DOCUMENT STORAGE SLOT CLAMPING DEVICE, BI-DIRECTIONAL DOCUMENT STORAGE SLOT AND BI-DIRECTIONAL DOCUMENT STORAGE CAROUSEL

TECHNICAL FIELD

The present disclosure relates generally to a document storage device, and more particularly, to a document storage slot clamping device which is capable of clamping the document at the storage position, a bi-directional document storage slot arranged with the document storage slot clamping device, and a bi-directional document storage carousel comprising the bi-directional document storage slot.

BACKGROUND

With the rapid growth of urban residents and the widespread existence of the documents (such as IC card) in our lives, the number of the document stored and issued by the document issuance department is increasing. Accordingly, a lot of manpower and storage space are required on the one hand, and the documents are frequently lost, forgotten or taken by mistake on the other hand.

For coping with such problems, intelligent management devices have appeared in the market to facilitate the document storage and management. However, the storage slots of the carousel in the existing intelligent management devices are designed in one-piece. The disadvantage is that if one part of them is damaged, the whole carousel would be unavailable, and should be replaced as a whole. In addition, the storage positions on the carousel are designed vertically, so the stability of the documents on the storage positions is poor. As the documents are simply placed in the storage positions, they are easy to fall when moving the intelligent management device. Accordingly, it is very important to develop a document storage slot

clamping device with an improved elastic clamping structure and capable of clamping the document at the storage position.

SUMMARY

The object of the present application is to provide a document storage slot clamping device, a bi-directional document storage slot and a bi-directional document storage carousel, aiming at the technical defects mentioned above.

In a first aspect, a document storage slot clamping device is provided, which comprising two clamping elements arranged oppositely, wherein each clamping element comprises a horizontal reference connection part, a horizontal clamping part, and an elastic inclination part arranged between the horizontal reference connection part and the horizontal clamping part, wherein the horizontal reference connection part and the elastic inclination part are symmetrically arranged along a central axis of the horizontal clamping part respectively.

Preferably, a chamfer connection part is arranged between the horizontal clamping part and the elastic inclination part.

Preferably, the clamping element has a thickness compatible with a document thickness.

Preferably, an inclination degree between the elastic inclination part and the horizontal reference connection part is compatible with a distance between the horizontal reference connection part and the horizontal clamping part.

Preferably, the horizontal reference connection part can be connected with an external device.

In a second aspect, a bi-directional document storage slot is provided, which comprising a frame, and an access position component and ~~an documenta~~ a document entrance component arranged on the frame, wherein the access position component

and the document entrance component are in one by one correspondence, wherein the access position component is arranged with the document storage slot clamping device discussed above at its both sides.

Preferably, the access position component comprises N space plates, wherein $N \geq 1$.

Preferably, the space plate comprises a left part and a right part, wherein a first connection plate is correspondingly arranged between the left part and the frame, a second connection plate is correspondingly arranged between the right part and the frame.

Preferably, a first receiving part is arranged on an upper part of the space plate, a second receiving part is arranged on a lower part of the space plate, wherein the first receiving part and the second receiving part are symmetrically arranged in a longitudinal direction.

Preferably, the first receiving part and the second receiving part are both used for storing a book-type document, wherein the first receiving part and the second receiving part both have a size and a shape compatible with those of the book-type document.

Preferably, the first receiving part and the second receiving part are both used for storing a card-type document, wherein the first receiving part and the second receiving part both have a size and a shape compatible with those of the card-type document.

Preferably, the frame is provided with a connection mechanism for connecting a plurality of the frames into a batch of the bi-directional document storage slots.

Preferably, the connection mechanism comprises a connection hole and a positioning element distributed all around the frame.

Preferably, the document entrance component is provided with a trapezoidal guiding surface at its end, and the trapezoidal guiding surface has a size compatible with that of the document.

In a third aspect, a bi-directional document storage carousel is provided, which comprising the bi-directional document storage slot discussed above and a carousel fixation and connection device for fixing the bi-directional document storage slot.

Preferably, the bi-directional document storage carousel is provided with a sensor for identifying whether there is a document stored in the bi-directional document storage slot.

Preferably, the carousel fixation and connection device comprises a first carousel fixation and connection device arranged at a top of the carousel fixation and connection device and a second carousel fixation and connection device arranged at a bottom of the carousel fixation and connection device.

Preferably, the carousel fixation and connection device comprises a storage slot connection part, a fixation plate positioned outside of the storage slot connection part, and a connection support connecting the storage slot connection part and the fixation plate.

Preferably, the storage slot connection part comprises a storage slot fixation support arranged with at least one clamping part compatible with the bi-directional document storage slot.

