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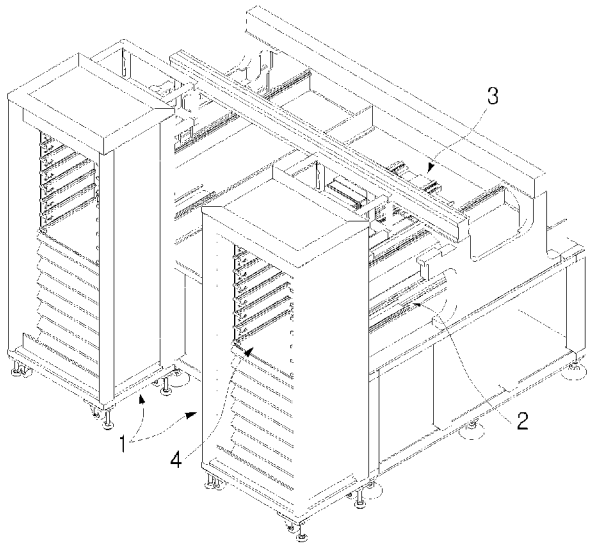
(54) **Title:** VISION INSPECTION SYSTEM FOR SEMICONDUCTOR DEVICES

[Fig. 1]



(57) **Abstract:** A vision inspection system for semiconductor devices includes a pair of loaders, respectively, each loader being constructed to allow a plurality of magazines, on each of which a tray having a plurality of semiconductor devices received therein is loaded, to be staked therein, the magazines being movable upward or downward, a pair of indexers disposed at the rear of the respective loaders for transferring trays to a sorting region and a vision inspection region, a vision inspection unit, a transfer picker for picking up and transferring semiconductor devices to be visually inspected, and a sorting unit for sorting the visually inspected semiconductor devices. Each magazine includes a magazine body, and a tray alignment unit disposed at one side of the magazine body, for aligning the tray loaded on the magazine body depending upon the size of the tray.

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Description

VISION INSPECTION SYSTEM FOR SEMICONDUCTOR DEVICES

Technical Field

[1] The present invention relates to a vision inspection system for semiconductor devices, and, more particularly, to a vision inspection system for semiconductor devices that is capable of easily achieving the alignment of a semiconductor tray on a magazine, on which the tray is loaded.

Background Art

[2] Semiconductor devices, including memory modules, are manufactured through a series of processes and are subjected to precise inspection before shipping. Not only the internal defectiveness of the semiconductor device packages but also microscopic defects on the external appearances of the semiconductor devices have a fatal influence on the performance of the semiconductor devices. For this reason, the precise inspection includes various kinds of inspection, such as inspection of the external appearances of the semiconductor devices using vision cameras, as well as inspection of electric operations of the semiconductor devices.

[3] Generally, external defects of semiconductor devices, especially defects of ball grid arrays (BGA) and leads, may occur during the assembly of the semiconductor devices to a printed circuit board (PCB). Consequently, the inspection of the leads or the balls is very important.

[4] An example of a system for inspecting the external appearances of semiconductor devices is disclosed in Korean Patent Registration No. 0663385 entitled "Vision inspection system for semiconductor devices," which has been filed and registered in the name of the applicant of the present application.

[5] However, the vision inspection system for semiconductor devices disclosed in Korean Patent Registration No. 0663385 has problems in that a loading region where trays having semiconductor devices to be visually inspected received therein are stacked, a sorting region where the semiconductor devices are sorted into defective semiconductor devices and good-quality semiconductor devices according to results of the vision inspection, and a recycling region where empty trays are transferred to a buffer region occupy the front part or the rear part of a system body of the vision inspection system, i.e., work spaces, whereby the efficient use of the installation space is not expected.

[6] Also, it is required to additionally provide an empty tray stacking region where empty trays, which will be supplied to the trays to receive the semiconductor devices

sorted into good-quality semiconductor devices or defective semiconductor devices, among the visually inspected semiconductor devices, are stacked. As a result, it is difficult to reduce the size of equipment.

[7] A technology to solve the above-described problems is disclosed in Korean Patent Application No. 2007-0031866 entitled "Vision inspection system for semiconductor devices," which has been filed in the name of the applicant of the present application.

[8] According to the disclosure of Korean Patent Application No. 2007-0031866, a tray to be visually inspected and an unloading tray to receive semiconductor devices sorted as good-quality products according to the results of the vision inspection are simultaneously received in one loader, and semiconductor devices sorted as good-quality products are supplied to a tray stacked in the same loader or a tray stacked in the other loader. This structure needs no unloaders, and therefore, the reduction in size of equipment is achieved.

[9] In the conventional vision inspection system with the above-stated construction, magazines, on each of which a tray is loaded, are stacked in each loader. In conventional vision inspection system, however, it is required to adjust an alignment bar depending upon the size of the tray and fix the tray on each magazine using bolts.

[10] For this reason, it is required to manually loosen and retighten the bolts whenever loading trays of various sizes, which is very troublesome.

[11] That is, it is required to loosen the bolts, manually move the alignment bar from side to side, such that the alignment bar is located at a desired position, depending upon the size of the tray, and fix the tray on each magazine using the bolts, whenever the size of the tray is changed. As a result, the adjustment process is complicated and troublesome. Furthermore, much time is needed to perform the adjustment process.

Disclosure of Invention

Technical Problem

[12] Therefore, the present invention has been made in view of the above problems, and it is an object of the present invention to provide a vision inspection system for semiconductor devices that is capable of easily achieving the alignment of a tray loaded on a magazine depending upon the size of the tray through the use of a tray alignment unit configured to be movable from side to side in a sliding fashion for aligning the tray in the side-to-side direction by a touch.

