Description

APPARATUS FOR INSPECTING SEMICONDUCTOR DEVICE

Technical Field

[1] The present invention relates to an apparatus for inspecting semiconductor device, and more particularly to an apparatus for inspecting semiconductor device for inspecting upper and lower external appearance of semiconductor device.

Background Art

[2] The semiconductor devices after packaging process, are examined through Burn-In Test process, etc. and are loaded in a client tray so as to be distributed to the market.

[3] And a mark such as serial number, manufacturer's logo, etc. is marked on the surface of the semiconductor devices to be distributed though the marking process.

[4] In addition, a vision inspection process for inspecting an external appearance of the semiconductor device in order to examine whether there is damage on leads or ball grids, crack, scratch, etc., and for inspecting marking state printed on the surface is performed.

[5] Meanwhile, since a process for inspecting an external appearance of the semiconductor device and for inspecting marking state is added in the overall process for the semiconductor device, the time for the inspecting process has an influence on the overall time for the overall process.

[6] Particularly, if the process for inspecting an external appearance of the semiconductor device and for inspecting marking state is inefficiently performed, a delay in inspecting process may result in loss of overall working efficiency, thereby lowering productivity.

[7] In addition, there is a problem that an abnormal loading state of semiconductor device in a tray may cause malfunction of the apparatus for inspecting semiconductor device or damage on the semiconductor device.

Disclosure of Invention

Technical Problem

[8] Therefore, it is an object of the present invention to provide an apparatus for inspecting semiconductor device which is capable of enhancing inspecting speed by separating and arranging a vision inspecting unit for inspecting lower external appearance of the semiconductor device and a vision inspecting unit for inspecting upper external appearance of the semiconductor device.

[9] Another object of the present invention to provide an apparatus for inspecting semiconductor device which is capable of not only enhancing overall inspecting speed but also lessening size of the apparatus by moving a vision inspecting unit for inspecting

lower external appearance of the semiconductor device in width and length directions, i.e. X-axis and Y-axis directions.

[10] Still another object of the present invention to provide an apparatus for inspecting semiconductor device and a method therefor which is capable of enhancing overall inspecting speed by arranging pickers of a transferring tool for transferring a plurality of semiconductor devices in plural rows, moving the semiconductor devices to inspecting position at once, and acquiring and analyzing image.

[11] Still another object of the present invention to provide an apparatus for inspecting semiconductor device which is capable of inspecting loading state of the semiconductor device in the loading grooves of a transferred tray loaded with semiconductor device.

Technical Solution

[12] To achieve these objects, there is provided an apparatus which includes a transferring tool for transferring a plurality of semiconductor devices picked up by a plurality of pickers for picking up semiconductor device, the plurality of pickers being arranged in plural rows; and an image acquisition unit for acquiring image of lower external a ppearance of a plurality of semiconductor devices transferred by the transferring tool in order to inspecting external state for semiconductor devices by analyzing image of lower external appearance of semiconductor devices.

[13] Intervals between the pickers of the transferring tool may be fixed in at least one direction of width direction and length direction, and controllable in the other direction of width direction and length direction, or intervals between the pickers of the transferring tool is controllable in at least one of width direction and length direction.

[14] The pickers in at least one row may be movable in row direction.

[15] To achieve these objects, there is also provided a method for inspecting semiconductor device, the method comprising the steps of: transferring step for transferring a plurality of semiconductor devices by a transferring tool having a plurality of pickers arranged in a plurality of rows; image acquiring step for acquiring image of lower external appearance of semiconductor devices transferred by the transferring tool; and inspecting step for inspecting external state for semiconductor devices by analyzing image of lower external appearance of semiconductor devices acquired in the image acquiring step.

[16] Herein, the image of lower external appearance of semiconductor devices is acquired after intervals in at least one of width direction and length direction between the pickers of the transferring tool arranged in a plurality of rows are lessened in the image acquiring step.

