

**CONVEYING AND COLLECTING MACHINE CAPABLE OF
TRANSPORTING ELEMENTS TO DIFFERENT HOLDING MEMBERS**

BACKGROUND OF THE INVENTION

Field of the Invention

5 The present invention relates to a conveying and collecting machine capable of transporting elements to different holding members that can automatically pass elements to different holding members so as to improve the production efficiency.

○ Description of the Prior Arts

10 Currently, an element product is made through multiple manufacturing processes. For example, an integrated circuit is firstly designed, then in the manufacturing process of Transparent Media Adapter, a detailed circuit diagram will be reproduced onto a silicon wafer in a layer by layer manner, after that, applying nitric acid chemicals and the like, the silicon wafer will be cleaned and etched so as to finish the manufacture of wafer. Thereafter, said finished wafer will be tested in
15 the testing process in which qualified chips will be cut therefrom, then the cut chips
○ will be packaged, dip-soldered, cleaned, and finally have a retesting and a packaging treatment. However, every workshop is provided with different holding members for receiving elements based on their operational purposes, for instance, the cleaning workshop is applied a holding member having a larger slot-distance (such as a
20 carrier) to receive integrated circuits, while the testing workshop is used a holding member having a smaller slot-distance (such as a material tray) to receive integrated circuits. Because aforesaid difference between the cleaning and the testing workshops, after the completion of cleaning process, the worker needs to manually

transfer integrated circuits of the holding member of cleaning workshop onto the holding member of testing workshop, thus resulting in a time-consuming and inefficient production. Also, the integrated circuit is easy to be damaged from such a manual manufacturing processes.

5 The present invention has arisen to mitigate and/or obviate the afore-described disadvantages.

SUMMARY OF THE INVENTION

○ The primary objective of the present invention is to provide a conveying and collecting machine capable of transporting elements to different holding
10 members, which can use such an automatized machine to replace manual manufacturing processes so as to greatly enhance production efficiency.

 The secondary objective of the present invention is to provide a conveying and collecting machine capable of transporting elements to different holding members, which can use such an automatized machine to replace manual
15 manufacturing processes so as to save the labor and the production costs.

○ Another objective of the present invention is to provide a conveying and collecting machine capable of transporting elements to different holding members that can reduce the damages of elements due to the manual manufacturing processes.

 Still another objective of the present invention is to provide a conveying and
20 collecting machine capable of transporting elements to different holding members that can automatically collect the respective holding members so as to enhance the usage convenience.

 A conveying and collecting machine capable of transporting elements to

different holding members provided in accordance with the present invention comprises:

a feeding means provided with at least one first holding member for the feeding of elements on said at least one first holding member;

5 a conveying means defined with a passing mechanism, a loading mechanism, a carrying mechanism, and a shifting mechanism, wherein the passing mechanism is used to convey held elements of first holding members onto a distance-adjustable loading mechanism so as to adjust the distance between the two
10 respective elements, thereafter, the passing mechanism will transport the distance-adjusted elements to the carrying mechanism, then the carrying mechanism will further pass the elements to the shifting mechanism by which said elements will be finally carried to a collection means;

a collection means having at least one second holding member for the storage of elements.

15 The feeding means is also defined with a guiding mechanism, a transferring mechanism, a temporary storage area, a first carrying means, a storing means, a supplying means and a second carrying means, wherein

the guiding mechanism is utilized to guide into a plurality of first holding members, and then by virtue of the transferring mechanism, the first holding
20 members will be transferred forward for the automatic feeding;

the temporary storage area is used for the temporary storage of first holding members;

the first carrying means serves to pass the first holding members to a

feeding area so that the conveying means can pick the elements out;

the storing means is applied to automatically store the first holding members;

the supplying means is provided with a plurality of second holding members for receiving the elements;

the second carrying means is used to transport empty second holding members of supplying means to a collection processing area so as to hold elements, also, said second carrying means severs to carry full holding members of collection processing area to the collection means.

