is provided between the upper plate 10 and the lower plate 20 or to be hidden in the first through hole 21.

When the first elastic member 40 is in the reset state, a distance between the upper plate 10 and the lower plate 20 is maximal, and a length of the cutter 30 may be less than a distance between the upper plate 10 and the lower plate 20 (i.e., a distance between the lower surface of the upper plate 10 and the upper surface of the lower plate 20) or less than a distance between the lower surface of the upper plate 10 and the lower surface of the lower plate 20. An end of the cutter 30 away from the upper plate 10 can be regarded as the head end, and the head end is between the upper plate 10 and the lower plate 20 or hidden in the first through hole 21 of the lower plate 20 in the reset state, and the head end does not protrude from the first through hole 21, so as to prevent the head of the cutter 30 from being damaged and affecting the core removal effect.

Referring to FIGS. 3-5, in some embodiments, the lower plate 20 includes a lower surface 22 facing away from the upper plate 10, and an end of the cutter 30 away from the upper plate 10 protrudes from the lower surface 22 of the lower plate 20 when the first elastic member 40 is

in the compressed state.

Thus, when the first elastic member 40 is in the compressed state (i.e., when the upper plate 10 moves toward the lower plate 20 to a first preset position), the cutter 30 protrudes from the first through hole 21 of the lower plate 20 to remove the core of the fruit below the lower plate 20. In other words, when the upper plate 10 moves toward the lower plate 20 to the first preset position, the head end of the cutter 30 can pass through the first through hole 21.

When the first elastic member 40 is in a compressed state, the lower surface 22 of the lower plate 20 abuts against a fruit or the abutment member 350 above the fruit, and a distance between the upper plate 10 and the lower plate 20 becomes small, so that the head end of the cutter 30 protrudes from the lower surface 22 of the lower plate 20 and protrudes from the first through hole 21 to stamp and core-remove the fruit.

Referring to FIGS. 3-5, in some embodiments, the number of the first elastic members 40 is multiple, and the multiple first elastic members 40 are provided symmetrically with respect to the center of the lower plate 20.

In this way, the force between the upper plate 10 and the lower plate 20 is relatively balanced, and the deflection to a side will not occur.

The first elastic member 40 may be sleeved outside the mounting post 50 and a number of the first elastic members 40 may be the same as a number of the mounting posts 50. For example, the number of the first elastic members 40 may be provided to be four, and the four first elastic members 40 are respectively provided at four corners of the upper plate 10 and are sleeved outside the four mounting posts 50 in a one-to-one correspondence. In some other embodiments, the number of the first elastic members 40 may be provided according to shapes of the upper plate 10 and the lower plate 20. For example, the number of the first elastic members 40 may be provided to be three, four, five, etc., which is not limited herein.

Referring to FIGS. 3-5, in some embodiments, a number of the cutters 30 is multiple and the multiple cutters 30 are arranged in an array. In this way, the multiple cutters 30 can simultaneously perform the core removal treatment on multiple fruits, thereby improving the core removal efficiency of the core removal machine 1000.

The multiple cutters 30 are arranged at intervals and the multiple cutters 30 may be

arranged in an array. Since multiple cutters 30 are in a one-to-one correspondence with the centers of multiple fruits to facilitate core removal, the multiple cutters 30 need to be arranged at intervals to avoid interference between the cutters 30 and damage to pulp of fruits. The array arrangement enables the cutters 30 to be arranged as much as possible in a limited space, thereby enabling more fruits to be core-removed at a stamping, and improving the core removal efficiency.

Referring to FIGS. 3 and 4, in some embodiments, the bracket 200 includes an upright rod 210 and a connecting member 220 sleeved outside the upright rod 210. The connecting member 220 is configured to be slidable relative to the upright rod 210, and the core removal module 100 is installed on the connecting member 220.

Thus, the core removal module 100 can be installed to the bracket 200 through the connecting member 220, the connecting member 220 can slide with respect to the upright rod 210, and thus the core removal module 100 can also slide up and down with respect to the upright rod 210.

The upright rod 210 may have a cylindrical rod-shaped structure to facilitate sliding of the connecting member 220, or the upright rod 210 may be a square rod, a multi-prism-shaped rod or the like, which is not limited herein. The upright rod 210 mainly functions as a support, and the upright rod 210 may be made of a hard metal material, thereby making a connection structure of a component such as a connecting member 220 installed to the upright rod 210 more stable. The connecting member 220 may be provided as a whole in a plate-like structure, and a size of a plate surface of the connecting member 220 is larger than a size of a plate surface of the upper plate 10, thereby facilitating the detachable mounting of the core removal module 100 to the connecting member 220.

The upright rod 210 and the connecting member 220 may be arranged perpendicular to each other (i.e., an axis of the upright rod 210 is perpendicular to the plate surface of the connecting member 220), four upright rods 210 may be provided, four corners of the connecting member 220 may be respectively sleeved outside the four upright rods 210, and the connecting member 220 can slide up and down relative to the upright rods 210. The core removal module 100 is detachably installed to the connecting member 220 and the core removal

module 100 can be moved up and down relative to the upright rods 210 under the drive of the connecting member 220 so that the core removal module 100 can stamp downwardly to remove core of the fruit.

Referring to FIGS. 3 and 4, in some embodiments, the connecting member 220 includes a mounting plate 221 and a fastening member 222 fixed to the mounting plate 221. The fastening member 222 and the mounting plate 221 may cooperate to form a chute 223, and the upper plate 10 can be clamped in the chute 223 to restrict movement of the core removal module 100 in the upward, downward, leftward, rightward, and rearward directions relative to the connecting member 220.

