

CONNECTOR, CONNECTING AND SNAP-LOCKING STRUCTURE FOR COMBINED OBJECT-SUPPORTING CARRIER BOARD AND COMBINED OBJECT-SUPPORTING CARRIER BOARD

BACKGROUND

[0001] The present invention relates to a connector, and further to a connecting and snap-locking structure for a combined carrier board and a combined carrier board.

[0002] In recent years, with the growth of logistics technology, the plastic carrier boards are increasingly and widely used. However, most of the existing plastic carriers are of a non-removable structure which is bulky, difficult to process, and expensive to manufacture. Further, when the carrier board is partially damaged, the entire carrier board becomes useless since it cannot be removed and replaced, resulting in greater economic loss and energy waste.

[0003] To solve this problem, a Chinese patent No.201320431132.0 provides an assembled plastic carrier board. However, its connector and snap-fit structure have a disadvantageous design and are inconvenient to disassemble and assemble. Moreover, its assembling efficiency is low, and its configuration is not firm after the assembly of the connector with the plastic carrier board. At the same time, the lower board of the plastic carrier board is an integrated part, which can be hardly disassembled and spliced, causing a high production cost and post-maintenance cost.

SUMMARY

[0004] In this section, a series of simplified concepts are introduced, which will be described in further detail in the DETAILED DESCRIPTION section. This section of the present invention does not intend to define the critical features or the essential technical features of the claimed technical solution, nor intend to determine the protection scope of the claimed technical solution.

[0005] To at least partially solve the above problem, the present invention discloses a connector including a main body, characterized in that, one end of the main body is provided with an elastic rotary snap-fit portion for snap-fitting into a carrier board through rotation,

and the other end of the main body is provided with a twist lock portion for snap-locking the carrier board and rotating the main body through a cooperation with a twist lock tool.

[0006] Preferably, the main body has a cylindrical shape. The elastic rotary snap-fit portion includes a snap-lock block having a length greater than a diameter of the main body and a width less than or equal to the diameter of the main body. Snap-lock projections are provided on both ends of the snap-lock block in its longitudinal direction, and an elastic yield gap is arranged between the snap-lock projection and the snap-lock block.

[0007] Preferably, the twist lock portion includes a twist-lock stop block for restricting the connection height between the twist lock portion and the elastic rotary snap-fit portion. An exposed end of the twist-lock stop block is provided with a twist lock structure which can be twisted with a wrench.

[0008] Preferably, the elastic rotary snap-fit portion is molded integrally with the main body by an elastic material.

[0009] The present invention also discloses a connecting and snap-locking structure for a combined carrier board, characterized in that, includes lower lock holes provided in a lower board of the carrier board, through which a connector passes; the connector includes a main body having one end provided with an elastic rotary snap-fit portion for snap-fitting into the carrier board by rotation and the other end provided with a twist lock portion for snap-locking the carrier board and rotating the main body through a cooperation with a twist lock tool. An outer end of the lower lock hole is provided with a snap-lock cavity in which the elastic rotary snap-fit portion can rotate and be locked such that an upper board and the lower board of the combined carrier board are pressed and connected.

[0010] Preferably, the main body has a cylindrical shape. The elastic rotary snap-fit portion includes a snap-lock block having a length greater than a diameter of the main body and a width less than or equal to the diameter of the main body. Snap-lock projections are provided on both ends of the snap-lock block in its longitudinal direction. An elastic yield gap is arranged between the snap-lock projection and the snap-lock block. The lower lock hole is an elongated hole. The snap-lock cavity includes a stepped hole provided at the outer end of the lower lock hole and is provided with a locking plane therein such that the snap-lock block could press against the lower board after rotation. An angled guide surface is provided

between the lock plane and a bottom of the snap-lock cavity for guiding the snap-lock block to slide to the lock plane.

[0011] Preferably, a snap-lock groove is provided on an inner wall of the snap-lock cavity in which the snap-lock projections are snap-fitted such that the connector is locked in position.

[0012] Preferably, a rotary stop portion is provided at a side of the snap-lock groove for restricting the rotation direction of the snap-lock block.

[0013] The present invention also discloses a combined carrier board to which the above connecting and snap-locking structure is applied, including an upper board, a lower board and a connection base therebetween. The upper board is provided with upper lock holes, the lower board is provided with lower lock holes, and the connection base is provided with connection holes therein. A connector passes through the upper lock hole, the lower lock hole, and the connection hole. A connecting and snap-locking structure is provided between the connector and the lower board.