[17] To achieve these objects, there is also provided an apparatus for inspecting semi-

conductor device comprising: a first vision inspecting unit for inspecting for inspecting semiconductor devices by acquiring image of lower external appearance of a plurality of semiconductor devices and analyzing acquired image; a second vision inspecting unit for inspecting semiconductor devices by acquiring image of upper surface of semiconductor devices and analyzing the acquired image, the second vision inspecting unit being installed over a tray loaded with a plurality of semiconductor devices; a loading unit for supplying semiconductor devices to the first vision inspecting unit and the vision inspecting unit; and a sorting unit for sorting semiconductor devices in accordance with the inspection result of the first vision inspecting unit and the second vision inspecting unit.

[18] The loading unit may include a guide unit for guiding movement of a tray loaded with a plurality of semiconductor devices and a driving unit for moving the tray along the guide unit, and the first vision inspecting unit and the second vision inspecting unit may be installed at a side of the guide unit in order.

[19] The first vision inspecting unit may includes an image acquisition unit for acquiring image of lower external appearance of one or more semiconductor devices when the one or more semiconductor devices loaded in the tray moving along the loading unit are transferred by a transferring tool, and an image analyzing unit for analyzing the image acquired by the image acquisition unit and inspecting external state for the respective semiconductor devices, and the second vision inspecting unit may includes an image acquisition unit for acquiring image of upper surface of the semiconductor device by moving in X-axis and Y-axis directions, and an image analyzing unit for analyzing the image acquired by the image acquisition unit and inspecting external state for the respective semiconductor devices, in which the Y-axis direction is a moving direction of the loading unit and the X-axis direction is a direction perpendicular to the Y-axis direction.

[20] The second vision inspecting unit may inspect a state of laser marking printed on the upper surface of the semiconductor device.

[21] To achieve these objects, there is also provided an apparatus for inspecting semiconductor device comprising a tray formed with a plurality of loading grooves loaded with the respective semiconductors; and a loading state inspecting unit for inspecting loading state in the loading grooves formed in the tray, the loading state inspecting unit being installed adjacent to a tray loading unit loaded with the tray.

[22] The tray loading unit may be a tray transferring device including a pair of guide units for guiding movement of the tray; and a driving unit for moving the tray along the pair of guide units, or a tray stacking unit stacked with a plurality of trays.

[23] The loading state inspecting unit may include an image acquisition unit for acquiring image of a tray loaded with semiconductor device, the image acquisition unit being

installed over the tray loading unit, and an image analyzing unit for analyzing the image acquired by the image acquisition unit and inspecting loading state of the semiconductor device. Here, the image acquisition unit is installed together with a transferring tool for transferring semiconductor device.

[24] The loading state inspecting unit may include a light emitting unit emitting light across the tray in a direction parallel with an upper surface of the tray loaded in the tray loading unit; a light receiving unit receiving light from the light emitting unit installed in the opposite side of the tray loading unit; and an image analyzing unit for inspecting loading state of the semiconductor device in accordance with the receiving state of the light receiving unit.

[25] To achieve these objects, there is also provided an apparatus for sorting semiconductor device comprising the apparatus for inspecting semiconductor device.

Advantageous Effects

[26] The apparatus for sorting semiconductor device in accordance with the present invention has an advantage that the apparatus may enhance inspecting speed by separating and arranging a vision inspecting unit for inspecting lower surface of the semiconductor device and a vision inspecting unit for inspecting upper surface of the semiconductor device.

[27] Also the apparatus for sorting semiconductor device in accordance with the present invention has an advantage that the apparatus may enhance not only overall inspecting speed but also lessen size of the apparatus by moving a vision inspecting unit for inspecting lower external appearance of the semiconductor device in width and length directions, i.e. X-axis and Y-axis directions.

[28] Also the apparatus for sorting semiconductor device in accordance with the present invention has an advantage that the apparatus may enhance overall inspecting speed for inspecting external appearance of the semiconductor device by arranging pickers of a transferring tool for transferring a plurality of semiconductor devices in plural rows, moving the semiconductor devices to inspecting position at once, and acquiring and analyzing image.

[29] Also the apparatus for sorting semiconductor device in accordance with the present invention has an advantage that not only reliability of the apparatus may be enhanced but also unstable loading on a tray of semiconductor device may be prevented by inspecting loading state the semiconductor device in the loading grooves of the transferred tray loaded with semiconductor device.

