



159159

CASSETTE HAVING A TRACKING DEVICE SECURED THERETO

Field of Invention

5 The invention relates generally to cassettes for receiving storage media. In particular, the invention relates to a cassette for storage media having a tracking device secured thereto.

Background

10 Cassettes are typically used in disk drive or storage media industries for holding and conveying items such as magnetic disks or wafers and other forms of storage media. The storage media are usually processed through a manufacturing line having multiple process stations for different processes. An automated transportation system is typically employed for transporting the items contained in the cassettes along the different process stations in the manufacturing line.

15

Due to an increasing demand for high manufacturability of the storage media, there is a need for reliable methods for physically tracking the storage media through the manufacturing line. It is therefore desirable to improve on the tracking of the storage media in order to reduce downtime within a manufacturing cycle due to stoppages caused
20 by disruptions to the tracking of the storage media.

Conventionally, each cassette has a tracking device secured thereto. Therefore, the cassettes can be physically tracked by using the tracking device corresponding to the cassettes. An example of the tracking device is a radio frequency identification (RFID)
25 tag. An RFID tag is typically secured to each of the cassettes such that information critical to the processing of the storage media is stored within the RFID tag. The RFID tag is normally inserted into and secured by an adaptor to the cassette.



G00002

At specific steps along the manufacturing line, for example cleaning and spin drying steps, the cassettes are subjected to rapid and recurring mechanical movements. The cleaning and spin drying steps are usually repeated many times during processing of the storage media. As a result, the tracking devices very often become dislodged and separated from the cassette not only when being transported along the manufacturing line, but also when undergoing processing at the respective process stations. For example, when undergoing the cleaning and drying steps, the rapid mechanical movements undesirably increase the possibility of dislodging the tracking device from the adaptor of the cassette.

Furthermore, movement during transportation of the cassette between stations further increases the possibility of dislodgement of the tracking device. This results in a loss of tracking information required for processing the storage media and thereby causes unnecessary downtime within the manufacturing cycle.

Since processing at the cleaning and drying stations and transportation between stations cannot be avoided, the tracking device should be effectively mounted to the cassette to reduce ease of dislodgement. Moreover, the effectiveness of mounting the tracking device to the cassette is dependent on the ability of the adaptor to retain the tracking device. Mishandling of the cassette usually leads to the adaptor breaking or deforming which in turn substantially reduces the adaptor's ability to retain the tracking device.

There is therefore a need for improving the securing of the tracking devices to the adaptors of the cassettes for better reliability in tracking the storage media held and conveyed in the cassettes.

Summary

A preferred embodiment of the invention disclosed herein provides improved reliability relating to the securing of tracking devices to cassettes.

Therefore, in accordance with the invention, a cassette for receiving storage media is disclosed. The cassette comprises a holder for removably securing a tracking device to the cassette, the holder comprising a first holding member extending substantially upright
5 from the cassette along a first axis; and a second holding member extending from the cassette substantially parallel to the first holding member, the first and second holding members being spatially inter-configured for defining an insertion opening, the tracking device being insertable between the first and second holding members through the insertion opening substantially along the first axis for engaging with the at least one of
10 the first and second holding members, wherein when the tracking device engages with at least one of the first and second holding member, the at least one of the first and second holding member substantially impedes spatial displacement of the tracking device along the first axis, and the other of the first and second holding member being shaped and further configured for cooperating with the at least one of the first and second holding
15 member for substantially impeding spatial displacement of the tracking device substantially along a second axis, the second axis being substantially perpendicular to the first axis.

Brief Description Of The Drawings

20 A preferred embodiment of the invention is described hereinafter with reference to the drawings, in which:

Fig. 1 is an isometric view of a cassette according to the preferred embodiment of the invention;

25 Fig. 2 is an isometric view of a holder formed on the cassette of Fig. 1;

Fig. 3 is an isometric view of the holder of Fig. 2 having a tracking device inserted therein;

Fig. 4 is an isometric view of a securing member attachable to the cassette of Fig. 1;

Fig. 5 is an isometric view of the securing member of Fig. 4 attached to the cassette and positioned over the holder and tracking device of Fig. 3; and

5

Fig. 6 is an isometric view of an identifier attachable to the cassette of Fig. 1.