The present invention will become more obvious from the following description when taken in connection with the accompanying drawings, which show, for purpose of illustrations only, the preferred embodiment in accordance with the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 shows a conveying and collecting machine capable of transporting elements to different holding members in accordance with the present invention transporting elements onto different holding members;

Fig. 2 further shows a conveying and collecting machine capable of transporting elements to different holding members in accordance with the present invention transporting the elements onto different holding members in detail;

Fig. 3 shows a conveying and collecting machine capable of transporting elements to different holding members in accordance with a preferred embodiment of the present invention;

Fig. 4 shows a first carrying means clamping a carrier in a temporary storage area;

Fig. 5 shows the first carrying means conveying the carrier into a feeding processing area;

5 Fig. 6 shows a transferring process of a conveying means;

Fig. 7 shows a passing mechanism conveying elements to a loading mechanism;

Fig. 8 shows the passing mechanism transporting the elements to a carrying mechanism;

10 Fig. 9 shows the carrying mechanism passing the elements to a shifting mechanism;

Fig. 10 shows the shifting mechanism carrying the elements onto a material tray;

15 Fig. 11 shows a second carrying means transferring the material tray to a collection means;

Fig. 12 shows a storing means storing an empty carrier.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As shown in Fig. 1, a conveying and collecting machine capable of transporting elements to different holding members in accordance with the present invention can be embodied in a transporting process of elements and comprises a feeding means 1, a conveying means 2 and a collection means 3.

The feeding means 1 is provided with a guiding mechanism 11 for guiding a plurality of first holding members (such as carriers) which have held elements to

cause a movement in a first direction (X-direction). Also, a transferring mechanism 12 capable of movement in a first and a second direction (Y-direction) is disposed on the feeding means 1 for transporting the first holding members on the guiding mechanism 11 to the conveying means 2.

5 The conveying means 2 is defined with a passing mechanism 21 having a first pick-and-place apparatus 211 and a second pick-and-place apparatus 212 which respectively serve to pick and place different distances of elements, moreover, they are driven by a driver 213 to simultaneously cause a movement in a third direction (Z-direction) and an angle rotation such as 90 degree. A loading mechanism 22
10 having at least two support plates 221 is mounted on the conveying means 2, by using a driver 222, one of the support plates 221 will move in a first direction so as to corresponds to the pick-and-place distances of the first and the second pick-and-place apparatus 211 、 212 of passing mechanism 21 in such a manner that the elements can be picked and placed. Also, a carrying mechanism 23 is driven by
15 two drivers 231 and 232 so as to drive loading platforms 233 、 234 to move in a first and a third direction such that the loading platforms 233 and 234 can interchangeably move to pass the elements to a shifting mechanism 24, by means of a driver 241, the shifting mechanism 24 will be driven to push a pick-and-place apparatus 242 to move in a second and a third direction, accordingly the elements
20 will be carried to a collection means 3.

Referring to Fig. 2, a conveying and collecting machine capable of transporting elements to different holding members in accordance with the present invention can further embodied in a detailed transporting process of elements and

comprises a feeding means 1 provided at the side thereof with a temporary storage area 4 for temporarily storing first holding members. In the temporary storage area 4 is arranged a driver 41 for conveying the holding members of a transferring mechanism 12 of feeding means 1 in a first direction, and a feeding processing area 5 is formed at the side of temporary storage area 4, a first carrying means 6 is disposed for transporting the first holding members between the temporary storage area 4 and the feeding processing area 5. By using a first driver 61, a loading platform 62 will be driven to move in a first direction, while by using a second driver 63, the loading platform 62 will be driven to move in a third direction so as to hold the first holding members. At the side of loading platform 62 is disposed a clamping apparatus 64 capable of movement in a first direction, so that the first holding members can be fixedly clamped. Further, by virtue of a third driver 65, the loading platform 62 can urge the elements of first holding members to cause a movement in a third direction. In addition, at the side of feeding processing area 5 is defined with a storing means 7, in which a pushing apparatus 71 capable of movement in a first direction is arranged therein for pushing the first holding members to be stored in a magazine mechanism 7, and a collection processing area 8 is formed at front of conveying means 2 for placing different types of second holding members, such as material trays. At one side of collection processing area 8 is mounted a supplying means 9 so as to provide the second holding members. In order to carry the second holding members, among the supplying means 9, the collection processing area 8 and a collection means 3 is fixed a second carrying means 10 in which a driver 101 is formed therein so as to drive a loading platform 102 to move in

a first direction. Furthermore, the loading platform 102 is installed with a first clamping apparatus 103 as well as a second clamping apparatus 104 by which the second holding members will be fixedly clamped.

As shown in Fig. 3, the guiding mechanism 11 of feeding means 1 can guide a plurality of first holding members capable of holding elements A, wherein the holding members can be carriers B, and by using the transferring mechanism 12, one of the carriers B will be transported to the temporary storage area 4 in which the carriers B of transferring mechanism 12 will be guided by the driver 41.