[0014] Preferably, a stop groove is provided at an outer end of the upper lock hole into which a twist-lock stop block extends to cooperate with the elastic rotary snap-fit portion so that the upper board and the lower board are pressed and connected. The twist lock portion includes the twist-lock stop block for restricting the connection height between the elastic rotary snap-fit portion and the twist lock portion to fall into the stop groove. An exposed end of the twist-lock stop block is provided with a twist lock structure that can be twisted with a wrench.

[0015] Based on the above technical solution, the present invention presents advantageous effects over the prior art as follows:

[0016] The present invention has the advantages of simple structure, easy manufacture, low production cost, and convenience of disassembling and replacing when the boards are damaged, thus the economic loss is depressed. At the same time, the connector and the snap-lock structure of the present invention cause a good assembly effect, high assembly efficiency, so that the structure is secured after the boards are assembled.

[0017] The snap-lock structure of the present invention is provided with an angled guide surface thereon, along which the connector is rotated to be locked, so that the

assembled boards are secured and become gapless.

[0018] The lower board of the present invention is composed of a plurality of spliced secondary boards, which is convenient to manufacture and causes injection molds smaller, such that the production cost is effectively reduced. Further, because of frequent contact between the lower board and the fork tip of the forklift, the lower board is more likely to be damaged. However, the use of such spliced secondary boards can be easily replaced when local damage occurs, reducing economic loss and energy waste.

[0019] Disclosed herein is a connector comprising a main body, characterized in that, one end of the main body is provided with an elastic rotary snap-fit portion for snap-fitting into a carrier board through rotation, and other end of the main body is provided with a twist lock portion for snap-locking the carrier board and rotating the main body through a cooperation with a twist lock tool, the main body has a cylindrical shape, the elastic rotary snap-fit portion includes a snap-lock block having a length greater than a diameter of the main body and a width less than or equal to the diameter of the main body, snap-lock projections are provided on both ends of the snap-lock block in its longitudinal direction, and an elastic yield gap is arranged between the snap-lock projection and the snap-lock block.

[0020] Disclosed herein is also a connecting and snap-locking structure for a combined carrier board, characterized in that, comprises a lower lock hole provided in a lower board of the carrier board, through which a connector passes; the connector includes a main body having one end provided with an elastic rotary snap-fit portion for snap-fitting into the carrier board by rotation and the other end provided with a twist lock portion for snap-locking the carrier board and rotating the main body through a cooperation with a twist lock tool; an outer end of the lower lock hole is provided with a snap-lock cavity in which the elastic rotary snap-fit portion can rotate and be snap-locked such that an upper board and the lower board of the combined carrier board are pressed and connected, the main body has a cylindrical shape, the elastic rotary snap-fit portion includes a snap-lock block having a length greater than a diameter of the main body and a width less than or equal to the diameter of the main body; snap-lock projections are provided on both ends of the snap-lock block in its longitudinal direction; an elastic yield gap is arranged between the snap-lock projection and the snap-lock block; the lower lock hole is an elongated hole, the snap-lock cavity is a

stepped hole provided at an outer end of the lower lock hole and is provided a lock plane therein such that the snap-lock block could press against the lower board after rotation; and an angled guide surface is provided between the lock plane and a bottom of the snap-lock cavity for guiding the snap-lock block to slide to the lock plane.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] The following drawings of the embodiments of the present invention are hereby incorporated as part of the present invention to understand the present invention. The drawings which illustrate and depict the embodiments of the present invention are used to explain the principle of the present invention. In which,

[0022] Fig.1 is a perspective view of the connector of the present invention;

[0023] Fig.2 is a perspective view of the connector of the present invention;

[0024] Fig.3 is a sectional schematic view of the snap-lock structure of the present invention;

[0025] Fig.4 is a sectional schematic view of the snap-lock structure of the present invention;

[0026] Fig.5 is an enlarged view of portion C in Fig.4;

[0027] Fig.6 is a sectional schematic view of the snap-lock structure of the present invention;

[0028] Fig.7 is a sectional schematic view of the snap-lock structure of the present invention; and

[0029] Fig.8 is a sectional schematic view of the snap-lock structure of the present invention.