[13] It is another object of the present invention to provide a vision inspection system for semiconductor devices constructed in a structure in which the magazine is configured to be movable on a corresponding indexer such that the magazine transfers the tray while the tray is loaded on the magazine and that is capable of performing the alignment of the tray in the frontward-and-backward direction through the use of an

auxiliary alignment unit mounted at the indexer.

Technical Solution

[14] In accordance with the present invention, the above and other objects can be accomplished by the provision of a vision inspection system for semiconductor devices including a pair of loaders installed at opposite sides of the front of a system body, respectively, each loader being constructed to allow a plurality of magazines, on each of which a tray having a plurality of semiconductor devices received therein is loaded, to be staked therein, the magazines being movable upward or downward, a pair of indexers disposed at the rear of the respective loaders for transferring trays to a sorting region and a vision inspection region, a vision inspection unit for photographing semiconductor devices, a transfer picker for picking up and transferring semiconductor devices to be visually inspected, and a sorting unit for sorting the visually inspected semiconductor devices, wherein each magazine includes a magazine body having rotary wheels mounted at opposite sides thereof for moving the magazine, the magazine body being constructed in a structure in which a tray is loaded on the magazine body, and a tray alignment unit disposed at one side of the magazine body, such that the tray alignment unit can be moved from side to side in a sliding fashion, for aligning the tray loaded on the magazine body depending upon the size of the tray.

[15] Preferably, the tray alignment unit includes an alignment bar configured to come into tight contact with one side of the tray loaded on the magazine body, a latch for allowing the movement of the alignment bar in one direction while restricting the movement of the alignment bar in the opposite direction, and alignment bar guides for guiding the side-to-side movement of the alignment bar.

[16] Preferably, the tray alignment unit further includes a tension member disposed at the inside of the alignment bar for correcting errors in aligning the tray depending upon the size of the tray through the use of the alignment bar. Also, the tray alignment unit further includes a locking member connected to the alignment bar for restricting the movement of the alignment bar along the latch in one direction.

[17] Preferably, the side-to-side movement of the alignment bar is automatically controlled based on the operation of a motor.

[18] Preferably, each magazine is constructed to be movable on the corresponding indexer by the operation of a motor such that the magazine transfers a tray to the sorting region and the vision inspection region while the tray is loaded on the magazine. Each indexer includes a pair of left- and right-side guides having guide parts for guiding the movement of the opposite rotary wheels of the magazine 4 while the rotary wheels of the magazine are placed on the respective guide parts, the guides having a predetermined height, and a magazine moving unit disposed between the guides, such that

the magazine moving unit is coupled to the rear of the magazine, for moving the magazine in the frontward-and-backward direction.

[19] Preferably, the magazine moving unit includes a first magazine moving unit and a second magazine moving unit coupled to the opposite sides of the magazine, respectively, such that the first magazine moving unit and the second magazine moving unit are alternately operated depending upon the movement distance of the magazine, whereby the magazine moving unit is operated in a dual mode.

[20] Preferably, each of the first and second magazine moving units includes an auxiliary alignment unit for aligning the tray loaded on the magazine in the frontward-and-backward direction. The auxiliary alignment unit includes an alignment bar configured to be rotated by the operation of a cylinder and an alignment bar moving member for moving the alignment bar in the frontward-and-backward direction according to the operation of the motor.

[21] Preferably, the one-side guide is provided at the guide part thereof with a groove, in which the one-side rotary wheels are engaged, to secure the straight movability of the magazine during the movement of the magazine in the frontward-and-backward direction. The groove of the guide part of the one-side guide is formed in the shape of V, and the one-side rotary wheels of the magazine are inclined outward from the middle of the bottom planes of the wheels such that the one-side rotary wheels can be fitted in the V-shaped groove.

Brief Description of the Drawings

[22] The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

[23] FIG. 1 is a front perspective view illustrating a vision inspection system for semiconductor devices according to the present invention;

[24] FIG. 2 is a rear perspective view of the vision inspection system for semiconductor devices according to the present invention;

[25] FIG. 3 is a plan view of the vision inspection system for semiconductor devices according to the present invention;

[26] FIG. 4 is a detailed perspective view illustrating a magazine of FIG. 1;

[27] FIG. 5 is a plan view of FIG. 4;

[28] FIG. 6 is a perspective view illustrating another embodiment of the magazine of FIG. 1;

[29] FIG. 7 is a plan view of FIG. 6

[30] FIG. 8 is a front perspective view illustrating an indexer of FIG. 1; and

[31] FIG. 9 is a rear perspective view of the indexer of FIG. 1.

Best Mode for Carrying Out the Invention

[32] Now, a preferred embodiment of the present invention will be described in detail with reference to the accompanying drawings.

[33] FIG. 1 is a front perspective view illustrating a vision inspection system for semiconductor devices according to the present invention, FIG. 2 is a rear perspective view of the vision inspection system for semiconductor devices according to the present invention, and FIG. 3 is a plan view of the vision inspection system for semiconductor devices according to the present invention.

[34] Referring to FIGS. 1 to 3, the vision inspection system for semiconductor devices according to the present invention includes a pair of loaders 1, a pair of indexers 2, a vision inspection unit 3, a transfer picker (not shown), and a sorting unit (not shown).

[35] The loaders 1 are installed at opposite sides of the front of a system body, respectively. In each loader 1 are stacked a plurality of magazines 4,on each of which a tray having a plurality of semiconductor devices received therein is loaded, such that the magazines 4 can be moved upward or downward. A technology for moving the magazines 4 upward or downward in the respective loaders 1 according to the operation of an elevator is well known in the art to which the present invention pertains, and therefore, a detailed description thereof will not be given.

[36] The indexers 2 are disposed at the rear of the respective loaders for transferring trays to a sorting region and a vision inspection region.