Detailed Description

With reference to the drawings, a cassette according to a preferred embodiment of the invention having improved reliability and effectiveness in securing a tracking device thereto is disclosed. The cassette is suitable for holding and conveying storage media along a manufacturing line.

Conventional cassettes for securing tracking devices thereto are disclosed herein also. The conventional cassettes have adaptors for storing the tracking devices. However, the adaptors of the conventional cassettes are prone to breakage which consequently cause the tracking devices to be dislodged from the cassettes. This results in unnecessary downtime in the process for the manufacturing of storage media contained in the conventional cassettes.

20

For purposes of brevity and clarity, the description of the invention is limited hereinafter to applications related to securing tracking devices to cassettes. This however does not preclude applications of the preferred embodiment of the invention to securing other devices to the cassettes, which require similar securing means as the preferred embodiment of the invention for securing the tracking devices to the cassettes. The functional and operational principles on which the preferred embodiment of the invention is based upon remain the same throughout the other applications.

25

The preferred embodiment of the invention is a cassette having a holder for removably securing a tracking device to the cassette. The preferred embodiment of the invention is

30

described in greater detail hereinafter. In the detailed description and illustrations provided in Figs. 1 to 6 of the drawings, like elements are identified with like reference numerals.

- 5 With reference to Fig. 1, an isometric view of the cassette 100 having a holder 102 according to the preferred embodiment of the invention is shown. The cassette 100 has a conventional opened-jaw rack portion 105 which holds and segregates storage media (not shown) by inwardly opposing strips 103. The inwardly opposing strips 103 are formed between upper portions 106 and base portions 108 of the cassette 100. The cassette 100
10 has a plurality of slots 104 formed between the inwardly opposing strips 103.

Examples of the storage media are the magnetic disks of hard drives and semiconductor wafers containing memory devices. The storage media are typically cleaned by liquid and dried thereafter to remove the liquid during cleaning thereof. The cassette 100
15 preferably has sidewalls 110 that are preferably substantially U-shaped. This advantageously reduces the surface area of the cassette 100 to substantially expose the storage media to drying air and desirably reduces the time for drying the storage media. An identifier 112 is preferably removably attached to the upper portions of the cassette 100.

20

The holder 102 is preferably formed on one end of the cassette 100, for example adjacent to the sidewall 110 of the cassette 100. The holder 102 secures and houses a tracking device 302 (as shown in Fig. 3), such as an RFID tag, for storing information related to the processing of the storage media contained in the cassette 100.

25

A securing member 114 is preferably removably fastened to the cassette 100 and disposed over the holder 102 and the tracking device 302. The securing member 114 protects the tracking device 302 from any accidental knocks by foreign objects. The securing member 114 also enhances retention of the tracking device to the cassette 100 in

the event that the holder 102 is deformed and is therefore unable to prevent the tracking device 302 from accidental or unintended dislodgement.

Fig. 2 shows an isometric view of the holder 102 formed proximal to the sidewall 110 of the cassette 100 of Fig. 1. The holder 102 has an insertion opening 200 for receiving the tracking device 302. The insertion opening 200 is partially defined by a first holding member 202 and a second holding member 204. Each of the first holding member 202 and the second holding member 204 preferably extends substantially upright along a first axis, such as the z-axis as shown in Fig. 2, and substantially parallel to each other.

The first holding member 202 has a first inner surface 206, wherein the normal of the first inner surface 206 is substantially perpendicular to the z-axis. The second holding member 204 similarly has a second inner surface 208, wherein the normal of the second inner surface 208 is substantially perpendicular to the z-axis and is disposed opposite to the first inner face 206. Both the first and second inner surfaces 206, 208 preferably form similarly shaped concavities in the respective first holding member 202 and second holding member 204 and are shaped such that any tracking device 302 having a particular structural geometry is insertable therebetween.

In this preferred embodiment of the invention as shown in Fig. 2, the first and second inner surfaces 206, 208 are preferably curved for adapting to a cylindrical shaped tracking device 302 insertable therebetween. Each of the inner surfaces 206, 208 preferably has a curvature with a diameter larger than the diameter of the tracking device 302 for allowing the tracking device 302 to be inserted between the inner surfaces 206, 208.