Brief Description of the Drawings

[30] Fig. 1 is a conceptual view showing the apparatus for inspecting semiconductor device in accordance with the present invention;

[31] Figs. 2 and 3 are conceptual views showing construction of a transferring tool of the apparatus for inspecting semiconductor device of Fig. 1;

[32] Figs. 4 to 6 are conceptual views showing acquisition process of image acquired by the image inspection unit by transferring semiconductor device by the transferring tool of Fig. 2;

[33] Fig. 7 is a conceptual view showing construction of the second vision inspecting unit of the apparatus for inspecting semiconductor device of Fig. 1;

[34] Fig. 8 is a sectional view showing the loading state inspecting unit;

[35] Figs. 9 and 10 are sectional views showing another example of the loading state inspecting unit; and

[36] Figs. 11 and 12 are sectional views showing the other example of the loading state inspecting unit.

Mode for the Invention

[37] Hereinafter, an apparatus for inspecting semiconductor device according to the present invention will be explained in more detail with reference to the attached drawings.

[38] Fig. 1 is a conceptual view showing an apparatus for inspecting semiconductor device in accordance with the present invention, Figs. 2 and 3 are conceptual views showing construction of a transferring tool of the apparatus for inspecting semiconductor device of Fig. 1, Figs. 4 to 6 are conceptual views showing acquisition process of image acquired by the image inspection unit by transferring semiconductor device by the transferring tool of Fig. 2, Fig. 7 is a conceptual view showing construction of the second vision inspecting unit of the apparatus for inspecting semiconductor device of Fig. 1, and Fig. 7 is a sectional view showing the loading state inspecting unit.

[39] As shown in Figs. 1 and 2, the apparatus for sorting semiconductor device in accordance with the present invention, includes a transferring tool 600 having a plurality of pickers 610 for picking up a plurality of semiconductor devices 1 in plural rows; and an image acquisition unit 400 for acquiring image of lower external appearance of a plurality of semiconductor devices 1 transferred by the transferring tool 600.

[40] That is to say, the apparatus for sorting semiconductor device in accordance with the present invention adopts a method, so-called On The Fly (OTF) method, for inspecting semiconductor device 1 in accordance with analysis result by transferring semiconductor devices 1 to inspection positions, i.e. above the image acquisition unit 400 by the pickers 610 in plurla rows, acquiring image of semiconductor devices 1, especially lower external appearance, and analyzing the acquired image.

[41] The plurality of pickers 610 of the transferring tool 600 are arranged in plural rows and may be arranged in m columns×n rows (m and n are a natural number not less than 2). Fig. 2 shows the transferring tool 600 arranged in 10×2. Here, the arrangement of the pickers 610 may be different according to the arrangement of loading grooves formed in a tray 2, etc. to be loaded with semiconductor devices 1, the arrangement structure for pickers 610 may be oblique lattice structure as shown in Fig. 3 as well as perpendicular lattice structure.

[42] The transferring tool 600 is provided with the plurality of pickers 610 installed to a supporting bracket 630, and the supporting bracket 630 is installed to be movable along a transferring tool guide 601 installed at a main body 10.

[43] The pickers 610 for transferring semiconductor device 1 may have various structure, and have an absorption head 612 sucking and picking up semiconductor device 1 by generating vacuum pressure together with movement in upper and lower directions (Z direction movement). In addition, each absorption head 612 may independently move in upper and lower directions.

[44] Meanwhile, semiconductor device 1 to be inspected is transferred by being loaded in the loading groove 2a formed in the tray 2, and the intervals in width and length directions, i.e. X-axis and Y-axis directions between the semiconductor devices 1 loaded in the tray 2 may be different according to the types of semiconductor devices 1 and a manufacturing company.

[45] Accordingly, it is preferable that intervals Ph, Pv between the pickers 610 of the transferring tool 600 in width and length directions are fixed, or controllable in at least one of width direction and length direction.

[46] That is to say, intervals between the pickers 610 of the transferring tool 600 in at least one direction of width and length directions are fixed, and controllable in the other direction of width and length directions, or intervals between the pickers 610 are controllable in at least one of width and length directions.