[37] The vision inspection unit 3 serves to photograph semiconductor devices, the transfer picker (not shown) serves to pick up and transfer semiconductor devices to be visually inspected, and the sorting unit (not shown) serves to sort the visually inspected semiconductor devices. The transfer picker (not shown) and the sorting unit (not shown) are installed at a frame above the vision inspection unit 3, which is obvious to those skilled in the art to which the present invention pertains. For this reason, the transfer picker and the sorting unit are omitted from the drawings.

[38] FIG. 4 is a detailed perspective view illustrating one of the magazines 4 shown in FIG. 1, and FIG. 5 is a plan view of FIG. 4.

[39] The present invention is characterized in that each magazine 4 includes a tray alignment unit 42 for aligning opposite sides of a tray loaded on the magazine 4 depending upon the size of the tray.

[40] More specifically, as shown in FIGS. 4 and 5, the magazine 4 includes a magazine body 41 having rotary wheels 411 (411a and 411b) mounted at opposite sides thereof for moving the magazine 4, the magazine body 41 being constructed in a structure in which a tray is loaded on the magazine body 41, the magazine body 41 having alignment points marked thereon, and a tray alignment unit 42 disposed at one side of

the magazine body 41, such that the tray alignment unit 42 can be moved from side to side in a sliding fashion, for aligning a tray loaded on the magazine body 41 depending upon the size of the tray.

[41] The tray alignment unit 42 includes an alignment bar 421 configured to come into tight contact with one side of the tray loaded on the magazine body 41, a latch 422 for allowing the movement of the alignment bar 421 in one direction while restricting the movement of the alignment bar 421 in the opposite direction, and alignment bar guides 423 for guiding the side-to-side movement of the alignment bar 421.

[42] The tray alignment unit 42 may further include a tension member 424 disposed inside the alignment bar 421 for correcting errors in aligning the tray depending upon the size of the tray through the use of the alignment bar 421.

[43] FIG. 6 is a perspective view illustrating another embodiment of the magazine of FIG. 1, and FIG. 7 is a plan view of FIG. 6. A detailed description of the same components as those of FIG. 4 will not be given.

[44] In this embodiment, the magazine is characterized in that the tray alignment unit 42 further includes a locking member425 connected to the alignment bar 421 for restricting the movement of the alignment bar 421 along the latch 422 in one direction.

[45] After the alignment bar 421 is moved along the latch 422 in one direction to align the tray, the alignment bar 421 may be unintentionally further moved by a worker. For this reason, the locking member 425 is preferably provided to restrict the movement of the alignment bar 421.

[46] In the above-described embodiments of the present invention, the alignment bar is moved in the latch-based structure to align the tray depending upon the size of the tray. However, the side-to-side movement of the alignment bar may be automatically controlled based on the operation of a motor.

[47] In the motor-based structure, it is possible to automatically align the tray. Furthermore, the alignment bar is held by the motor, and therefore, no additional locking member is needed.

[48] In the present invention, the magazine 4 is constructed to be movable on the corresponding indexer 2 by the operation of the motor such that the magazine 4 transfers the tray loaded thereon to the sorting region (not shown) and the vision inspection region (not shown). That is, not the magazine but the tray is moved on the corresponding indexer in the conventional art, whereas the magazine is moved on the corresponding indexer in the present invention.

[49] With the above-described structure, the alignment bar 421 is moved along the latch 422 in one direction according to the alignment points 43 indicated on the magazine body 41 of the magazine 4 to perform the alignment operation. At this time, the alignment bar 421 is locked by the locking member 425, whereby the movement of the

alignment bar 421 is restricted.

[50] Meanwhile, as shown in FIGS. 8 and 9, each indexer 2 includes a pair of left- and right-side guides 21 (21a and 21b) and a magazine moving unit 22 (22a and 22b).

[51] The guides 21 have guide parts 211 for guiding the movement of the opposite rotary wheels 411 (411a and 411b) of the magazine 4 while the rotary wheels 411 (411a and 411b) of the magazine 4 are placed on the respective guide parts 211. The guides 21 have a predetermined height.

[52] The magazine moving unit 22 (22a and 22b) is disposed between the left- and right-side guides 21 (21a and 21b). The magazine moving unit 22 (22a and 22b) is coupled to the rear of the magazine 4 to move the magazine 4 in the frontward-and-backward direction.

[53] The magazine moving unit 22 (22a and 22b) includes a first magazine moving unit 22a and a second magazine moving unit 22b coupled to the opposite sides of the magazine 4, respectively. The first magazine moving unit 22a and the second magazine moving unit 22b are alternately operated depending upon the movement distance of the magazine 4. That is, the magazine moving unit 22 (22a and 22b) is operated in a dual mode.

[54] Each of the first and second magazine moving units 22a and 22b may include an auxiliary alignment unit 221 for aligning the tray loaded on the magazine 4 in the frontward-and-backward direction.

[55] The auxiliary alignment unit 221 includes an alignment bar 221a configured to be rotated by the operation of a cylinder and an alignment bar moving member 221b for moving the alignment bar 221a in the frontward-and-backward direction according to the operation of the motor.

[56] Specifically, the cylinder is driven to rotate the alignment bar 221a, which is parallel to the bottom plane, such that the alignment bar 221a is perpendicular to the bottom plane, and the alignment bar moving member 221b is driven to move the alignment bar 221a backward, whereby the tray is aligned in the frontward-and-backward direction.

[57] At this time, the movement of the alignment bar moving member 221b may be accurately controlled by the operation of the motor, whereby it is possible to prevent the alignment bar 221a from excessively pushing the tray.

[58] Meanwhile, a groove 212 is formed at the guide part 211 of the one-side guide 21, and the one-side rotary wheels 411a are engaged in the groove 212.

[59] The groove 212 of the guide part 211 is formed in the shape of V. The one-side rotary wheels 411a of the magazine 4 are inclined outward from the middle of the bottom planes of the wheels 411a such that the one-side rotary wheels 411a can be fitted in the V-shaped groove 212. Consequently, the side-to-side movement of the wheels is prevented, during the movement of the magazine 4 in the frontward-

and-backward direction, and therefore, the straight movability of the magazine 4 is secured during the movement of the magazine in the frontward-and-backward direction.