Thus, the upper plate 10 is clamped in the chute 223, thereby limiting a sliding of the core removal module 100 with respect to the connecting member 220, so that the core removal module 100 does not slide randomly and affect the core removal effect of the core removal module 100 when the core removal module 100 stamps downwardly for core removal.

The mounting plate 221 is sleeved outside the upright rod 210 and can slide up and down relative to the upright rod 210. The fastening member 222 may be fixedly connected below the mounting plate 221 and the fastening member 222 may be provided in an ‘L’ shape so that the chute 223 can be formed between the fastening member 222 and the mounting plate 221.

The fastening members 222 may be installed on both of a left side and a right side of the mounting plate 221, and a distance between the fastening members 222 on the left side and the right side may be adapted to a width (dimension in a left-right direction) of the upper plate 10, thereby limiting the movement of the upper plate 10 in the left-right direction within the chute 223. A depth (dimension in an up-down direction) of the chute 223 can be adapted to a thickness (dimension in the up-down direction) of the upper plate 10, thereby limiting the movement of the upper plate 10 in the up-down direction within the chute 223.

The fastening member 222 may also be installed below a rear side of the mounting plate 221, thereby limiting the movement of the upper plate 10 in a rearward direction within the chute 223, so as to prevent the upper plate 10 from over-slipping rearward during installation and being unable to accurately align with the fruit core below. The core removal module 100 can be installed and removed by sliding into and out of a front of the chute 223. The chute 223

is provided so that the core removal module 100 can accurately slide to a predetermined core removal position and the core removal module 100 can be aligned with the fruit core below to improve the core removal effect.

Referring to FIG. 5, in some embodiments, the core removal module 100 further includes a handle 11 fixedly connected to the upper plate 10, and the handle 11 is used for sliding the upper plate 10 into or out of the chute 223. In this way, the handle 11 is configured to facilitate disassembly and assembly of the core removal module 100.

The handle 11 may be provided on a front side of the upper plate 10. When the core removal module 100 slides into the chute 223, the upper plate 10 and the mounting plate 221 are attached or nearly attached to each other, so that it is inconvenient to pull the core removal module 100 out of the chute 223. Further, the handle 11 is configured to enable the upper plate 10 to have a point of force, thus facilitating the movement of the core removal module 100 in the chute 223 and quickening the disassembly of the core removal module 100.

Referring to FIGS. 3 and 4, in some embodiments, the mounting plate 221 is provided with a joint 230, the core removal machine 1000 further includes a driving mechanism 400 connected to the joint 230, and the driving mechanism 400 is used for driving the core removal module 100 to move up and down relative to the upright rod 210 through the joint 230.

In this way, the mounting plate 221 can be connected to the driving mechanism 400 through the joint 230, so that the connection between the mounting plate 221 and the driving mechanism 400 is more stable. The driving mechanism 400 can provide an external force to the core removal module 100, so that the cutter 30 is stamped downwardly to complete the core removal process of the fruit.

The driving mechanism 400 may include a driving device, such as an electric cylinder and a hydraulic press. The joint 230 may be provided at a middle position above the mounting plate 221, and the driving mechanism 400 may be provided above the mounting plate 221 and detachably connected with the joint 230, thereby facilitating the driving mechanism 400 to drive the mounting plate 221 to drive the core removal module 100 downwardly for stamping and core removal.

Referring to FIGS. 3 and 4, in some embodiments, the bracket 200 further includes a

partition plate 240, and the upright rod 210 is fixedly installed to the partition plate 240. The driving mechanism 400 may include a driving part 410 and a telescopic rod 420 connected with the driving part 410, the driving part 410 may be installed on a side of the partition plate 240 facing away from the core removal module 100, and the telescopic rod 420 may penetrate the partition plate 240 and be connected to the joint 230.

In this way, the partition plate 240 can support the driving part 410, so that the mounting of the driving mechanism 400 is more stable, and the telescopic rod 420 can extend downwardly under the drive of the driving part 410 to drive the core removal module 100 to stamp downwardly for core removal.

The partition plate 240 may be provided above the connecting member 220 and four upright rods 210 may be provided and fixedly connected at four corners of the partition plate 240 respectively so that the mounting structure of the bracket 200 is more stable. The driving part 410 may be installed above the partition plate 240, and an avoidance hole is provided in the middle of the partition plate 240, so that the telescopic rod 420 can protrude downwardly from the avoidance hole and drive the connecting member 220, so as to drive the core removal module 100 to stamp downwardly for core removal.

Referring to FIGS. 4, 6, and 7, in some embodiments, the core removal machine 1000 also includes an auxiliary positioning structure 500. The auxiliary positioning structure 500 may be installed on the bracket 200 and the auxiliary positioning structure 500 may abut against the upper plate 10 to position the core removal module 100 on the bracket 200.

Thus, the auxiliary positioning structure 500 can be installed on the bracket 200 and abut against the upper plate 10, so that the core removal module 100 can be accurately positioned, and the core removal module 100 can be prevented from removing relatively excessive pulp of fruit due to deviation when stamping downwardly for core removal, thus improving the core removal effect, or the cutter 30 can be prevented from being damaged due to abutting against a part on a lower side, thus protecting the cutter 30.

The auxiliary positioning structure 500 may be installed on a side of the bracket 200. When the core removal module 100 is installed to the bracket 200, the auxiliary positioning structure can abut against the upper plate 10 so that the core removal module 100 can be stably

installed to the bracket 200. In addition, the core removal module 100 corresponds to the core of the fruit below, so that when the core removal module 100 moves downwardly for stamping and core removal, the cutter 30 can accurately remove the fruit core without removing excessive pulp. It is also possible to make the cutter 30 accurately pass through a second through hole 351 of the abutment member 350 and an accommodating hole 310 of the core removal mold 300 (see below for detailed description) so as to prevent the cutter 30 from being damaged.