[0030] Fig.9 is a perspective view of the carrier board of the present invention;

[0031] Fig.10 is a perspective view of the carrier board of the present invention;

[0032] Fig.11 is an exploded view of the carrier board of the present invention;

[0033] Fig.12 is an exploded view of the carrier board of the present invention;

[0034] Fig.13 is an enlarged view of portion A in Fig.12; and

[0035] Fig.14 is an exploded view of the carrier board of the present invention;

[0036] Fig.15 is a perspective view of the carrier board of the present invention; and

[0037]	Fig.16 is an enlarged view of portion B in Fig.15;	
[0038]	REFERENCE NUMERALS	
[0039]	1 main body	2 twist lock portion
[0040]	202 twist-lock stop block	203 twist lock structure
[0041]	3 elastic rotary snap-fit portion	301 snap-lock block
[0042]	303 snap-lock projection	302 elastic yield gap
[0043]	4 upper board	401 upper lock hole
[0044]	402 stop groove	5 lower board
[0045]	501 lower lock hole	502 snap-lock cavity
[0046]	503 snap-lock groove	505 lock plane
[0047]	506 angled guide surface	507 rotary stop portion
[0048]	508 secondary board	6 connection base
[0049]	601 connecting hole	100 connector

DETAILED DESCRIPTION

[0050] In the following description, numerous specific details are set forth in order to provide a more thorough understanding of the present invention. However, as obvious to the skilled in this art, the present invention may be implemented without one or more of these details. Some of the technical features well known in the art are not described so as not to obscure the embodiments of present invention.

[0051] A structure would be described in detail in the following description for the purpose of thorough understanding the embodiment of present invention. Apparently, the implementations of the embodiments of present invention are not limited to special details known by the skilled in this art.

[0052] The present invention will be first described with reference to Figs. 1 and 2.

[0053] A connector according to the present invention includes a main body 1 having one end provided with an elastic rotary snap-fit portion 3 for snap-fitting into a carrier board through rotation, and the other end provided with a twist lock portion 2 for snap-locking the carrier board and rotating the main body 1 through a cooperation with a twist lock tool.

[0054] The main body 1 has a cylindrical shape. The elastic rotary snap-fit portion 3

includes a snap-lock block 301 having a length greater than a diameter of the main body 1 and a width less than or equal to the diameter of the main body 1. Snap-lock projections 303 are provided on both ends of the snap-lock block 301 in its longitudinal direction. An elastic yield gap 302 is arranged between the snap-lock projection 303 and the snap-lock block 301. Its advantages include simple structure, convenient manufacture, excellent locking effect, and convenient operation.

[0055] The twist lock portion 2 includes a twist-lock stop block 202 for restricting the connection height between the elastic rotary snap-fit portion 3 and the twist lock portion 2, and an exposed end of the twist-lock stop block 202 is provided with a twist lock structure 203 that can be twisted with a wrench. Its advantages include simple structure, easy installation, and effective restriction of the locking height of the connector.

[0056] The elastic rotary snap-fit portion 3 is molded integrally with the main body 1 by an elastic material. Its advantages include simple structure, convenient manufacture, easily be locked, convenient in locking and unlocking, and low production cost.

[0057] A connecting and snap-locking structure for a combined carrier board according to the present invention will be described with reference to Figs. 3 to 8. The connecting and snap-locking structure for a combined carrier board includes lower lock holes 501 provided in a lower board 5 of the carrier board, through which a connector 100 passes. The connector 100 includes a main body 1 having one end provided with an elastic rotary snap-fit portion 3 for snap-fitting into the carrier board through rotation and the other end provided with a twist lock portion 2 for snap-locking the carrier board and rotating the main body through the cooperation with a twist lock tool. An outer end of the lower lock hole 501 is provided with a snap-lock cavity 502 in which the elastic rotary snap-fit portion 3 can rotate and be locked such that the upper and lower boards 4, 5 are pressed and connected.

[0058] The main body 1 has a cylindrical shape. The elastic rotary snap-fit portion 3 includes a snap-lock block 301 having a length greater than a diameter of the main body 1 and a width less than or equal to the diameter of the main body 1. Snap-lock projections 303 are provided on both ends of the snap-lock block 301 in its longitudinal direction. An elastic yield gap 302 is arranged between the snap-lock projection 303 and the snap-lock block 301. The lower lock hole 501 is an elongated hole. The snap-lock cavity 502 includes a stepped

hole provided at the outer end of the lower lock hole 501, and is provided a lock plane 505 therein such that the block 301 could press against the lower board 5 after rotation. An angled guide surface 506 is provided between the lock plane 505 and a bottom of the snap-lock cavity 502 for guiding the block 301 to slide to the lock plane 505. Its advantages include that the structure is simple, and the connector is rotated and snap-locked through the angled guide surface so that the combined carrier board is secured and becomes gapless.