[60] The other-side rotary wheels 411b are preferably constructed in a structure in which the bottom planes of the wheels 411b are flat such that the contact area between the wheels 411b and the corresponding guide part 211 for safe movement.

[61] Hereinafter, the operation of the vision inspection system for semiconductor devices with the above-stated construction according to the present invention will be described in detail with reference to FIGS. 1 to 9.

[62] First, the latch 422 is manipulated, depending upon the size of a tray to be received, to move the alignment bar 421. After the movement of the alignment bar 421 is completed, the alignment bar 421 is locked by the locking member 425.

[63] In this regard, the coupled state of the alignment bar, which is achieved through the use of bolts, is released, the alignment position of the alignment bar is adjusted to be located at a predetermined alignment point, and then the bolt coupling process is performed, in the conventional art. The above-mentioned processes are manually carried out, and therefore, the alignment time is long and the alignment procedure is complicated and troublesome.

[64] According to the present invention, on the other hand, the latch is simply touched such that the alignment position of the alignment bar is located at a predetermined alignment point, and then the alignment bar is locked by the locking member. Alternatively, the alignment bar is automatically moved by the operation of the motor. Consequently, it is possible to easily and conveniently carry out the alignment procedure within a short time.

[65] Also, the tension member 424 is provided to correct alignment errors. Consequently, the present invention is advantageous in that the tray alignment is successfully achieved even when the alignment position of the alignment bar is exactly located at a desired alignment point according to the size of the tray.

[66] After the side-to-side alignment of the tray using the alignment bar is completed, the magazine 4 stacked in the loader 1 is moved to the sorting region by the operation of the first magazine moving unit 22a and to the vision inspection region by the operation of the second magazine moving unit 22b.

[67] At this time, the frontward-and-backward alignment state of the tray may be released due to vibration generated during the movement of the magazine 4. In this case, the frontward-and-backward alignment of the tray is carried out by the auxiliary alignment unit 221.

[68] In other words, the cylinder is driven to rotate the alignment bar 221a, such that the alignment bar 221a is perpendicular to the bottom plane, and the alignment bar moving

member 221b is driven to move the alignment bar 221a backward, whereby the tray is aligned in the frontward-and-backward direction.

[69] At this time, it is preferred to prevent the tray from being pushed by the alignment bar 221a through the accurate control based on the operation of the motor, thereby preventing the damage to the tray or the disposition of semiconductors received in the tray from being out of order.

Industrial Applicability

[70] As apparent from the above description, the vision inspection system for semiconductor devices according to the present invention is constructed in a structure in which the tray alignment unit is configured to be moved from side to side in a sliding fashion for aligning the tray in the side-to-side direction, and the tray alignment unit includes the latch-type alignment bar configured to be moved from side to side by a touch. Consequently, the present invention has the effect of easily achieving the alignment of the tray loaded on the magazine depending upon the size of the tray, thereby simplifying alignment procedure and reducing alignment time, and therefore, increasing inspection speed.

[71] Also, the vision inspection system for semiconductor devices according to the present invention is constructed in a structure in which the guide part of one of the guides for guiding the movement of the magazine on the indexer has the groove formed in the left and right sectional shape of V, and the one-side rotary wheels of the magazine are inclined outward from the middle of the bottom planes of the wheels such that the one-side rotary wheels can be easily moved along the guide part having the V-shaped groove while the one-side rotary wheels are fitted in the V-shaped groove of the guide part. Consequently, the present invention has the effect of achieving the alignment of the magazine by means of the one-side guide part, thereby securing the straight movability of the magazine during the movement of the magazine in the frontward-and-backward direction.

[72] Furthermore, the vision inspection system for semiconductor devices according to the present invention is constructed in a structure in which the magazine is configured to be moved on the indexer such that the magazine transfers the tray while the tray is loaded on the magazine, and the indexer is provided with the auxiliary alignment unit for performing the alignment of the tray in the frontward-and-backward direction. Consequently, the present invention has the effect of achieving the alignment of the tray in the frontward-and-backward direction, thereby improving the reliability of inspection.

[73] Although the preferred embodiment of the present invention has been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions are possible, without departing from the scope and spirit of

the invention as disclosed in the accompanying claims.

[74]

Claims

[1] A vision inspection system for semiconductor devices comprising:
a pair of loaders installed at opposite sides of the front of a system body, respectively, each loader being constructed to allow a plurality of magazines, on each of which a tray having a plurality of semiconductor devices received therein is loaded, to be staked therein, the magazines being movable upward or downward;
a pair of indexers disposed at the rear of the respective loaders for transferring trays to a sorting region and a vision inspection region;
a vision inspection unit for photographing semiconductor devices;
a transfer picker for picking up and transferring semiconductor devices to be visually inspected; and
a sorting unit for sorting the visually inspected semiconductor devices, wherein each magazine includes
a magazine body having rotary wheels mounted at opposite sides thereof for moving the magazine, the magazine body being constructed in a structure in which a tray is loaded on the magazine body, and
a tray alignment unit disposed at one side of the magazine body, such that the tray alignment unit can be moved from side to side in a sliding fashion, for aligning the tray loaded on the magazine body depending upon the size of the tray.

[2] The vision inspection system according to claim 1, wherein the tray alignment unit includes
an alignment bar configured to come into tight contact with one side of the tray loaded on the magazine body,
a latch for allowing the movement of the alignment bar in one direction while restricting the movement of the alignment bar in the opposite direction, and
alignment bar guides for guiding the side-to-side movement of the alignment bar.

[3] The vision inspection system according to claim 2, wherein the tray alignment unit further includes a tension member disposed at the inside of the alignment bar for correcting errors in aligning the tray depending upon the size of the tray through the use of the alignment bar.

