STORAGE APPARATUS FOR STORING SEMICONDUCTOR ELEMENT OR RETICLE

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Abstract
The present invention provides a storage apparatus for storing a semiconductor element or a reticle. The storage apparatus comprises a first cover, a second cover and a flange. The first cover has a top and a plurality of laterals around the top. The second cover is for being assembled with the first cover to form an inner space for accommodating the reticle. As to the flange, it is provided on the first cover for being mechanically held and placed. The characteristic of the disclosed storage apparatus is that the flange and the first cover are integrally formed.
STORAGE APPARATUS FOR STORING SEMICONDUCTOR ELEMENT OR RETICLE

[0001] The current application is a continuation of, and claims a priority to U.S. patent application Ser. No. 12/106, 274 filed on Apr. 19, 2008, which claims a priority to a foreign patent application in Taiwan of application number 096219271 filed on Nov. 15, 2007.

BACKGROUND OF THE INVENTION

[0002] 1. Technical Field
[0003] The present invention relates to storage apparatuses for storing semiconductor elements or reticles and, more particularly, to a storage apparatus having a flange integrally formed with a first cover thereof for storing a semiconductor element or a reticle.
[0004] 2. Description of Related Art
[0005] In the rapidly developing semiconductor technology, optical lithography plays an important role and wherever pattern definition is conducted, optical lithography is requisite. As to the application of optical lithography relating to semiconductors, a designed circuit pattern is used to produce a light-transparent reticle. Basing on the principle of exposure, after a light passes through the reticle to be projected on a silicon wafer, the circuit pattern formed on the reticle can be exposed onto the silicon wafer. Since any dust (such as particles, powders or an organic matter) can adversely affect the quality of such projected pattern, the reticle used to produce the pattern on the silicon wafer is required with absolute cleanliness. Thus, clean rooms are typically employed in general wafer processes for preventing particles in the air from defiling reticles and wafers. However, absolute dustless environment is inaccessible even in known clean rooms.
[0006] Hence, reticle storage apparatuses that facilitate preventing defilement are implemented in current semiconductor processes for the purpose of storage and transportation of reticles so as to ensure cleanliness of the reticles. When such reticle storage apparatuses accommodate reticles for semiconductor processes, the reticles can be isolated from the atmosphere when being transferred and conveyed between stations, so as to be defended from defilement caused by impurities that induces deterioration. Similarly, when semiconductor element storage apparatuses accommodate semiconductor elements in semiconductor processes, the semiconductor elements can be isolated from the atmosphere when being transferred and conveyed between stations, so as to be secured from defilement caused by impurities that induces deterioration. Therefore, it is preferable to store reticles or semiconductor elements in storage apparatuses so as to ensure the cleanliness and prevent contamination.
[0007] However, conventional storage apparatuses for storing semiconductor elements or reticles typically have complex structures. For example, a conventional storage apparatus is always composed of two covers and, for safe mechanical transportation, a flange alone or in company with a flange support has to be provided at a top of one of the covers for being help by a robot for transportation purpose. Further, a handle is also required for manual displacement. Besides, a board is needed for receiving a label tagged thereon while other structures may be necessary to accommodate other components.
[0008] Such flange, flange support, handle, board and other components on the storage apparatus for storing semiconductor elements or reticles can significantly increase the weight of the storage apparatus and consume increased assembling time. Besides, connectors are indispensable in the conventional storage apparatus for connecting the aforementioned components. Even with the most exquisite assembly, it is difficult to perpetually maintain tightness of the connectors. Consequently, when the connectors loosen, the connected components risk departing from each other. At a minimum then, the boards may fall off or lose identifying functions thereof; in a worst case situation, the flange, flange support or the handle may come off during the transportation of the storage apparatus for storing semiconductor elements or reticles, resulting in enhanced possibility of damage to the semiconductor elements or reticles.
[0009] Therefore, the present invention provides a storage apparatus having a flange integrally formed with a first cover thereof for storing a semiconductor element or a reticle to improve the current technology.