Additionally, each of the first and second inner surfaces 206, 208 preferably has at least one protrusion 210, 212 respectively extending therefrom for engaging the tracking device 302. The protrusions 210, 212 are preferably but not limited to having a triangular or wedge shape.

Each of the protrusions 210, 212 has an edge for abutting the curved surface of the cylindrical shaped tracking device 302 and for substantially impeding displacement thereof along a plane X. The z-axis is normal to the plane X. A second axis, for example one of axes x_1 and x_2 of Fig. 2, extends parallel to the plane X.

5

Additional protrusions 214, 216, 218 and 220 are preferably formed and arranged at predetermined sections of the first and second inner surfaces 206, 208. The protrusions 210, 212, 214, 216, 218 and 220 therefore facilitate retention of the tracking device 302 between the first and second holding members 202, 204 by substantially impeding spatial displacement of the tracking device 302 along the plane X. Two other protrusions 222, 224 are formed at the bottom of the holder 102. The two protrusions 222, 224 therefore create a space between the bottom of the tracking device 302 and the bottom of the holder 102 for facilitating the removal of undesired liquid trapped therebetween. This advantageously reduces the time required for cleaning and drying the storage media and cassette 100.

15

A third holding member 226 and a fourth holding member 228 are preferably formed between the first and second holding members 202, 204. Each of the third and fourth holding members 226, 228 extends substantially upright along the z-axis and preferably has a catch 230, 232 formed at one end thereof distal to the bottom of the holder 102.

20

The third and fourth holding members 226, 228 are preferably structurally similar and configured such that when the tracking device 302 is fully inserted into the holder 102, each of the respective catches 230, 232 of the third and fourth holding members 226, 228 clasps the top of the tracking device 302. The abutment of the other planar surface of the tracking device 302 substantially impedes the spatial displacement along the first axis. The catches 230, 232 therefore secures the tracking device 302 along the z-axis and, together with the first and second holding members 202, 204, substantially prevent dislodgement of the tracking device 302 from the cassette 100 during transportation and processing of the storage media that are contained in the cassette 100.

30

Fig. 3 shows an isometric view of a cylindrical shaped tracking device 302 being inserted into the holder 102. A gap g having a substantially uniform-width is formed between the tracking device 302 and the first and second inner surfaces 206, 208. The gap g substantially prevents trapping by facilitating discharge of liquid from the holder 102 during the cleaning and drying processes of the storage media. This advantageously prevents any trapped liquid from contaminating subsequent processing stations after the storage media has undergone the cleaning and drying processes. The gap g preferably has a width of at least two millimeters (mm).

The protrusions 210, 212, 214, 216, 218 and 220 of the first and second holding members 202, 204 and the catches 230, 232 of the third and fourth holding members 226, 228 advantageously allowed the tracking device 302 to be firmly secured within the holder 102 of the cassette 100. This improves the reliability in securing the tracking device 302 to the cassette 100.

An expanded view of the securing member 114 of Fig. 1 for securing the tracking device 302 to the cassette is shown in Fig. 4. The securing member 114 has legs 402 extending from a body 404. The legs 402 are located at the extremities of the body 404 and are displaced such that the securing member 114 is able to accommodate the tracking device 302 and the holder 102. The body 404 is preferably planar and has openings 406 formed therethrough. The legs 402 are preferably substantially perpendicular to the body 404 and parallel to each other. Each of the legs 402 has a free end 408 that is preferably hook-shaped. The securing member 114 protects the tracking device 302 by restricting access to the insertion opening 200.

Fig. 5 shows the securing member 114 being secured to the cassette 100 and disposed over the holder 102 and the tracking device 302. Each free end 408 of the legs 402 of the securing member 114 is engaged to an opening 502, 504 on the cassette 100. The openings 502, 504 on the cassette 100 are formed preferably adjacent to the third and fourth holding members, 226, 228 respectively.

An expended view of the identifier 112 is shown in Fig. 6. The identifier 112 preferably has a pair of resiliently biased catches 602 extending from one end of a connector 604 for securing to the cassette 100. The pair of resiliently biased catches 602 preferably has similar shape. The other end of the connector 604 is connected to an
5 identification tab 606. The identifier 112 is preferably attachable to one of the upper portions 106 of the cassette 100.