[4] The vision inspection system according to claim 2 or 3, wherein the tray alignment unit further includes a locking member connected to the alignment bar for restricting the movement of the alignment bar along the latch in one direction.

[5] The vision inspection system according to claim 2, wherein the side-to-side

movement of the alignment bar is automatically controlled based on the operation of a motor.

[6] The vision inspection system according to claim 1, wherein each magazine is constructed to be movable on the corresponding indexer by the operation of a motor such that the magazine transfers a tray to the sorting region and the vision inspection region while the tray is loaded on the magazine.

[7] The vision inspection system according to claim 6, wherein each indexer includes

a pair of left- and right-side guides having guide parts for guiding the movement of the opposite rotary wheels of the magazine 4 while the rotary wheels of the magazine are placed on the respective guide parts, the guides having a pre-determined height, and

a magazine moving unit disposed between the guides, such that the magazine moving unit is coupled to the rear of the magazine, for moving the magazine in the frontward-and-backward direction.

[8] The vision inspection system according to claim 7, wherein the magazine moving unit includes a first magazine moving unit and a second magazine moving unit coupled to the opposite sides of the magazine, respectively, such that the first magazine moving unit and the second magazine moving unit are alternately operated depending upon the movement distance of the magazine, whereby the magazine moving unit is operated in a dual mode.

[9] The vision inspection system according to claim 8, wherein each of the first and second magazine moving units includes an auxiliary alignment unit for aligning the tray loaded on the magazine in the frontward-and-backward direction.

[10] The vision inspection system according to claim 9, wherein the auxiliary alignment unit includes

an alignment bar configured to be rotated by the operation of a cylinder, and

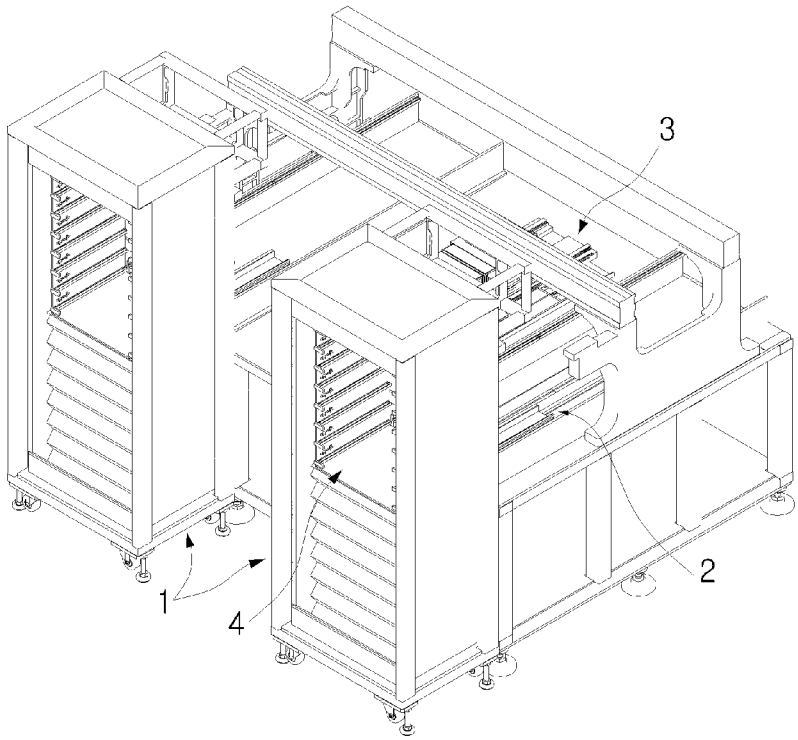
an alignment bar moving member for moving the alignment bar in the frontward-and-backward direction according to the operation of the motor.

[11] The vision inspection system according to claim 7, wherein the one-side guide is provided at the guide part thereof with a groove, in which the one-siderotary wheels are engaged, to secure the straight movability of the magazine during the movement of the magazine in the frontward-and-backward direction.

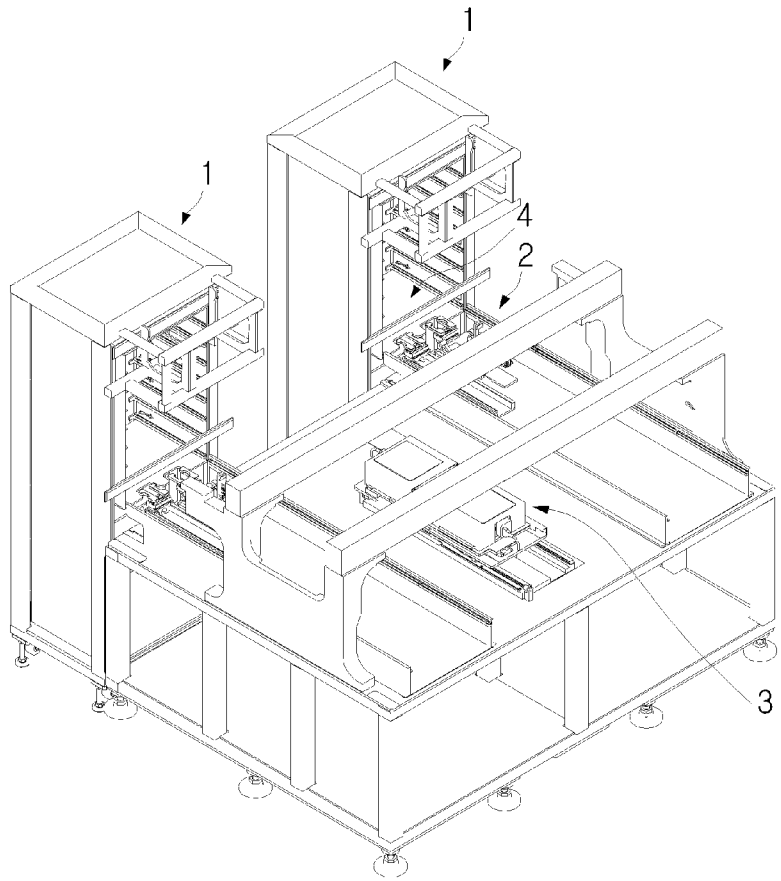
[12] The vision inspection system according to claim 11, wherein the groove of the guide part of the one-side guide is formed in the shape of V, and the one-side rotary wheels of the magazine are inclined outward from the middle of the bottom planes of the wheels such that the one-side rotary wheels can be fitted in the V-shaped groove.