Preferably, the bi-directional document storage carousel is attached to an external device through the fixation plate

By implementing the present application, the document storage slot clamping device can not only solve the problem of document stability, but also solve the problem of the too tight or too loose clamping of the prior art, and the problem of the document damage caused by the too tight document insertion. In additional, the

bi-directional document storage slot can store as many documents as possible in a small space, while solving the bi-directional document access. In additional, two opposite control platforms can be arranged corresponding to one carousel fixation and connection device, so the usage efficiency is greatly improved. The modular installation of the bi-directional document storage slot in the present application is more convenient, especially when some components of the bi-directional document storage slot are damaged, the replacement is convenient. As the whole replacement is not needed, the maintenance cost is reduced.

BRIEF DESCRIPTION OF THE DRAWINGS

In order to more clearly illustrate the technical solution in the embodiment of the present disclosure, the drawings used in the embodiments or prior arts will be briefly introduced. It is obvious that the drawings in the following description are only some embodiments of the present application. For ordinary technicians in the present art, they can also obtain other drawings without paying creative labor according to these drawings.

Fig. 1 is a structural diagram of the document storage slot clamping device according to the present application.

Fig. 2 is a structural diagram of the clamping element in the document storage slot clamping device according to the present application.

Fig. 3 is a structural diagram of the bi-directional document storage slot according to the first embodiment of the present application.

Fig. 4 is a first structural diagram of the connection mechanism of the bi-directional document storage slot according to the first embodiment of the present application.

Fig. 5 is a second structural diagram of the connection mechanism of the bi-directional document storage slot according to the first embodiment of the present application.

Fig. 6 is a structural diagram of the bi-directional document storage slot according to the second embodiment of the present application.

Fig. 7 is a first structural diagram of the connection mechanism of the bi-directional document storage slot according to the second embodiment of the present application.

Fig. 8 is a second structural diagram of the connection mechanism of the bi-directional document storage slot according to the second embodiment of the present application.

Fig. 9 is a structural diagram of the bi-directional document storage carousel according to the present application.

Fig. 10 is a structural diagram of the carousel fixation and connection device of the bi-directional document storage carousel according to the present application.

Fig. 11 is a first structural diagram of the first carousel fixation and connection device of the bi-directional document storage carousel according to the present application.

Fig. 12 is a structural diagram of the fixation plate of the bi-directional document storage carousel according to the present application.

Fig. 13 is a second structural diagram of the first carousel fixation and connection device of the bi-directional document storage carousel according to the present application.

Fig. 14 is a structural diagram of the storage slot connection part of the bi-directional document storage carousel according to the present application.

Fig. 15 is a first structural diagram of the connection support of the bi-directional document storage carousel according to the present application.

Fig. 16 is a second structural diagram of the connection support of the bi-directional document storage carousel according to the present application.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The document storage slot clamping device, bi-directional document storage slot and bi-directional document storage carousel are described in detail combination with Figs. 1-16.

It should be understood that the specific embodiments described herein are only used to explain the present application and are not used to limit the present application

It should be noted that when an element/component is mentioned as being "fixed" or "arranged" on another element/component, it can be directly on another element/component or it may be indirectly fixed or arranged on another element/component through a third element/component. When an element/component is mentioned as being "connected" with another element/component, it may be directly connected with another element/component or it may be indirectly connected to another element/component through a third component.

It should be noted that the technical terms, such as “length”, “width”, “upper”, “lower”, “front”, “back”, “left”, “right”, “vertical”, “horizontal”, “top”, “bottom”, “inner”, “outer”, indicating the orientation or position relationship are based on the orientation or position relationship shown in the attached drawings. They are just for the description convenience and simplifying, rather than indicating or implying that the device or element referred to must have the specific orientation, or be constructed and operated in the specific orientation, and cannot be understood as the limitation of the present application.

In addition, the terms "first" and "second" are used for descriptive purposes only and cannot be understood as indicating or implying the relative importance or implicitly indicating the number of technical features. Thus, the features defined with "first" and "second" can explicitly or implicitly include one or more of these features. In the description of the present application, “a plurality of” means two or more, unless otherwise is specifically defined.

As shown in Figs.1-2, a document storage slot clamping device 100 is provided in the present disclosure.

As shown in Figs.1-2, the document storage slot clamping device 100 comprises two groups of clamping elements 110 arranged oppositely. Each clamping element 110 comprises a horizontal reference connection part 111, a horizontal clamping part 112, and an elastic inclination part 113 arranged between the horizontal reference connection part 111 and the horizontal clamping part 112. The horizontal reference connection part 111 and the elastic inclination part 113 are symmetrically arranged along a central axis of the horizontal clamping part 112 respectively. In the present embodiment, it is preferable that the horizontal reference connection part 111 and the elastic inclination part 113 are arranged in a mirror symmetry way.

As the clamping element 110 has the elastic inclination part 113, so it has the elasticity, which enables the document storage slot clamping device 100 to have the elasticity, thus avoiding the problem that the document storage is adverse due to the too tight or too loose insertion of the document into the storage slot.