[47] Here, a pitch control device (not shown) for controlling intervals between the pickers 610 in width direction or length direction may be implemented as various modules such as a link device or a linear movement device, etc.

[48] And the pitch control device may be manually controlled, or automatically controlled in order to control intervals of pickers 610 by recognizing positions of semiconductor devices 1 or intervals of loading grooves 2a formed in a tray. In addition, intervals of loading grooves 2a may be identical or different among others.

[49] In addition, the pickers 610 in each row of the transferring tool 600, as shown in Fig. 3, may be independently movable so that the arrangement of the pickers 610 in each row be out of line.

[50] In case that the pickers 610 in at least one row are independently movable in row

direction, it is advantageous in that the number of semiconductor devices 1 within FOV of the image acquisition unit 400 may be incresed.

[51] In addition, since intervals between semiconductor devices 1 need to be lessened in order to acquire image only for the semiconductor devices 1 when transferred to the image acquisition unit 400, the image acquisition unit 400 may acquire image of lower external appearance of the plurality of semiconductor devices 1 after the intervals between the pickers 610 of the transferring tool 600 are lessened in at least one direction width and length directions.

[52] The image acquisition unit 400 installed at the main body 10 is constructed to acquire image of lower external appearance of a plurality of semiconductor devices 1 transferred by the transferring tool 600, and transmit image to an image analyzing device in order to analyze image of external appearance, especially lower external appearance of semiconductor devices 1 and inspect external state for respective semiconductor devices 1.

[53] The image acquisition unit 400 may include an image acquisition device 410 such as a digital camera or a scanner for acquiring image, and the image analyzing device for analyzing image acquired by the image acquisition device 410. Here, the image acquisition unit 400 may be implemented as one module together with the image analyzing device, or a part of a control unit.

[54] Since the semiconductor devices 1 are transferred over the image acquisition device 410 by the pickers 610 arranged in plural rows of m×n, the image acquisition device 410 are installed to have a proper distance from the semiconductor devices 1 arranged in plural rows of m×n, and has an optical module in order to acquire image of lower external appearance of the semiconductor devices 1 in m×n arrangement.

[55] Meanwhile, the number of the semiconductor devices 1 for which a camera of the image acquisition unit 400 can acquire image at once, is limited to be 2, 4, etc. in accordance of FOV of the camera of the image acquisition unit 400.

[56] Here, the image acquisition unit 400 may acquire image for all the semiconductor devices 1 at once by using an optical system, but the size of the apparatus having such image acquisition unit 400 needs to be increased due to the increased acquiring distance.

[57] Accordingly, as shown in Figs. 4 and 5, the image acquisition unit 400 acquires image of the semiconductor devices 1 which are positioned within the FOV of a camera by moving the semiconductor devices 1 in a constant speed or in a step in one direction after picking up the semiconductor devices 1 in plural rows by the transferring tool 600.

[58] The inspecting speed may be enhanced by picking up the semiconductor devices 1 in plural rows, moving the semiconductor devices 1 over the image acquisition unit 400,

and acquiring image of lower appearance of the semiconductor devices 1.

[59] Meanwhile, the apparatus for inspecting semiconductor device in accordance with the present invention may further include a second vision inspecting unit 500 for acquiring and inspecting image of upper surface of semiconductor devices 1 as well as the image acquisition unit 400 for acquiring and inspecting external state for semiconductor devices 1, as a first vision inspecting unit 400. Here, the apparatus for inspecting semiconductor device may be provided with a loading unit 100 for loading semiconductor devices 1.

[60] The second vision inspecting unit 500 may have a construction similar with that of the image acquisition unit 400, as the first vision inspecting unit 600, and is installed over the main body 10 in order to acquire upper image of semiconductor devices 1.

[61] The second vision inspecting unit 500 includes an image acquisition unit 530 for acquiring upper image of the semiconductor device 1, which is installed over the tray 2 loaded with the semiconductor devices 1.

[62] Here the movement of the tray 2 needs to be controlled so that second vision inspecting unit 500 acquires image, but the size of the apparatus should be increased because a device for controlling the movement of the tray 2.