Referring to FIGS. 4, 6, and 7, in some embodiments, the auxiliary positioning structure 500 is installed to the connecting member 220, and the auxiliary positioning structure 500 abuts against a side surface of the upper plate 10. Since the core removal module 100 is installed to the connecting member 220, the auxiliary positioning structure 500 may be installed to a side of the connecting member 220.

The auxiliary positioning structure 500 may be installed to the fastening member 222. The auxiliary positioning structure 500 may extend from the fastening member 222 to the inside of the chute 223, so that when the core removal module 100 is installed into the chute 223, the auxiliary positioning structure 500 can abut against the upper plate 10 to enable the core removal module 100 to be installed and positioned.

Referring to FIGS. 4, 6, and 7, in some embodiments, the auxiliary positioning structure 500 abuts against the left side or the right side of the upper plate 10. It can be understood that the auxiliary positioning structure 500 can be installed on the left or right fastening member 222, as long as the auxiliary positioning structure 500 can abut against the upper plate 10 to stably mount and position it when the core removal module 100 is installed into the chute 223. The present application is not limited to the specific installation position of the auxiliary positioning structure 500.

In some embodiments, multiple auxiliary positioning structures 500 are provided. The multiple auxiliary positioning structures 500 may be disposed at intervals along a length direction of the chute 223 (i.e., the sliding direction in which the core removal module 100 is installed into the chute 223), thereby further enhancing the stability of the core removal module 100 when installed into the chute 223 so that the core removal module 100 does not offset to

both sides resulting in positioning deviation.

Alternatively, in some embodiments, the fastening members 222 on both the left side and the right side may be provided with the auxiliary positioning structures 500. Alternatively, the multiple auxiliary positioning structures 500 may be provided on the fastening member 222 on the same side so that the installation of the core removal module 100 is more stable and the positioning effect is better.

Referring to FIGS. 4, 6, and 7, in some embodiments, the auxiliary positioning structure 500 includes a fixing part 510 and an elastic assembly 520 connected to the fixing part 510. The fixing part 510 is fixed to the fastening member 222, the elastic assembly 520 is connected with the fixing part 510, and the elastic assembly 520 abuts against a side surface of the upper plate 10.

Thus, when the core removal module 100 slides into the chute 223, the provision of the elastic assembly 520 prevents the auxiliary positioning structure 500 from jamming the upper plate 10 and hindering the installation of the core removal module 100. After the core removal module 100 is installed in place, the elastic assembly 520 can provide an elastic force to the upper plate 10, so that the installation of the core removal module 100 is more stable.

The fixing part 510 may be provided on a side of the fastening member 222 facing away from the chute 223. One end of the elastic assembly 520 is connected with the fixing part 510, and the other end of the elastic assembly 520 penetrates the fastening member 222 and extends into the chute 223, so that the installation of the auxiliary positioning structure 500 is more stable. When the upper plate 10 is slid into the chute 223, the elastic assembly 520 is compressed to abut against the upper plate 10 in a direction opposite to the auxiliary positioning structure 500, so that the core removal module 100 is installed to a preset position.

Referring to FIGS. 4, 6, and 7, in some embodiments, the elastic assembly 520 includes a second elastic member 521 and a terminal 522, one end of the second elastic member 521 is connected to the fixing part 510, and the other end of the second elastic member 521 is connected to the terminal 522, and the terminal 522 abuts against a side surface of the upper plate 10.

The second elastic member 521 may be a spring, an elastic tube (a telescopic tubular

structure) or other elements. A side of the terminal 522 abutting against a side surface of the upper plate 10 can be provided in an arc shape, so that the installation of the upper plate 10 can be more smoothly. The terminal 522 exerts a squeezing force on the upper plate 10 under the action of an elastic force of the second elastic member 521 and does not hinder the sliding-in of the upper plate 10.

Referring to FIGS. 3-8, in some embodiments, the core removal machine 1000 also includes a locking member 260 and a triggering electrical device 270. The locking member 260 is installed to the bracket 200 and the locking member 260 is used for locking the core removal module 100 to the bracket 200 or unlocking the core removal module 100 from the bracket 200. The triggering electrical device 270 is provided on a side of the locking member 260 and the locking member 260 causes the triggering electrical device 270 to trigger an electrical signal in a case where the locking member 260 locks the core removal module 100 to the bracket 200.

In this way, the locking member 260 can lock the core removal module 100 to the bracket 200 or unlock the core removal module 100 from the bracket 200. When the locking member 260 is in a locked state, the locking member 260 can abut against the triggering electrical device 270 to trigger an electrical signal, so that the core removal machine 1000 can operate normally. When the locking member 260 is in an unlocked state, the locking member 260 is spaced apart from the triggering electrical device 270 (i.e., the locking member 260 is separated from the triggering electrical device 270), so that the core removal machine 1000 cannot operate. Furthermore, the core removal machine 1000 can operate only after the core removal module 100 is installed in place and positioned accurately, thus avoiding damage to the cutter 30 or personnel caused by mis-start and reducing potential safety hazards.