SUMMARY OF THE INVENTION

[0010] To remedy the problem of the prior arts, the present invention provides a storage apparatus for storing a semiconductor element or a reticle that is constructed from a first cover, a second cover and a flange. The first cover has a top and a plurality of laterals around the top. The second cover is to be assembled with the first cover to form an inner space for accommodating the reticle. The flange is on the first cover for being mechanically held and placed. The disclosed subject matter is characterized by that the flange is integrally formed with the first cover as a whole.
[0011] Thereupon, it is one objective of the present invention to provide a storage apparatus having a flange integrally formed with a first cover thereof for storing a semiconductor element or a reticle that requires no connectors so as to reduce risks of damaged to components due to wear of the connectors.
[0012] It is another objective of the present invention to provide a storage apparatus having a flange integrally formed with a first cover thereof for storing a semiconductor element or a reticle that requires no connectors so as to reduce risks of damaged to components due to wear of the connectors.
[0013] It is another objective of the present invention to provide a storage apparatus having a flange integrally formed with a first cover thereof for storing a semiconductor element or a reticle that requires no connectors so as to reduce risks of damaged to components due to wear of the connectors.
[0014] It is another objective of the present invention to provide a storage apparatus having a flange integrally formed with a first cover thereof for storing a semiconductor element or a reticle that requires no connectors so as to reduce overall weight of the storage apparatus.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The invention as well as a preferred mode of use, further objectives and advantages thereof, will best be understood by reference to the following detailed description of an illustrative embodiment when read in conjunction with the accompanying drawings, wherein:
[0016] FIG. 1 is a perspective view of a storage apparatus for storing a semiconductor element or a reticle according to one embodiment of the present invention;
[0017] FIGS. 2A and 2B provide alternative embodiments of the storage apparatus for storing a semiconductor element or a reticle according to the present invention;
FIGS. 3A to 3K provide alternative embodiments of the storage apparatus for storing a semiconductor element or a reticle according to the present invention, wherein different configurations of the flanges, flange supports and the top of the first cover are illustrated;

FIGS. 4A to 4F provide alternative embodiments of the storage apparatus for storing a semiconductor element or a reticle according to the present invention, wherein different configurations of the flanges, flange supports and the lateral of the first cover are illustrated;

FIG. 5 is a perspective view of a storage apparatus for storing a semiconductor element or a reticle of the present invention including a handle 41;

FIGS. 6A and 6B are perspective views of the disclosed storage apparatus for storing a semiconductor element or a reticle including a board 42; and

FIGS. 7A to 7C are perspective views of the disclosed storage apparatus for storing a semiconductor element or a reticle including an alarm, a sensor or an identifying device.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

While the present invention discloses a storage apparatus having a flange integrally formed with a first cover thereof for storing a semiconductor element or a reticle, it is to be stated first of all that the detailed manufacturing or processing procedures of the disclosed reticle storage apparatuses or semiconductor element storage apparatuses rely on known technology and need not be discussed at length herein. Meantime, while the accompanying drawings are provided for purpose of illustration, it is to be understood that the components and structures therein need not to be made in scale.

Please refer to FIG. 1 for a perspective view of a storage apparatus for storing a semiconductor element or a reticle according to one embodiment of the present invention. The disclosed storage apparatus comprises a first cover 1, a second cover 2 and a flange 3. The first cover 1 has a top 11 and a plurality of laterals 12 around the top 11. The second cover 2 is for being assembled with the first cover 1 to form an inner space for accommodating the semiconductor element or the reticle. The flange 3 is provided on the first cover 1 and may be embodied as one or more than one flange. When the disclosed storage apparatus for storing the semiconductor element or the reticle is to be transported, a robot can be directly placed below the flange 3 to raise the flange 3 and in turn raise the disclosed storage apparatus so as to deliver, transport or place the disclosed storage apparatus. The disclosed subject is characterized by that the flange 3 is integrally formed with the first cover 1 as a whole. Therein, the flange 3 may project from one of the laterals 12, as shown in FIG. 2A. Alternatively, the flange 3 may project from the top 11 of the first cover 1, as shown in FIG. 2B.

Now please refer to FIGS. 3A to 3K. In the disclosed storage apparatus for storing the semiconductor element or the reticle, a flange support 31 may be additionally disposed on flange 3 for connecting the first cover 1 and supporting the flange 3 so as to contribute to enhanced support strength when the disclosed storage apparatus is held by the robot. Diverse configurations of the flange support 31 may be implemented in the present invention, as shown in FIGS. 3A through 3K. The flange support 31 may be perpendicular to the top 11 of the first cover 1, or the flange support 31 may be provided on the top 11 of the first cover 1 and include an angle with the top 11 of the first cover 1 that is greater or less than 90 degrees. Various modifications of the configurations of the flange support 31 may be adopted as needed.