[63] Accordingly, as shown in Figs. 1 and 7, the image acquisition unit 530 is installed to be movable in width and length directions, i.e. X-axis and Y-axis directions over the moving path of the transferred tray 2, i.e. over the loading unit 100, and guide units 510, 520 for guiding movement of the image acquisition unit 530 in X-axis and Y-axis directions may be installed in the main body 10.

[64] Here, the size of the apparatus may be lessened because no additional device for moving and controlling a tray 2 is necessary by being provided with the image acquisition unit 530 movable in X-axis and Y-axis directions.

[65] Naturally, the second vision inspecting unit 500 may be installed at a side of the loading unit 100 and the whole tray 2 be transferred for being inspected.

[66] The second vision inspecting unit 500 may include an image analyzing device as one module together with the image acquisition unit 530 which analyze image acquired by the image acquisition device 410 and image of external appearance, especially laser marking state printed on the upper surface of semiconductor devices 1, or an additional module.

[67] The loading unit 100 is for supplying the first and the second vision inspecting units 400, 500 with semiconductor devices 1, is constructed to transfer a plurality of semiconductor devices 1 in loaded state in the loading groove 2a formed in the tray 2 so that the first and the second vision inspecting units 400, 500 may inspect semiconductor devices 1.

[68] The loading unit 100 may have various constructions, and as shown in Fig. 1, may

include a guide unit 110 for guiding movement of the tray 2 loaded with a plurality of semiconductor devices 1, and a driving unit (not shown) for moving the tray 2 along the guide unit 110.

[69] Here, the first vision inspecting unit 400 and the second vision inspecting unit 500 may be installed at a side of the guide unit 110 in order, and naturally a plurality of the first vision inspecting units 400 and the second vision inspecting units 50 may be inst alled considering the inspecting speed.

[70] Here, the semiconductor devices 1 loaded in the tray 2 transferred along the guide unit 110 of the loading unit 100, are again loaded into the tray 2 after being transferred to the first vision inspecting unit 400 by the transferring tool 600 and then finishing the image acquisition process of the first vision inspecting unit 400.

[71] Meanwhile, the apparatus for inspecting semiconductor device in accordance with the present invention may further include a sorting unit 300 for sorting semiconductor devices 1 in accordance with the inspection result of the first vision inspecting unit 400 and the second vision inspecting unit 500.

[72] The sorting unit 300 may have a construction similar with that of the loading unit 100, and may be implemented as a plurality of sorting units 300 having a classification index such as Good G, Bad 1 or Abnormal 1 R1, Bad 2 or Abnormal 2 R2, etc.

[73] And the respective sorting units 300 may include a guide unit 310 installed in parallel with the loading unit 100 at a side of the loading unit 100, and a driving unit (not shown) for moving the tray 2 along the guide unit 310.

[74] Meanwhile, a tray 2 may be transferred between the loading unit 100 and the sorting units 300 by a tray transferring unit (not shown), and an empty tray unit 200 for providing an empty tray 2 loaded with no semiconductor devices 1 may be provided with in the sorting unit 300.

[75] Here, the empty tray unit 200 may include a guide unit 210 installed in parallel with the loading unit 100 at a side of the loading unit 100, and a driving unit (not shown) for moving the tray 2 along the guide unit 210.

[76] In addition, an additional transferring tool 620 for transferring semiconductor devices 1 in accordance with the classification index between the sorting units 300.

[77] The transferring tool 620 may have a construction identical with that of the transferring tool 600, and a plural row structure or one row structure.

[78] Meanwhile, since a process for inspecting upper and lower appearances of the semiconductor devices 1 is a final process for the semiconductor devices 1, and the semiconductor devices 1 are loaded in a tray 2 or a reel tape and distributed to the market after the inspecting process, the loading state of the semiconductor devices 1 in the tray 2 needs to be confirmed.

[79] Accordingly, the apparatus for inspecting semiconductor device in accordance with

the present invention may include a loading state inspecting unit for inspecting loading state in the loading grooves 2a formed in the tray 2, the loading state inspecting unit being installed adjacent to a tray loading unit loaded with the tray 2.