As shown in FIGS. 3 and 8, the locking member 260 may be installed on the mounting plate 221 of the connecting member 220. For example, the locking member 260 may be installed on a front side of the mounting plate 221. The locking member 260 can be configured to trigger the triggering electrical device 270 while locking the core removal module 100, so that the core removal machine 1000 can perform normal core removal operation only when the core removal module 100 is locked, and the situation that the core removal module 100 stamps downwardly for core removal before being installed in place is avoided, thus enhancing the

accuracy and safety of the core removal machine 1000 during core removal.

It can be understood that when the upper plate 10 slides into a predetermined position in the chute 223, the upper plate 10 is abutted and restrained on the upper, lower, left, right, and rear sides by the mounting plate 221 and the fastening member 222, so that the upper plate 10 cannot be moved in the upward, downward, leftward, rightward, and rearward directions relative to the mounting plate 221, and can only be installed and moved through the front side. Thus, the locking member 260 is provided on the front side of the mounting plate 221 and the movement of the upper plate 10 in a forward direction can be restricted so that the core removal module 100 is fixed at a predetermined position in the chute 223 and does not move arbitrarily. When the core removal module 100 moves downwardly to perform core removal under the drive of the driving mechanism 400, the core removal module 100 can be accurately aligned with the position of the fruit core, and the core removal deviation rate can be reduced to prevent excessive fruit pulp removal.

The triggering electrical device 270 may be provided on a side of the bracket 200 close to the locking member 260. The triggering electrical device 270 may be configured to cut off a circuit of the core removal machine 1000 when it is not triggered, so that the core removal machine 1000 cannot drive the core removal module 100 to stamp downwardly for core removal even if a start key is pressed. When the triggering electrical device 270 is triggered, an electrical signal is sent so that the circuit of the core removal machine 1000 is communicated, and the core removal machine 1000 can drive the core removal module 100 to stamp downwardly for core removal after the start key is pressed.

Referring to FIGS. 3 and 8, in some embodiments, the triggering electrical device 270 includes a microswitch. The locking member 260 abuts against the microswitch in a case where the locking member 260 locks the core removal module 100 to the bracket 200, and the locking member 260 is spaced apart from the microswitch in a case where the locking member 260 unlocks the core removal module 100 from the bracket 200.

Thus, when the locking member 260 locks the core removal module 100, the locking member 260 abuts against the microswitch to trigger an electrical signal, so that the core removal machine 1000 can drive the core removal module 100 to stamp for core removal.

When the locking member 260 unlocks the core removal module 100, the locking member 260 is spaced apart from the microswitch to disconnect the electrical signal, so that the core removal machine 1000 cannot drive the core removal module 100 in a case where the electrical signal is disconnected. The microswitch is small, easy to install and does not occupy a large space. The microswitch can include a spherical gear switch, an infrared switch, etc. The present application does not limit the types of microswitches.

Referring to FIGS. 3 and 8, in some embodiments, the locking member 260 includes a locking part 261 and a rotating shaft 262 connected to the locking part 261. The locking part 261 is rotationally disposed on the bracket 200 through the rotating shaft 262, the locking part 261 is used for locking the core removal module 100 to the bracket 200 or unlocking the core removal module 100 from the bracket 200, and the locking part 261 causes the triggering electrical device 270 to trigger an electrical signal in a case where the locking part 261 locks the core removal module 100 to the bracket 200.

In this way, the locking part 261 can rotate relative to the bracket 200 under an action of the rotating shaft 262, so that the locking part 261 can trigger the triggering electrical device 270 while locking the core removal module 100, or so that the locking part 261 is spaced apart from the triggering electrical device 270 while unlocking the core removal module 100 without triggering an electrical signal.

The rotating shaft 262 can be fixedly installed to the mounting plate 221 and the locking part 261 can be rotationally connected with the front-facing end of the rotating shaft 262. The locking part 261 may be provided in a strip shape and the rotating shaft 262 is connected in the middle position of the locking part 261. The locking part 261 can be rotationally switched between a vertical state and a transverse state with respect to the mounting plate 221.

When the locking part 261 is rotated to the vertical state (as shown in FIG. 8), a lower end of the locking part 261 protrudes from the mounting plate 221, so that the locking part 261 can abut against the front side of the upper plate 10 to prevent the upper plate 10 from moving forward, thereby fixing the core removal module 100. Meanwhile, an upper end of the locking part 261 can abut against the triggering electrical device 270 to make the triggering electrical device 270 trigger an electrical signal so that the core removal machine 1000 can be activated to

drive the core removal module 100 to stamp downwardly for core removal.

When the locking part 261 is rotated to the transverse state, the locking part 261 is parallel to the mounting plate 221, and both ends of the locking part 261 are separated from the upper plate 10 and the triggering electrical device 270, respectively, so that the core removal module 100 can move outwardly (i.e., forward) in the chute 223, and the triggering electrical device 270 is not triggered, so that the core removal machine 1000 cannot drive the core removal module 100 to move downwardly even if the start key is pressed.

Referring to FIGS. 3 and 8, in some embodiments, the locking part 261 includes a pressing sheet 2611 and an operating ring 2612 connected to the pressing sheet 2611. The locking member 260 locks the core removal module 100 to the bracket 200 in a case where the pressing sheet 2611 abuts against the upper plate 10, and the locking member 260 unlocks the core removal module 100 from the bracket 200 in a case where the pressing sheet 2611 is separated from the upper plate 10.

In this way, the pressing sheet 2611 may be configured to abut against or detach from the upper plate 10 and the triggering electrical device 270, and the operating ring 2612 is configured to facilitate rotation of the pressing sheet 2611.

The pressing sheet 2611 may be provided in a strip-shaped sheet structure, and the operating ring 2612 may be provided at a middle position of the pressing sheet 2611, and the operating ring 2612 is provided at a side of the pressing sheet 2611 opposite to the rotating shaft 262, thereby facilitating rotation of the pressing sheet 2611 to switch the locking member 260 between locking and unlocking.