[13] The vision inspection system according to claim 11 or 12, wherein the other-side rotary wheels are constructed in a structure in which the bottom planes of the wheels are flat such that the contact area between the wheels and the corresponding guide part for safe movement.

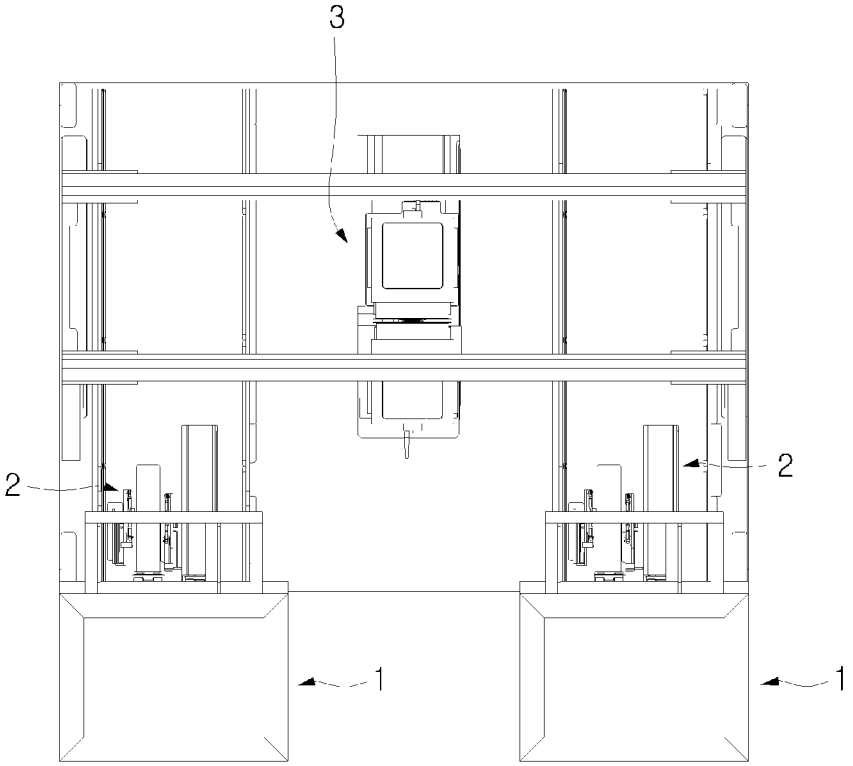
[Fig. 1]



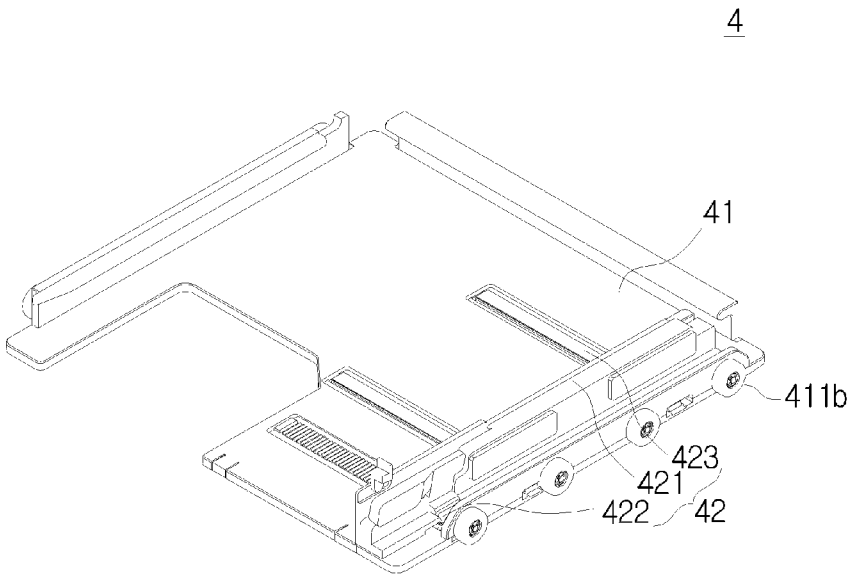
[Fig. 2]



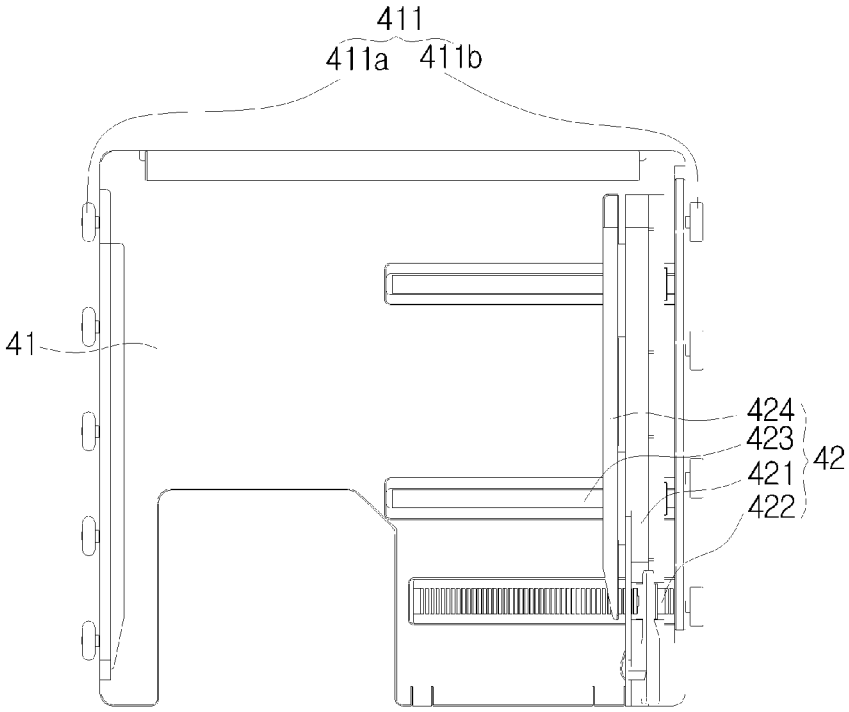
[Fig. 3]