[80] Fig. 8 is a sectional view showing the loading state inspecting unit; Figs. 9 and 10 are sectional views showing another example of the loading state inspecting unit; and Figs. 11 and 12 are sectional views showing the other example of the loading state inspecting unit.

[81] The tray loading unit may be comprised of a tray transferring device including a pair of guide units 110, 310 for guiding movement of the tray 2; and a driving unit for moving the tray along the pair of guide units 110, 310, or a tray stacking unit stacked with a plurality of trays 2.

[82] Meanwhile, the loading state inspecting unit is a device for inspecting loading state in the loading grooves 2a formed in the tray 2 installed adjacent to a tray loading unit l oaded with the tray 2, may include an image acquisition unit 731 for acquiring image of a tray 2 loaded with semiconductor device 1, the image acquisition unit 731 being installed over the tray loading unit, and an image analyzing unit for analyzing the image acquired by the image acquisition unit 731 and inspecting loading state of the semiconductor device 1.

[83] Here, a camera may be used as the image acquisition unit 731, as shown in Fig. 8, installed together with a transferring tool 620, or as shown in Figs. 9 and 10, installed over a tray in the moving path of the tray 2 in the sorting unit 300.

[84] And the image acquisition unit 731 is for inspecting loading state in the loading grooves 2a formed in the tray 2, may use a low resolution camera, and may have an acquisition area CA of size enabling image for semiconductor devices 1 of about two rows in the tray 2.

[85] In addition, as shown in Fig. 11 and 12, the loading state inspecting unit may include a light emitting unit 710 emitting light across the tray in a direction parallel with an upper surface of the tray 2 loaded in the tray loading unit; a light receiving unit 720 receiving light from the light emitting unit 710 installed in the opposite side of the tray loading unit; and an image analyzing unit (not shown) for inspecting loading state of the semiconductor device 1 in accordance with the receiving state of the light receiving unit 720.

[86] The loading state inspecting unit having the above described structure, as shown in Figs. 11 and 12, determines that the loading state of the semiconductor device 1 is good in case that the light receiving unit 720 receives light emitted by the light emitting unit 710, and bad in case that the light receiving unit 720 fails to receive light emitted by the light emitting unit 710 because the emitted light is blocked due to the inclined loading of semiconductor device 1 in the loading groove 2a.

[87] The loading state inspecting unit may transmit signal to the control unit to generate abnormal signal and manually correct the loading state of the semiconductor device 1, or correct the loading state of the semiconductor device 1 by sucking and loading again with the transferring tool 620 controlled by the control unit.

[88] Meanwhile, the apparatus for inspecting semiconductor device in accordance with the present invention may further include a sorting unit and be used as the apparatus for sorting semiconductor device.

[89] It will also be apparent to those skilled in the art that various modifications and variations can be made in the present invention without departing from the spirit or scope of the invention. Thus, it is intended that the present invention cover modifications and variations of this invention provided they come within the scope of the appended claims and their equivalents.

Claims

[1] An apparatus for inspecting semiconductor device comprising:
a transferring tool for transferring a plurality of semiconductor devices picked up by a plurality of pickers for picking up semiconductor device, the plurality of pickers being arranged in m columns×n rows (m and n are a natural number not less than 2); and
an image acquisition unit for acquiring image of lower external appearance of a plurality of semiconductor devices transferred by the transferring tool in order to inspect external state for semiconductor devices by analyzing image of lower external appearance of semiconductor devices.

[2] The apparatus for inspecting semiconductor device of claim 1,
wherein intervals between the pickers of the transferring tool are fixed in one direction of width and length directions, and controllable in the other direction of width and length directions.

[3] The apparatus for inspecting semiconductor device of claim 1,
wherein intervals between the pickers of the transferring tool are controllable in at least one of width and length directions.

[4] The apparatus for inspecting semiconductor device of any one of claims 1 to 3,
wherein m is ten and n is two.

[5] The apparatus for inspecting semiconductor device of any one of claims 1 to 3,
wherein the pickers in at least one row are independently movable in row direction.