Referring to Fig. 4, the first driver 61 of first carrying means 6 will drive the loading platform 62 to move in a first direction such that the loading platform 62 can move into the temporary storage area 4, and by virtue of the second driver 63, the loading platform 62 can also move in a third direction so that the clamping apparatus 64 can clamp the carriers B of temporary storage area 4. Thereafter, the third driver 65 will drive the loading platform 62 to urge elements of carriers B to cause a movement in a third direction.

Referring next to Fig. 5, the first driver 61 can drive the loading platform 62 as well as the carrier B to cause a movement in an opposite direction so that said loading platform 62 and the carrier B can enter into the feeding processing area 5, and the carrier B will locate beneath the first pick-and-place apparatus 211 of the passing mechanism 21 of conveying means 2 for picking the elements out.

As shown in Fig. 6, the driver 213 of passing mechanism 21 can drive the first and the second pick-and-place apparatus 211 and 212 to cause a simultaneous movement in a third direction. Due to the distance between the two respective

pick-and-place heads (not shown) of the first and the second pick-and-place apparatus 211、212 is equal to the slot distance of carrier B, the first pick-and-place apparatus 211 can pick the elements A of carrier B out. And by means of the driver 213, the first and the second pick-and-place apparatus 211 and 212 can be driven to
5 cause a rotation at 90 degree such that the first pick-and-place apparatus 211 will locate above the support plates 221 of loading mechanism 22, at this moment, the driver 222 of loading mechanism 22 will adjust the distance between the respective support plates 221 so that aforesaid distance and the distance between the two
10 respective pick-and-place heads of first pick-and-place apparatus 211 are substantially the same in such a manner that the first pick-and-place apparatus 211 can place the elements onto the respective support plates 221.

Referring further to Fig. 7, the passing mechanism 21 can drive the first and the second pick-and-place apparatus 211、212 to reversely rotate at 90 degree by using the driver 213, and said first pick-and-place apparatus 211 will locate above
15 the carrier B, while said second pick-and-place apparatus 212 will locate above the support plates 221 of loading mechanism 22. Because the distance between the respective pick-and-place heads is equal to the slot distance of material tray C (another type of second holding member), the loading mechanism 22 can adjust the distance between the respective support plates 221 by using the driver 222, thus
20 aforesaid distance will be the same as the distance between the respective pick-and-place heads. When the driver 231 of passing mechanism 21 drive the first and the second pick-and-place apparatus 211、212 to move simultaneously in a third direction, the first pick-and-place apparatus 211 will cause a material-picking

movement again, and the second pick-and-place apparatus 212 will take the elements of support plates 221 out.

As shown in Fig. 8, the passing mechanism 21 can drive the first and the second pick-and-place apparatus 211 、 212 to cause a repeated opposite movement at 90 degree by virtue of the driver 213, and then the first pick-and-place apparatus 211 will fix above the support plates 221 of loading mechanism 22, while the second pick-and-place apparatus 212 will locate above the loading platform 233 of carrying mechanism 23. Thereafter, by using the driver 213, the first and the second pick-and-place apparatus 211 、 212 will be driven to cause a simultaneous movement in a third direction, then the first pick-and-place apparatus 211 will place the elements A onto the support plates 221. In view of the slot distance of loading platform 233 is equal to the width of second pick-and-place apparatus 212, accordingly, the second pick-and-place apparatus 212 can place the elements A onto the loading platform 233.

As shown in Fig. 9, in which, the carrying mechanism 23 can drive the loading platform 233 to cause a movement in a first direction by means of the driver 231, so that the elements A can be transported to the shifting mechanism 24 in which the pick-and-place apparatus 242 will be driven by the driver 241 to cause a movement in a second direction so as to pick the materials from the loading platform 233.

Referring to Fig. 10, by using the driver 101, the second carrying means 10 is driven to push the loading platform 102 to move in a first direction so as to further displace to the supplying means 9, and then the first clamping apparatus 103 will

clamp different types of empty second holding members, wherein said second holding members is a material tray C, and the material tray C will be carried to the collection processing area 8 for holding the elements A. The shifting mechanism 24 can drive the pick-and-place apparatus 242 to move in a second direction by means of the driver 241 so as to pass the elements A to the collection processing area 8 and to place said elements A onto the material tray C.

Referring next to the Fig. 11, the second carrying means 10 is driven by the driver 101 so as to drive the loading platform 102 to move in a first direction, and then by using the second clamping apparatus 104, the tray material C full of elements A will be fixed clamped, thereafter, the material tray C will be passed to the collection means 3 for collection. Referring final to the Fig. 12, after the elements have been completely picked out from the carrier B of feeding processing area 5, the pushing apparatus 71 of storing means 7 will push the empty carrier B in a first direction so that the carrier B can enter the magazine mechanism 72 for the storage thereof.