[Fig. 4]



[Fig. 5]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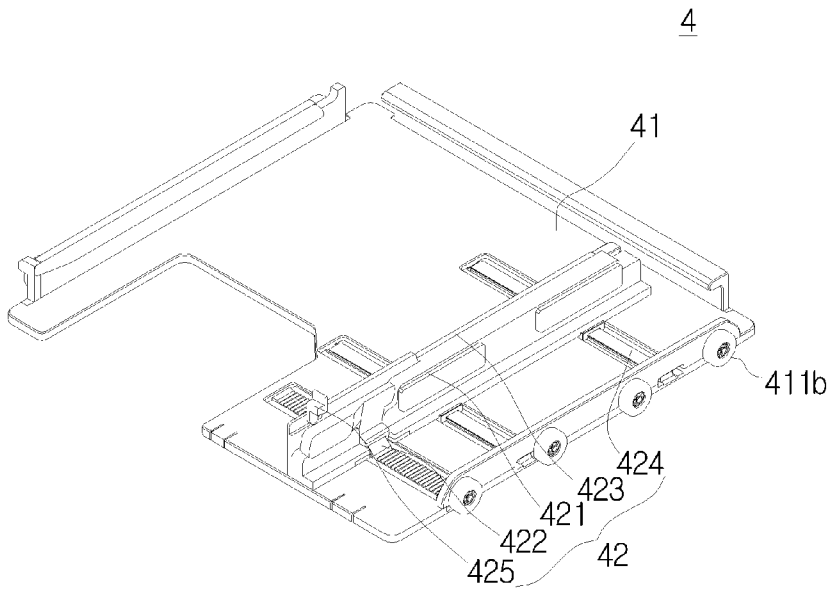
[Fig. 6]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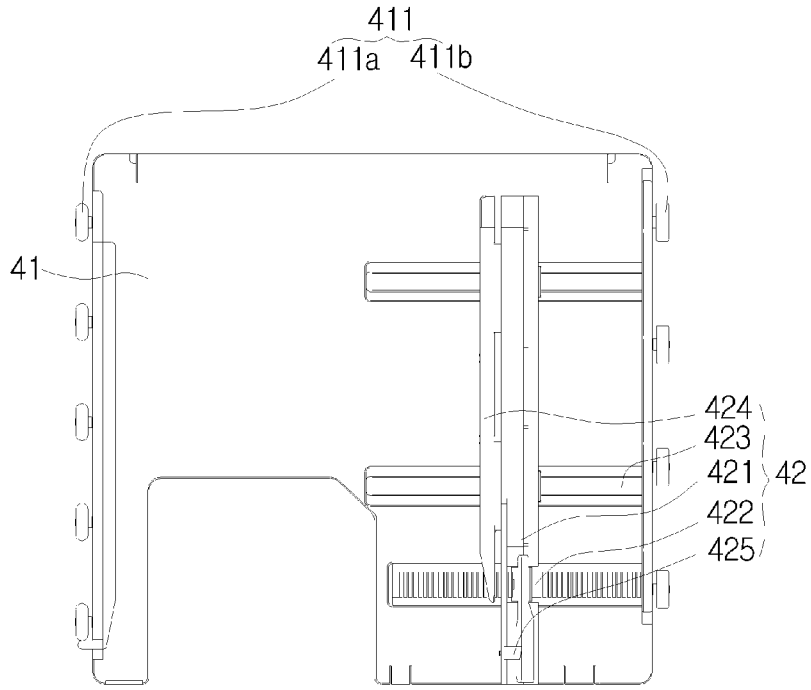
[Fig. 7]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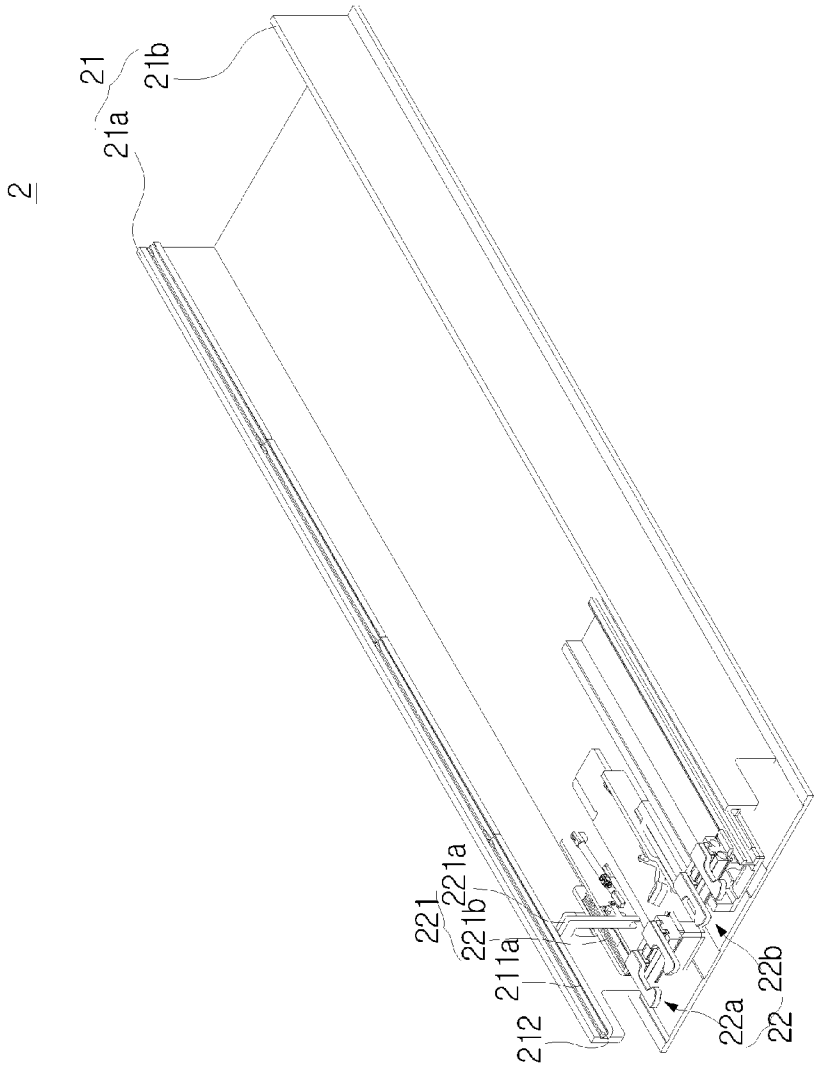
[Fig. 8]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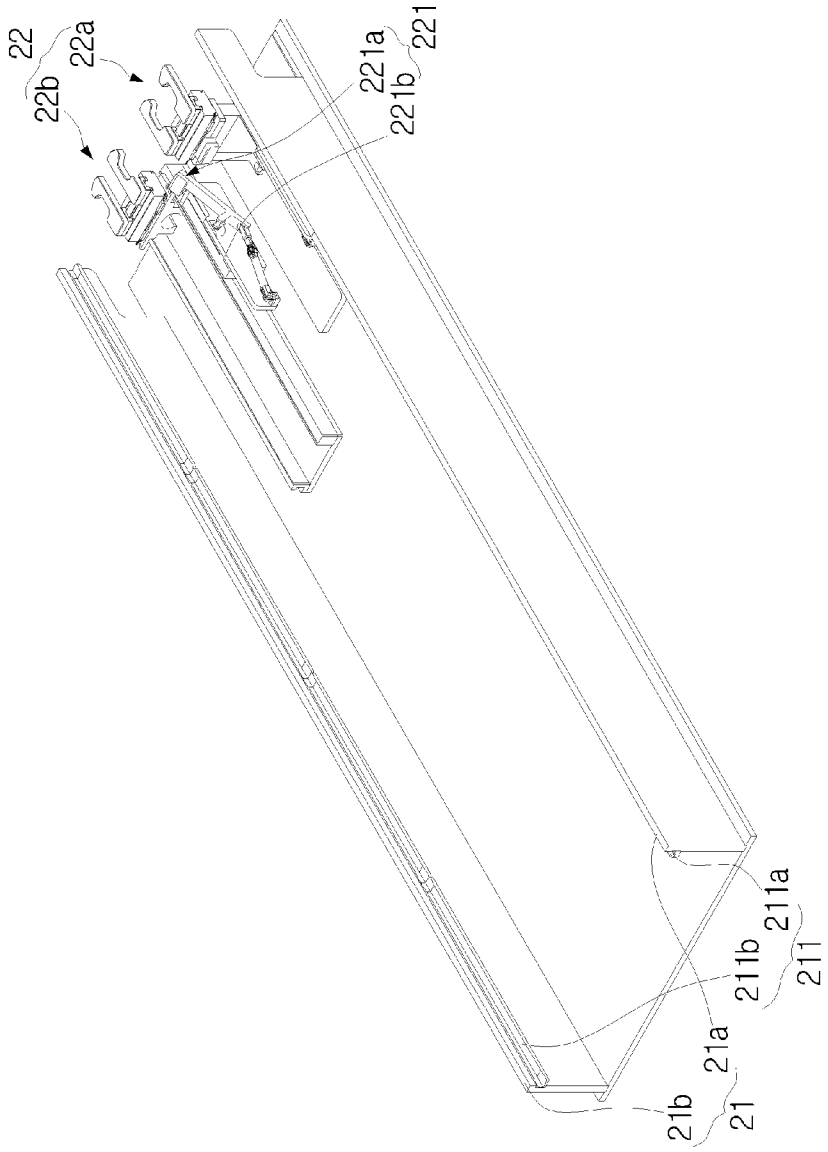
[Fig. 9]



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2008/003100

A. CLASSIFICATION OF SUBJECT MATTER

H01L 21/66(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 8 H01L 21/66

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Utility models and applications for Utility models since 1975

Japanese Utility models and applications for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

e-KIPASS(KIPO Internal); "vision inspection system", "tray alignment", "magazine body"

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	KR 1020060087850 A (INTEKPLUS CO., LTD.) 03 August 2006 see the abstract, claim 1, Figs. 1,2	1-13
A	JP 15-255636 A (RICOH CO., LTD.) 10 September 2003 see the abstract, claim 1, Figs. 1,2	1-13
A	JP 07-187332 A (EZAKI GLICO CO. , LTD.) 25 July 1995 see the abstract, claim 1, Figs. 5,6	1-13

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
27 NOVEMBER 2008 (27.11.2008)	**27 NOVEMBER 2008 (27.11.2008)**

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Authorized officer

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Telephone No. 82-42-481-5732

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR2008/003100

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