[0059] A snap-lock groove 503 is provided on an inner wall of the snap-lock cavity 502 in which the snap-lock projections 303 are snap fitted such that the connector 100 is locked in position. Its advantages include that the structure is simple, and the snap-lock positioning is secured so that it is unlikely to fall off when is used.

[0060] A rotary stop portion 507 is provided at a side of the snap-lock groove 503 for restricting the rotation direction of the snap-lock block 301. Its advantages include that the structure is simple, and the snap-lock positioning is secured so that it is unlikely to fall off when is used.

[0061] A combined carrier board to which the above connecting and snap-locking structure is applied will be described according to Figs. 9 to 16. The combined carrier board of the connecting and snap-locking structure includes an upper board 4, a lower board 5 and a connection base 6 therebetween. The upper board 4 is provided with upper lock holes 401, the lower carrier 5 is provided with lower lock holes 501, and the connection base 6 is provided with connection holes 601. A connector 100 passes through the upper lock hole 401, the lower lock hole 501 and the connection hole 601. The connecting and snap-locking structure is provided between the connector piece 100 and the lower board 5.

[0062] A stop groove 402 is provided at the outer end of the upper lock hole 401 into which a twist-lock stop block 202 extends to cooperate with the elastic rotary snap-fit portion 3 so that the upper board 4 and the lower board 5 are pressed and connected. The twist lock portion 2 includes the twist-lock stop block 202 for restricting the connection height between the elastic rotary snap-fit portion 3 and the twist lock portion 2 to fall into the stop groove 402. An exposed end of the twist-lock stop block 202 is provided with a twist-lock structure 203 that can be twisted with a wrench. Its advantage include that the structure is simple, its installation is convenient, and it is locked through an effective cooperation with the

connector.

[0063] The operational principle of the present invention is as follows:

[0064] Installation: the secondary boards 508 are first spliced to form the lower board 5. Then, the connection base 6 is placed between the upper board 4 and the lower board 5. A part of the connection base 6 is disposed above the spliced ends of two secondary boards 508, and the connecting holes 601 of the connection base 6 are arranged to align the upper lock holes 401 of the upper board 4 and the lower lock holes 501 of the lower board 5. Then, the connector 100 is inserted into the upper lock hole 401 from its outer end so that the twist-lock stop block 202 abuts against the stop groove 402. After the connector 100 is entirely inserted, the snap-lock block 301 is positioned within the snap-lock cavity 502, as shown in Fig.4. At this time, a wrench is inserted into the twist-lock structure 203 and twists the connector 100 so that the snap-lock block 301 is rotated in the snap-lock cavity 502 and slides to the lock plane 505 along an angled guide surface 506. The snap-lock projection 303 is snap-fitted to the snap-lock groove 503, as shown in Fig.8, and the installation is completed.

[0065] Based on the above technical solution, the present invention presents advantageous effects over the prior art as follows:

[0066] The present invention has the advantages of simple structure, easy manufacture, low production cost, and convenience of disassembling and replacing when the boards are damaged, thus the economic loss is depressed. At the same time, the connector and the snap-lock structure of the present invention causes a good assembly effect, high assembly efficiency, so that the structure is secured after the boards are assembled.

[0067] The snap-lock structure of the present invention is provided with an angled guide surface thereon, along which the connector is rotated to be locked, so that the assembled boards are secured and become gapless.

[0068] The lower board of the present invention is composed of a plurality of spliced secondary boards, which is convenient to manufacture and causes injection molds smaller, such that the production cost is effectively reduced. Further, because of frequent contact between the lower board and the fork tip of the forklift, the lower board is more likely to be damaged. However, the use of such spliced secondary boards can be easily replaced when local damage occurs, reducing economic loss and energy waste.

[0069] Unless defined otherwise, the technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skilled person in the art to which this invention pertains. The terms as used herein merely intend to describe specific implementation purpose, rather than restricting the present invention. The terms such as "provide" and the like appeared herein may mean that one component is directly attached to another component, or that one component is attached to another component through a middleware. The features described herein in one embodiment may be applied individually or in combination with other features to another embodiment, unless the feature is not applicable or otherwise described in this further embodiment.