While we have shown and described various embodiments in accordance with the present invention, it should be clear to those skilled in the art that further embodiments may be made without departing from the scope of the present invention.

WHAT IS CLAIMED IS:

1. A conveying and collecting machine capable of transporting elements to different holding members comprising:

5 a feeding means provided with at least one first holding member for the feeding of elements on said at least one first holding member;

a collection means having at least one second holding member for the collection of elements

10 a conveying means being used to convey the held elements of first holding members out of the feeding means and to adjust the distance between the two respective elements, thereafter, the distance-adjusted elements will be further carried to the second holding members of collection means;

wherein a passing mechanism is disposed in the conveying means for transporting elements between the feeding means and the collection means;

15 wherein a loading mechanism is arranged in the conveying means for carrying elements and adjusting the distance between the two respective elements;

wherein the loading mechanism is defined with at least two support plates, by using a driver, the distance between the two respective support plates is adjustable.

20 2. The conveying and collecting machine capable of transporting elements to different holding members as claimed in claim 1, wherein a guiding mechanism is defined in the feeding means for guiding first holding members, and then by virtue of a transferring mechanism, the first holding members can be transferred.

3. The conveying and collecting machine capable of transporting elements to different holding members as claimed in claim 1, wherein the passing mechanism

is provided with a pick-and-place apparatus for picking and placing different distances of elements, and by using a driver, said passing mechanism can cause a movement in a third direction and an angle rotation.

4. The conveying and collecting machine capable of transporting elements
5 to different holding members as claimed in claim 1, wherein in the conveying means is mounted a carrying mechanism and a shifting mechanism for carrying and shifting the elements, respectively.

5. The conveying and collecting machine capable of transporting elements
to different holding members as claimed in claim 4, wherein a driver is formed in the
10 carrying mechanism for driving a loading platform to cause a movement in a first direction.

6. The conveying and collecting machine capable of transporting elements
to different holding members as claimed in claim 4, wherein a driver is formed in the
shifting mechanism so as to drive a pick-and-place apparatus to move in a second
15 and a third direction.

7. The conveying and collecting machine capable of transporting elements
to different holding members as claimed in claim 1, wherein a temporary storage
area is arranged in the conveying and collecting machine for the temporary storage
of first holding elements.

8. The conveying and collecting machine capable of transporting elements
20 to different holding members as claimed in claim 7, wherein a driver is installed in the temporary storage area for driving the first holding members to move in a first direction.

9. The conveying and collecting machine capable of transporting elements to different holding members as claimed in claim 1, wherein a feeding processing area is formed in the conveying and collecting machine for the storage of first holding members.

5 10. The conveying and collecting machine capable of transporting elements to different holding members as claimed in claim 1, wherein a first carrying means is mounted in the conveying and collecting machine so as to transfer the first holding elements.

10 11. The conveying and collecting machine capable of transporting elements to different holding members as claimed in claim 10, wherein the first carrying means is disposed a driver for driving a loading platform to move in a first direction, also, a second and a third driver is fixed to the first carrying means such that the loading platform will be driven to move in a third direction, furthermore, a clamping apparatus is mounted to said first carrying means for the clamping of first holding
15 members.

12. The conveying and collecting machine capable of transporting elements to different holding members as claimed in claim 1, wherein a storing means is installed in the conveying and collecting machine so as to store the first holding members.

20 13. The conveying and collecting machine capable of transporting elements to different holding members as claimed in claim 12, wherein the storing means is provided with a pushing apparatus and a magazine mechanism, said pushing apparatus is used to urge the first holding members in a first direction, and the

magazine mechanism is used for the storage of first holding members.

14. The conveying and collecting machine capable of transporting elements to different holding members as claimed in claim 1, wherein a collection processing area is provided in the conveying and collecting machine so as to store the second
5 holding members.

15. The conveying and collecting machine capable of transporting elements to different holding members as claimed in claim 1, wherein a supplying means is fixed in the conveying and collecting machine so as to supply at least one different type of second holding member.

10 16. The conveying and collecting machine capable of transporting elements to different holding members as claimed in claim 1, wherein a second carrying means is arranged in the conveying and collecting machine for the carrying of second holding members.

15 17. The conveying and collecting machine capable of transporting elements to different holding members as claimed in claim 16, wherein a driver is mounted in the second carrying means so as to drive a loading platform to move in a first direction, in addition, a clamping apparatus is defined on the loading platform for the clamping of second holding members.