[6] A method for inspecting semiconductor device, the method comprising the steps of:
transferring step for transferring a plurality of semiconductor devices by a transferring tool having a plurality of pickers arranged in m columns×n rows (m and n are a natural number not less than 2);
image acquiring step for acquiring image of lower external appearance of semiconductor devices transferred by the transferring tool; and
inspecting step for inspecting external state for semiconductor devices by analyzing image of lower external appearance of semiconductor devices acquired in the image acquiring step.

[7] The method for inspecting semiconductor device of claim 6,
wherein the image of lower external appearance of semiconductor devices is acquired after intervals in at least one of width and length directions between the pickers of the transferring tool arranged in plural rows are lessened in the image acquiring step.

[8] An apparatus for inspecting semiconductor device comprising:
a first vision inspecting unit for inspecting semiconductor devices by acquiring image of lower external appearance of a plurality of semiconductor devices and analyzing acquired image;
a second vision inspecting unit for inspecting semiconductor devices by acquiring image of upper surface of semiconductor devices and analyzing the acquired image, the second vision inspecting unit being installed over a tray loaded with a plurality of semiconductor devices;
a loading unit for supplying semiconductor devices to the first vision inspecting unit and the vision inspecting unit; and
a sorting unit for sorting semiconductor devices in accordance with the inspection result of the first vision inspecting unit and the second vision inspecting unit.

[9] The apparatus for inspecting semiconductor device of claim 8,
wherein the loading unit includes a guide unit for guiding movement of a tray loaded with a plurality of semiconductor devices and a driving unit for moving the tray along the guide unit, and the first vision inspecting unit and the second vision inspecting unit are installed at a side of the guide unit in order.

[10] The apparatus for inspecting semiconductor device of claim 8,
wherein the first vision inspecting unit comprises:
an image acquisition unit for acquiring image of lower external appearance of one or more semiconductor devices when the one or more semiconductor devices loaded in the tray moving along the loading unit are transferred by a transferring tool, and
an image analyzing unit for analyzing the image acquired by the image acquisition unit and inspecting external state for the respective semiconductor devices.

[11] The apparatus for inspecting semiconductor device of claim 8,
wherein the second vision inspecting unit comprises:
an image acquisition unit for acquiring image of upper surface of the semiconductor device by moving in X-axis and Y-axis directions, and an image analyzing unit for analyzing the image acquired by the image acquisition unit and inspecting external state for the respective semiconductor devices, in which the Y-axis direction is a moving direction of the loading unit and the X-axis direction is a direction perpendicular to the Y-axis direction.

[12] The apparatus for inspecting semiconductor device of claim 11,
wherein the second vision inspecting unit inspects a state of laser marking printed on the upper surface of the semiconductor device.

[13] An apparatus for inspecting semiconductor device comprising:
a tray formed with a plurality of loading grooves loaded with the respective semiconductors; and
a loading state inspecting unit for inspecting loading state in the loading grooves formed in the tray, the loading state inspecting unit being installed adjacent to a tray loading unit loaded with the tray.

[14] The apparatus for inspecting semiconductor device of claim 13,
wherein the tray loading unit is a tray transferring device including a pair of guide units for guiding movement of the tray; and a driving unit for moving the tray along the pair of guide units, or a tray stacking unit stacked with a plurality of trays.

[15] The apparatus for inspecting semiconductor device of claim 13,
wherein the loading state inspecting unit comprises:
an image acquisition unit for acquiring image of a tray loaded with semi-conductor device, the image acquisition unit being installed over the tray loading unit, and
an image analyzing unit for analyzing the image acquired by the image ac-quisition unit and inspecting loading state of the semiconductor device.

[16] The apparatus for inspecting semiconductor device of claim 15,
wherein the image acquisition unit is installed together with a transferring tool for transferring semiconductor device.

[17] The apparatus for inspecting semiconductor device of claim 13,
wherein the loading state inspecting unit comprises:
a light emitting unit emitting light across the tray in a direction parallel with an upper surface of the tray loaded in the tray loading unit; a light receiving unit receiving light from the light emitting unit installed in the opposite side of the tray loading unit; and an image analyzing unit for inspecting loading state of the semiconductor device in accordance with the receiving state of the light receiving unit.

[18] The apparatus for sorting semiconductor device comprising the apparatus for inspecting semiconductor device of claim 13.