Additionally, the identifier 112 or at least the identification tab 606 is preferably coloured for use in associating the form factor of the storage media to the cassette 100. The
10 identifier 112 therefore allows facile identification of the type of magnetic disks or wafers contained in each cassette 100.

In the preferred embodiments of the invention, the spatial configuration of the holder 102, securing member 114 and identifier 112 is determined by the requirements of
15 designing the cassette 100. Additionally, the height of the holder 102 is preferably substantially similar to that of the tracking device 302.

In the foregoing manner, a cassette having a holder for securing a tracking device to the cassette is disclosed. Although only a preferred embodiment of the invention is
20 disclosed, it becomes apparent to one skilled in the art in view of this disclosure that numerous changes and/or modification can be made without departing from the scope and spirit of the invention. For example, although the holder is formed for securing tracking devices with circular dimensions in the forgoing embodiment, the securing may be efficiently performed if the holder is formed with different geometrical dimensions for
25 securing tracking devices having other geometrical dimensions such as square, polygonal and elliptical.

Claims:

1. A cassette for receiving storage media, the cassette comprising:
a holder for removably securing a tracking device to the cassette, the holder comprising:

5 a first holding member extending substantially upright from the cassette along a first axis; and

a second holding member extending from the cassette substantially parallel to the first holding member, the first and second holding members being spatially inter-configured for defining an insertion opening, the tracking device
10 being insertable between the first and second holding members through the insertion opening substantially along the first axis for engaging with the at least one of the first and second holding members,

wherein when the tracking device engages with at least one of the first and second holding member, the at least one of the first and second holding member substantially
15 impedes spatial displacement of the tracking device along the first axis, and the other of the first and second holding member being shaped and further configured for cooperating with the at least one of the first and second holding member for substantially impeding spatial displacement of the tracking device substantially along a second axis, the second axis being substantially perpendicular to the first axis.

20 2. The cassette of claim 1, wherein each of the first and second holding members includes at least one protrusion for engaging the tracking device.

3. The cassette of claim 2, wherein the at least one protrusion extends from each of
25 the first and second holding members for securing the tracking device along the first and the second axes.

4. The cassette of claim 1, wherein each of the first and second holding members provides an inner surface shaped to conform to the structural geometry of the tracking
30 device.

5. The apparatus of claim 4, wherein a gap is formed between at least one of the first and second holding members and the tracking device.

5 6. The cassette of claim 4, further comprising a third holding member having an inner surface, wherein the inner surfaces of the first and third holding members have substantially similarly shaped concavities.

7. The cassette of claim 6, further comprising a fourth holding members, wherein the
10 third and fourth holding members extend substantially parallel to the first axis.

8. The cassette of claim 7, wherein each of the third and fourth holding members includes at least one of a protrusion and catch extending therefrom for securing the tracking device along the first and second axis.

15 9. The cassette of claim 6, wherein the third and fourth holding members are shaped and further configured for cooperating with the first and second holding members respectively for substantially impeding spatial displacement of the tracking device substantially along the first and second axes.

20 10. The cassette of claim 1, further comprising a securing member adaptable for removably engaging the cassette.

11. The cassette of claim 10, wherein the securing member is configured for protecting
25 the tracking device and securing thereof to the cassette.

12. The cassette of claim 10, wherein the securing member provides engaging means for engaging the cassette.

13. The cassette of claim 10, wherein when in use the securing member is disposed over the tracking device and the holder for restricting access to the insertion opening.

5 14. The cassette of claim 10, wherein the securing member includes a body and at least one leg extending therefrom.

15. The cassette of claim 14, wherein each of the at least one leg of the securing member is hook shaped for engaging the cassette.

10

16. The cassette of claim 1, further comprising an identifier adaptable for removably engaging the cassette.

15

17. The cassette of claim 16, wherein the identifier has at least one resiliently biased catch extending from a connector.

18. The cassette of claim 18, wherein the connector is connected to an identification tab.

20

19. The cassette of claim 16, wherein the identifier is coloured for facilitating the association of the form factor of the storage media to the cassette.

20. The cassette of claim 1, wherein a substantially U-shaped sidewall is formed on each end thereof.