When the pressing sheet 2611 is rotated to the vertical state, the locking member 260 is in a locked state with respect to the core removal module 100, and the pressing sheet 2611 abuts against the triggering electrical device 270. At this time, the core removal machine 1000 can start the downward stamping for core removal by pressing the start key. When the pressing sheet 2611 is rotated to the transverse state, the locking member 260 is in an unlocked state with respect to the core removal module 100, and the pressing sheet 2611 is separated from the triggering electrical device 270. At this time, the core removal machine 1000 cannot start the downward stamping for core removal by pressing the start key, so as to ensure that the core

removal machine 1000 has double protection, and the core removal is not started when the core removal module 100 is not fixedly mounted in place, thus reducing potential safety hazards.

Referring to FIGS. 3 and 8, in some embodiments, the mounting plate 221 is formed with a clamping slot 2211, and the locking part 261 is at least partially clamped in the clamping slot 2211 in a case where the locking part 261 locks the core removal module 100 to the bracket 200. Thus, when the locking part 261 is in the locked state, the locking part 261 can be clamped in the clamping slot 2211 to prevent the locking part 261 from rotating during the operation of the core removal machine 1000, resulting in unstable mounting of the core removal module 100.

The clamping slot 2211 may be provided at a position corresponding to the locking part 261 on the front side of the mounting plate 221, and the width of the clamping slot 2211 may be adapted to the width of the pressing sheet 2611.

When the locking part 261 is rotated to the vertical state, a portion of the lower end of the pressing sheet 2611 is clamped in the clamping slot 2211, and the other portion of the lower end of the pressing sheet 2611 protrudes out of the clamping slot 2211 and abuts against the upper plate 10. The clamping slot 2211 is provided so that the locking part 261 does not rotate arbitrarily in the locked state and the locking part 261 can be relatively stable in the locked state. When the locking part 261 is rotated to the transverse state, the pressing sheet 2611 is rotated out of the clamping slot 2211 and is positioned outside the chute 223, and the locking part 261 is in the unlocked state, so that the core removal module 100 can slide outwardly from the chute 223.

Referring to FIGS. 3 and 8, in some embodiments, the bracket 200 also includes a partition plate 240 provided opposite to and spaced apart from the mounting plate 221, the upright rod 210 is fixedly installed to the partition plate 240, and the triggering electrical device 270 is provided between the partition plate 240 and the mounting plate 221. Thus, the locking member 260 may be installed on an upper side of the mounting plate 221 of the connecting member 220, and the triggering electrical device 270 is installed between the partition plate 240 and the mounting plate 221 so that triggering can be enabled between the locking member 260 and the triggering electrical device 270.

In some embodiments, the triggering electrical device 270 may be installed to the partition

plate 240. Thus, the triggering electrical device 270 can be stably installed in a position of the partition plate 240 corresponding to the locking member 260, thereby facilitating triggering between the locking member 260 and the triggering electrical device 270.

The triggering electrical device 270 may be installed at a position corresponding to the locking member 260 on a lower side of the partition plate 240. When the core removal module 100 is installed to a predetermined position in the chute 223, the locking member 260 can be rotated from the transverse state to the vertical state, i.e., switched from the unlocked state to the locked state to lock the core removal module 100 in the chute 223. At the same time, the triggering electrical device 270 also triggers an electrical signal by the locking member 260 so that the core removal machine 1000 can be activated to drive the core removal module 100 to stamp downwardly for core removal.

Referring to FIGS. 3 and 10, in some embodiments, the core removal machine 1000 further includes a core removal mold 300, the core removal mold 300 is formed with multiple accommodating holes 310, the accommodating holes 310 are used for accommodating fruits, and the core removal mold 300 is installed to the bracket 200 in a magnetic adsorption manner.

In this way, the core removal mold 300 is formed with an accommodating hole 310, the accommodating hole 310 can prevent the fruit from rolling, and the core removal mold 300 is installed to the bracket 200 in a magnetic adsorption manner, so that the core removal mold 300 can be stably installed and positioned, and the fruit in the accommodating hole 310 can accurately correspond to the upper cutter 30, thus reducing the damage of the cutter 30 to the fruit pulp and improving the core removal effect.

The core removal mold 300 is detachably installed to the bracket 200 and is installed below the core removal module 100. A shape of the core removal mold 300 may match with a shape of the core removal module 100.

Number and position of the accommodating holes 310 may be in a one-to-one correspondence with number and position of the cutters 30 of the core removal module 100, and may be in a one-to-one correspondence with the fruits in the accommodating holes 310 when the core removal module 100 stamps down for core removal, so as to improve the core removal efficiency.

As shown in FIGS. 8-10, the accommodating hole 310 may penetrate the core removal mold 300 from top to bottom. The accommodating hole 310 may be divided into two parts in the up-down direction: a fruit trough 311 and a cutter hole 312, and the fruit trough 311 and the cutter hole 312 communicate with each other. The fruit trough 311 faces upwardly and has a larger radial size, and a size of the fruit trough 311 may match with a size of the fruit to be core-removed. The cutter hole 312 faces downwardly and has a smaller radial size, and a diameter of the cutter hole 312 may match with a diameter of the cutter 30.

Thus, when the core removal module 100 stamps downwardly for core removal, the fruit trough 311 can prevent the fruit from rolling, to facilitate the positioning of the fruit and the cutter 30, and the stamped fruit core can be extruded from the cutter hole 312, while the cutter hole 312 can prevent the cutter 30 from abutting against the core removal mold 300 and the damage of the cutter 30.