Further, please refer to FIGS. 4A to 4F for alternative embodiments of the storage apparatus of the present invention. Therein, the flange support 31 is provided beside the lateral 12 of the first cover 1. An included angle between the flange support 31 and the lateral 12 of the first cover 1 may be equal to greater than or less than 90 degrees, as shown in FIGS. 4A to 4F. Various modifications of the configurations of the flange support 31 may be adopted as needed.

Now please refer to FIG. 5. A handle 41 may be further provided on the first cover 1 of the disclosed storage apparatus for facilitating manually handling and moving the disclosed storage apparatus. The handle 41 may be formed separately and then mounted on the first cover 1 or formed integrally with the first cover 1 as a whole.

Moreover, according to FIGS. 6A and 6B, a board 42 may be further provided on the first cover 1 of the disclosed storage apparatus. The board 42 may be additionally mounted on the first cover 1 or formed integrally with the first cover 1 as a whole. The board 42 is provided for receiving a label 43 tagged thereon so as to label the disclosed storage apparatus itself or contents therein.

In addition, in FIGS. 7A to 7C, the disclosed storage apparatus may further comprises an alarm 44 so that when the disclosed storage apparatus encounters a predefined danger, the alarm 44 can give an alert. The alarm may additionally comprises a sensor 45 for directing sensing related information. Or, an identifying device 46 is equipped on the disclosed storage apparatus to provide an identification function. The identifying device 46 may be a Radio Frequency Identification (RFID) device.

Although the particular embodiments of the invention has been described in detail for purposes of illustration, it will be understood by one of ordinary skill in the art that numerous variations will be possible to the disclosed embodiments without going outside the scope of the invention as disclosed in the claims.

What is claimed is:

1. A storage apparatus for storing a semiconductor element or a reticle, comprising:
   a first cover, having a top and a plurality of laterals around the top;
   a second cover for being assembled with the first cover to form an inner space for accommodating the semiconductor element or the reticle;
   at least one flange support, one end of each the flange support connected with the top of the first cover; and
   at least one flange, each flange individually connected with the other end of the each flange support for being held and placed by a machine;

2. The storage apparatus of claim 1, wherein the flange and the first cover are integrally formed as a whole.

3. The storage apparatus of claim 1, wherein an included angle between the flange support and the top of the first cover is greater or less than 90 degrees.

4. The storage apparatus of claim 1, wherein the flange support is perpendicular to the lateral of the first cover.
5. The storage apparatus of claim 1, wherein an included angle between the flange support and the lateral of the first cover is greater or less than 90 degrees.

6. The storage apparatus of claim 1, wherein a board is provided on the first cover.

7. The storage apparatus of claim 6, wherein the board is integrally formed with the first cover.

8. The storage apparatus of claim 6, wherein the board is for being tagged with a label.

9. The storage apparatus of claim 1, further comprising an alarm.

10. The storage apparatus of claim 1, further comprising a sensor.

11. The storage apparatus of claim 1, further comprising an identifying device.

12. The storage apparatus of claim 11, wherein the identifying device is a Radio Frequency Identification (RFID) device.

13. A storage apparatus for storing a semiconductor element or a reticle, comprising:

   a first cover, having a top and a plurality of laterals around the top;

   a second cover for being assembled with the first cover to form an inner space for accommodating the semiconductor element or the reticle;

   at least one flange support, one end of each the flange support connected with the top of the first cover;

   at least one flange, the each flange individually connected with the other end of the each flange support for being held and placed by a machine; and

   a handle for being assembled with the first cover;

   wherein the flange and the first cover are integrally formed as a whole.

14. The storage apparatus of claim 13, wherein the flange support is perpendicular to the top of the first cover.

15. The storage apparatus of claim 13, wherein an included angle between the flange support and the top of the first cover is greater or less than 90 degrees.

16. The storage apparatus of claim 13, wherein the flange support is perpendicular to the lateral of the first cover.

17. The storage apparatus of claim 13, wherein an included angle between the flange support and the lateral of the first cover is greater or less than 90 degrees.

18. The storage apparatus of claim 13, wherein the handle is integrally formed with the first cover.

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