[0070] The present invention has been described by way of the above embodiments, but it is to be understood that the above-described embodiments are for illustrative and explanatory purposes only and are not intended to limit the invention to the scope of the described embodiments. It will be understood by those skilled in the art that various modifications and variations can be made in accordance with the teachings of the present invention, which fall within the scope of the invention as claimed.

[0071] Throughout this specification, unless the context requires otherwise, the word "comprise", and variations such as "comprises" and "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

[0072] The reference to any prior art in this specification is not, and should not be taken as, an acknowledgment or any form of suggestion that the prior art forms part of the common general knowledge in Singapore.

WHAT WE CLAIM IS:

1. A connector comprising a main body, characterized in that, one end of the main body is provided with an elastic rotary snap-fit portion for snap-fitting into a carrier board through rotation, and other end of the main body is provided with a twist lock portion for snap-locking the carrier board and rotating the main body through a cooperation with a twist lock tool, the main body has a cylindrical shape, the elastic rotary snap-fit portion includes a snap-lock block having a length greater than a diameter of the main body and a width less than or equal to the diameter of the main body, snap-lock projections are provided on both ends of the snap-lock block in its longitudinal direction, and an elastic yield gap is arranged between the snap-lock projection and the snap-lock block.

2. The connector according to claim 1, characterized in that, the twist lock portion includes a twist-lock stop block for restricting the connection height between the twist lock portion and the elastic rotary snap-fit portion, and an exposed end of the twist-lock stop block is provided with a twist lock structure that can be twisted with a wrench.

3. The connector according to claim 1, characterized in that, the elastic rotary snap-fit portion is molded integrally with the main body by an elastic material.

4. A connecting and snap-locking structure for a combined carrier board, characterized in that, comprises a lower lock hole provided in a lower board of the carrier board, through which a connector passes; the connector includes a main body having one end provided with an elastic rotary snap-fit portion for snap-fitting into the carrier board by rotation and the other end provided with a twist lock portion for snap-locking the carrier board and rotating the main body through a cooperation with a twist lock tool; an outer end of the lower lock hole is provided with a snap-lock cavity in which the elastic rotary snap-fit portion can rotate and be snap-locked such that an upper board and the lower board of the combined carrier board are pressed and connected, the main body has a cylindrical shape, the elastic rotary snap-fit portion includes a snap-lock block having a length greater than a diameter of the

main body and a width less than or equal to the diameter of the main body; snap-lock projections are provided on both ends of the snap-lock block in its longitudinal direction; an elastic yield gap is arranged between the snap-lock projection and the snap-lock block; the lower lock hole is an elongated hole, the snap-lock cavity is a stepped hole provided at an outer end of the lower lock hole and is provided a lock plane therein such that the snap-lock block could press against the lower board after rotation; and an angled guide surface is provided between the lock plane and a bottom of the snap-lock cavity for guiding the snap-lock block to slide to the lock plane.

5. The connecting and snap-locking structure for a combined carrier board according to claim 4, characterized in that, a snap-lock groove is provided on an inner wall of the snap-lock cavity in which the snap-lock projections are snap fitted such that the connector is locked in position.

6. The connecting and snap-locking structure for a combined carrier board according to claim 5, characterized in that, a rotary stop portion is provided at a side of the snap-lock groove for restricting the rotation direction of the snap-lock block.

7. A combined carrier board to which the connecting and snap-locking structure according to any one of claims 4 to 6 is applied, including an upper board, a lower board and a connection base therebetween; the upper board being provided with upper lock holes, the lower board being provided with lower lock holes, the connection base being provided with connecting holes therein; a connector passing through the upper lock hole, the lower lock hole and the connecting hole; and a connecting and snap-locking structure being provided between the connector and the lower board.

8. The combined carrier board according to claim 7, characterized in that, a stop groove is provided at an outer end of the upper lock hole into which a twist-lock stop block extends to cooperate with the elastic rotary snap-fit portion so that the upper board and the lower board are pressed and connected; the twist-lock portion includes the twist-lock stop block for

restricting the connection height between the elastic rotary snap-fit portion and the twist-lock portion to fall into the stop groove; and an exposed end of the twist-lock stop block is provided with a twist-lock structure that can be twisted with a wrench.