A main body of the core removal mold 300 may be made of a magnetic material, such as, steel, iron, magnetic alloy and the like. The core removal mold 300 can be connected with the bracket 200 by magnetic adsorption, so that the core removal mold 300 can be installed in a predetermined position, and can be accurately positioned with the core removal module 100 above, enabling the cutter 30 to accurately correspond to the fruit for core removal when stamping down for core removal, and to accurately pass through the cutter hole 312 to prevent the cutter 30 from being damaged.

Referring to FIGS. 8-10, in some embodiments, the bracket 200 further includes a fixing plate 280 and a stopper 281 disposed on the fixing plate 280, and the core removal mold 300 is installed to the fixing plate 280 and fixed to the stopper 281 by magnetic adsorption.

Thus, the fixing plate 280 can carry the core removal mold 300, and the stopper 281 can limit the position of the core removal mold 300 relative to the fixing plate 280 so that the core removal mold 300 can be installed in place.

The fixing plate 280 may be fixedly connected below the upright rod 210 and may be parallel to the partition plate 240 above. The stopper 281 may be provided on an upper side of the fixing plate 280 and transversely provided at a rear position of the fixing plate 280 in a left-right direction. The stopper 281 may be made of a magnetic material such as a magnet so

that the core removal mold 300 can be fixed to the stopper 281 by magnetic adsorption when installed above the fixing plate 280, thereby restricting the core removal mold 300 to be installed to a predetermined position. The fixing plate 280 may be provided with a core hole 2800 corresponding to the accommodating hole 310 so that the removed fruit core can be dropped from the core hole 2800 below.

Referring to FIGS. 8-10, in some embodiments, an abutment member 350 is also provided above the core removal mold 300, and the abutment member 350 may be installed to the fixing plate 280. The abutment member 350 may be provided with a plurality of second through holes 351, number and position of the second through holes 351 are in a one-to-one correspondence with number and position of the accommodating holes 310, and position and number of the second through holes 351 are in a one-to-one correspondence with position and number of the first through holes 21. The abutment member 350 is configured for abutting the lower plate 20 when the core removal module 100 moves downwardly, and the cutter 30 can continue to move downwardly through the second through hole 351 to remove the core of the fruit.

Referring to FIGS. 8-10, in some embodiments, the rear side of the core removal mold 300 is fixed to the stopper 281 by magnetic adsorption. Thus, the core removal mold 300 can be installed from the front and the stopper 281 can limit the position of the core removal mold 300 in a front-rear direction so that the core removal mold 300 is installed in place more accurately.

In some embodiments, the rear side of the core removal mold 300 is provided with a magnetic member 320, and the magnetic member 320 is adsorbed with the stopper 281. In this way, the magnetic member 320 corresponds to the stopper 281, and the magnetic member 320 and the stopper 281 can attract each other so that the core removal mold 300 can be stably installed to a predetermined position.

The magnetic member 320 may be disposed on the rear side of the core removal mold 300 and corresponds to a position of the stopper 281. The rear side of the core removal mold 300 may be provided with a mounting groove and the magnetic member 320 is embedded in the mounting groove. When the magnetic member 320 and the stopper 281 are adsorbed together, the accommodating holes 310 of the core removal mold 300 are in a one-to-one correspondence with the cutters 30 above and in a one-to-one correspondence with the core holes 2800 of the

fixing plate 280, thereby enabling the core removal module 100 to be accurately aligned with the fruit cores when stamping downwardly, and removing the fruit cores from the core holes 2800.

Referring to FIGS. 4, and 8-10, in some embodiments, the fixing plate 280 is provided with a guide member 282, the guide member 282 and the fixing plate 280 jointly define a guide slot 283, and the core removal mold 300 is provided with a flange 330. The flange 330 is clamped in the guide slot 283, and the guide slot 283 extends in a front-rear direction of the core removal mold 300.

In this way, the cooperation between the guide member 282 and the fixing plate 280 can restrict movement of the core removal mold 300 in the leftward, rightward, upward, and downward directions with respect to the fixing plate 280 so that the core removal mold 300 can be installed to a predetermined position.

The guide members 282 may be fixed above the fixing plate 280 and provided vertically on both sides of the fixing plate 280 in a front-rear direction, the guide member 282 may be provided in an inverted “L” shape, and further the guide member 282 may cooperate with the fixing plate 280 to form a guide slot 283. A width between the left guide member 282 and the right guide member 282 may be adapted to a width of the core removal mold 300.

Flanges 330 are formed on both sides of the core removal mold 300. The flange 330 can be mated with the guide slot 283 and can slide rearwardly from a front of the guide slot 283. When the flange 330 slides for a certain distance, the magnetic member 320 on the rear side of the core removal mold 300 and the stopper 281 generate an adsorption force therebetween to fix the core removal mold 300 at a predetermined position corresponding to the core removal module 100, and the core removal mold 300 does not slide arbitrarily.

Referring to FIGS. 8-10, in some embodiments, a front side of the core removal mold 300 is provided with a handgrip 340, and the handgrip 340 can be operated to slide the flange 330 into the guide slot 283. Thus, the handgrip 340 is used for sliding the flange 330 of the core removal mold 300 into or out of the guide slot 283, and the handgrip 340 is configured to facilitate disassembly and assembly of the core removal mold 300.

The handgrip 340 may be provided on the front side of the core removal mold 300. Since

the core removal mold 300 is used for placing fruit, the fruit to be core-removed needs to be placed in the core removal mold 300 and the flange 330 of the core removal mold 300 is pushed into the guide slot 283 for core removal. In addition, the core-removed fruit needs to be pulled out and collected, and the flange 330 of the core removal mold 300 needs to be slid in and out of the guide slot 283 frequently, and the arrangement of the handgrip 340 makes the sliding in and out of the core removal mold 300 more convenient and quick.

Referring to FIGS. 8 and 9, in some embodiments, the core removal machine 1000 also includes a collection box 800 disposed beneath the fixing plate 280. In this way, the collection box 800 can collect the fruit cores removed by stamping from above, thereby preventing the fruit cores from being randomly stacked and facilitating cleaning.

The collection box 800 may be provided as a rectangle, an opening is provided at the upper portion of the collection box 800. A size of the collection box 800 can be adapted to a size of the core removal mold 300, and the collection box 800 can be placed directly below the core removal mold 300, so that all the removed fruit cores can be collected. The collection box 800 may be directly placed on a supporting surface, such as a floor or a table top, or may be fixed to the bracket 200 by providing a tank body for accommodating the collection box 800 in the bracket 200 or other means, and the specific installation method of the collection box 800 is not limited in the present application.

Referring to FIGS. 4, 5 and 10, in some embodiments, the core removal module 100 further includes a first positioning structure 60 spaced apart from the cutter 30, and the core removal mold 300 is further provided with a second positioning structure 360. The first positioning structure 60 cooperates with the second positioning structure 360 to align the cutter 30 with the accommodating hole 310 (i.e., a central axis of the cutter 30 is aligned with a central axis of the accommodating hole 310).

Thus, when the core removal module 100 moves downwardly and cooperates with the core removal mold 300 to stamp for core removal, the first positioning structure 60 and the second positioning structure 360 can restrict the alignment of the cutter 30 and the accommodating hole 310 in the up-down direction, so that the cutter 30 can accurately remove the fruit core, improving the core removal effect. At the same time, the cutter 30 can be

prevented from being damaged due to the cutter 30 being abutted against the core removal mold 300, thus reducing potential safety hazards.

The first positioning structure 60 may be provided on the upper plate 10 of the core removal module 100, or may be provided on the lower plate 20, and a specific position of the first positioning structure 60 is not limited herein. The first positioning structure 60 extends in a direction towards the core removal mold 300. The first positioning structure 60 is spaced apart from the cutter 30 so as not to affect the core removal of the cutter 30 when the core removal module 100 moves downwardly.

The second positioning structure 360 may be provided on an end face of the core removal mold 300 facing the core removal module 100. The second positioning structure 360 is spaced apart from the accommodating hole 310, and a position of the second positioning structure 360 corresponds to a position of the first positioning structure 60 in the up-down direction. The second positioning structure 360 can cooperate with the first positioning structure 60.

Referring to FIGS. 4, 5 and 10, in some embodiments, the first positioning structure 60 includes a positioning post 61, and the second positioning structure 360 includes a positioning hole 361. A center of the positioning post 61 and a center of the positioning hole 361 are aligned, and the positioning post 61 can extend into the positioning hole 361 when the cutter 30 moves towards the core removal mold 300.

In this way, when the core removal mold 300 is stamped downwardly for core removal, the positioning post 61 and the positioning hole 361 can cooperate with each other to accurately position the cutter 30 relative to the accommodating hole 310.

The positioning post 61 may be provided on the upper plate 10 and the positioning post 61 may extend in a direction towards the core removal mold 300. The positioning hole 361 may be provided in the core removal mold 300 and a diameter of the positioning hole 361 may be matched with a diameter of the positioning post 61 so that the positioning post 61 can extend into the positioning hole 361. The positioning hole 361 runs through the core removal mold 300 so as not to affect the cutter 30 to pass downwardly through the accommodating hole 310 to remove the fruit core into the collection box 800.

It should be noted that a lower end of the positioning post 61 may be lower than a lower

end of the cutter 30, so that the positioning post 61 can first be positioned in the positioning hole 361 when the core removal module 100 moves downwardly, and then the cutter 30 extends into the accommodating hole 310. In some embodiments, a length of the positioning post 61 may be greater than a length of the cutter 30, and the lower plate 20 may be provided with a through hole for the positioning post 61 to pass through, so that the positioning post 61 can protrude downwards through the lower plate 20, in order to first position the positioning post 61 in the positioning hole 361 when the core removal module 100 moves downwardly.

When the positioning post 61 cannot extend into the positioning hole 361, the positioning post 61 abuts against the core removal mold 300, thereby preventing the core removal module 100 from continuing to move downwardly and protecting the cutter 30. When the positioning post 61 can extend into and pass through the positioning hole 361, the core removal module 100 continues to move downwardly. At this time, the cutter 30 can accurately align with the fruit to remove the fruit core, so that the core removal effect is better and the loss of fruit pulp is reduced.

In some embodiments, the positioning post 61 may be installed to the core removal mold 300 and extend in a direction towards the core removal module 100, and the positioning hole 361 is provided in the lower plate 20 to cooperate with the positioning post 61. Alternatively, the first positioning structure 60 and the second positioning structure 360 are positioned by other means, such as laser positioning, which are not specifically limited in the present application.

In some embodiments, one end of the positioning post 61 protruding from the lower plate 20 is provided with a guide part, and the guide part is configured to guide the positioning post 61 when the positioning post 61 extends into the positioning hole 361, so that the positioning post 61 smoothly extends into the positioning hole 361.

Referring to FIGS. 4, 5 and 10, in some embodiments, one end (i.e. the lower end) of the positioning post 61 protruding from the lower plate 20 is in a shape of an inverted circular truncated cone. In this way, an inverted circular truncated cone structure forms the guide part, which can play a guiding role when the positioning post 61 extends into the positioning hole 361, thereby facilitating a smooth extension of the positioning post 61 into the positioning hole

361. In addition, when a center of the positioning post 61 and a center of the positioning hole 361 are not strictly aligned and are slightly deviated, the inverted circular truncated cone structure enables the positioning post 61 to still extend into the positioning hole 361, and the position of the core removal mold 300 can be adjusted so that the center of the positioning post 61 and the center of the positioning hole 361 are aligned.

In one embodiment of the present application, the core removal module 100 includes a first positioning structure 60 spaced apart from the cutter 30, the core removal mold 300 is provided with a second positioning structure 360, and the first positioning structure 60 cooperates with the second positioning structure 360 to align the cutter 30 with the accommodating hole 310. Thus, in the process of stamping for core removal by moving the core removal module 100 downwardly and cooperating the core removal module 100 with the core removal mold 300, the first positioning structure 60 and the second positioning structure 360 can restrict an alignment of the cutter 30 and the accommodating hole 310 in the up-down direction, so that the cutter 30 can accurately remove the fruit core, improving the core removal effect. At the same time, the cutter 30 can be prevented from being damaged due to the cutter 30 abutting against the core removal mold 300, thus reducing potential safety hazards.

In the description of this specification, descriptions of the reference terms “one embodiment”, “certain embodiments”, “illustrative embodiment”, “example”, “specific example” or “some examples” and the like mean that specific features, structures, materials or characteristics described in connection with the embodiments or examples are included in at least one embodiment or example of the present application. In this specification, schematic expressions of the above terms do not necessarily refer to the same embodiments or examples. Further, the specific features, structures, materials or characteristics described may be combined in any one or more embodiments or examples in a suitable manner.

Although embodiments disclosed herein are described above, the described contents are only embodiments used for facilitating understanding of the present application, and are not intended to limit the present application. Without departing from the spirit and scope disclosed herein, any person skilled in the art to which the present application pertains may make any modifications and changes in the form and details of implementations, but the scope of patent

protection of the present application shall still be defined by the appended claims.

Claims:

1. A core removal assembly for a core removal machine, the core removal assembly comprising:

a core removal module comprising a cutter and a first positioning structure spaced apart from the cutter; and

a core removal mold disposed below the core removal module, wherein the core removal mold is formed with an accommodating hole, the core removal mold is provided with a second positioning structure, and the first positioning structure cooperates with the second positioning structure to align the cutter with the accommodating hole.

2. The core removal assembly according to claim 1, wherein the first positioning structure comprises a positioning post and the second positioning structure comprises a positioning hole, a center of the positioning post and a center of the positioning hole are aligned, the positioning post is configured to be able to extend into the positioning hole during the movement of the cutter towards the core removal mold.

3. The core removal assembly according to claim 2, wherein the core removal module comprises an upper plate, one end of the positioning post is fixed to the upper plate, and one end of the cutter is fixed to the upper plate.

4. The core removal assembly according to claim 3, wherein the core removal module further comprises a lower plate opposite to the upper plate, and the positioning post is configured to pass through the lower plate.

5. The core removal assembly according to claim 4, wherein an end of the positioning post protruding from the lower plate is provided with a guide part, and the guide part is configured to play a guiding role when the positioning post extends into the positioning hole.

6. The core removal assembly according to claim 4, wherein an end of the positioning post protruding from the lower plate is in a shape of an inverted circular truncated cone.

7. The core removal assembly according to any one of claims 2 to 6, wherein a lower end of the positioning post is lower than a lower end of the cutter.

8. The core removal assembly according to claim 7, wherein a length of the positioning

post is greater than a length of the cutter.

9. The core removal assembly according to any one of claims 4 to 6, wherein the upper plate and the lower plate are movably connected, and the upper plate is configured to be movable towards or away from the lower plate.

10. The core removal assembly according to claim 9, wherein the cutter is configured to pass through the lower plate during the movement of the upper plate relative to the lower plate.

11. The core removal assembly according to claim 9, wherein the cutter comprises a head end at a lower end, the lower plate is provided with a first through hole, and the head end of the cutter is configured to pass through the first through hole when the upper plate moves towards the lower plate to a first preset position;

the head end of the cutter is configured to be positioned between the upper plate and the lower plate or hidden in the first through hole when the upper plate moves away from the lower plate to a second preset position.

12. The core removal assembly according to any one of claims 4 to 6, wherein the core removal module further comprises a mounting post connecting the upper plate and the lower plate.

13. The core removal assembly according to claim 12, wherein the mounting post is fixedly connected with the upper plate, and the mounting post is slidably connected with the lower plate, such that the upper plate is configured to move towards or away from the lower plate.

14. The core removal assembly according to claim 12, wherein the core removal module further comprises a spring sleeved outside the mounting post, and both ends of the spring abut against the upper plate and the lower plate, respectively.

15. A core removal machine comprising:

a bracket; and

the core removal assembly of any one of claims 1 to 14, wherein both the core removal module and the core removal mold are installed to the bracket.

16. The core removal machine according to claim 15, wherein the bracket comprises a

mounting plate and a fixing plate provided opposite to and spaced apart from the mounting plate, the core removal module is installed to the mounting plate, and the core removal mold is installed to the fixing plate.

17. The core removal machine according to claim 16, wherein the bracket further comprises an upright rod, the mounting plate is installed to the upright rod, and the core removal machine further comprises a driving mechanism configured to drive the mounting plate to move up and down relative to the upright rod.