In this embodiment, a chamfer connection part 114 is arranged between the horizontal clamping part 112 and the elastic inclination part 113. Preferably, the chamfer connection part 114 adopts a fillet structure, which avoids scratching the document by the resistance generated when the document is inserted, when compared with the straight connection structure. In additional, the fillet structure can

further prevent the structure interference caused by the existence of the flash burr during the assembly of the parts. When the document is inserted or extracted, as the clamping element needs to bear a certain force, the fillet structure can not only meet the mechanical requirements, but also prevent the problem of stress concentration.

In the present embodiment, the clamping element 110 has the function of clamping the document in the storage slot. Although the clamping element 110 has a certain elasticity, it needs to ensure that the thickness of the clamping element 110 is compatible with the document thickness in the storage slot. In addition, the clamping element 110 is integrated with the storage slot, and the thickness of the clamping element 110 will affect the storage space of the document in the storage slot, thereby affecting the pressure on the document in the storage slot. Specifically, the larger the thickness of the clamping element 110, the smaller the space for storing the document in the storage slot, accordingly, the greater pressure the document stored in the storage slot is subjected to. In such a way, on the one hand, it is easy to damage the document, and on the other hand, the clamping element 110 will be damaged by the reaction force. On the opposite, the smaller the thickness of the clamping element 110, the larger the space for storing the document in the storage slot, accordingly, the smaller pressure the document stored in the storage slot is subjected to. In such a way, the document is easy to shift in or fall from the storage slot. Combined with the document thickness and the manufacturing process of the storage slot, after a lot of experiments and researches, the thickness of the clamping element 110 in this example is preferably 0.8mm, which is compatible with the document thickness.

In addition, based on the performance requirements about the material of the clamping element 110, such as high strength, good toughness, easy for processing and molding, and good mechanical properties, materials such as POM (polydimethylene), nylon and ABS resin can be selected. Considering the

application scenario and the environmental conditions of the clamping element 110, such as the temperature and humidity, the clamping element 110 in this embodiment adopts ABS thermoplastic polymer structure material.

In this embodiment, the inclination degree between the elastic inclination part 113 and the horizontal reference connection part 111 is compatible with the distance between the horizontal reference connection part 111 and the horizontal clamping part 112. In this way, the clamping force of the clamping element 110 can be ensured to meet the requirements for storing the document in the storage slot, such that the problem of that the document would be damaged or displaced due to the too large force or too small force in the storage slot can be avoided. Specifically, the distance between the clamping element 110 and the horizontal reference connection part 111 is obtained through several experiments by technicians. Here, the distance is defined as D1 (not shown in the figures), and D1 is quantitative. In this embodiment, D1 is also the distance between the horizontal reference connection part 111 and the horizontal clamping part 112. Therefore, when the length of the horizontal reference connection part 111 remains unchanged, the inclination degree α between the elastic inclination part 113 and the horizontal reference connection part 112 determines the pressure on the clamping member 110, thereby affecting the pressure applied on the document in the storage slot. Specifically, when the inclination degree α between the elastic inclination part 113 and the horizontal reference connection part 112 is relative large, as D1 does not change, the length of the horizontal clamping part 112 becomes longer, the elasticity of the clamping element 110 becomes smaller after being forced, the corresponding elasticity acting on the document in the storage slot is smaller, so the document will shift in the storage slot. When the inclination degree α between the elastic inclination part 113 and the horizontal reference connection part 112 is relative small, as D1 does not change, the length of the horizontal clamping part 112 becomes shorter, the

elasticity of the clamping element 110 becomes greater after being forced, the corresponding elasticity acting on the document in the storage slot is greater, so the document will be crushed and damaged in the storage slot.

The documents stored in the storage slot can comprise card-type documents and book-type documents. It should be noted here that the card-type documents comprises legal card-type documents such as ID card (China ID card, Singapore ID card, Hong Kong and Macao ID cards, Bank card, etc.), residence card, pass card and so on, while the book-type documents comprises legal book-type documents such as passport (Hong Kong and Macao passport, etc.) and household registration book and so on. The side edges of the card-type document and book-type document is flat. When the document is inserted into the storage slot, only the appropriate clamping force and the friction force of the material itself are needed to ensure that the document does not shift in the storage slot. When the length of the horizontal clamping part 112 of the clamping element 110 is changed, the pressure applied on the clamping element 110 would change its elasticity, thus affecting the document storage in the storage slot by applying the acting force on the document.

In this embodiment, the horizontal reference connection part 111 can be connected with an external device. Alternatively, the horizontal ~~reference connector~~reference connection part 111 can be connected with the storage slot.

As shown in Fig. 3-12, a bi-directional document storage slot 200 is provided.

Specifically, as shown in Fig. 3, the bi-directional document storage slot 200 comprises a frame 210, an access position component 211 and a document entrance component 212 on the frame 210. The access position component 211 and the document entrance component 212 are in one by one correspondence. The access position component 211 arranged with the document storage slot clamping device 100 at its both sides.

By employing the bi-directional document storage slot 200, as the document storage slot clamping device 100 is provided with the elastic clamping element 110, which gives an appropriate clamping force to the document stored in the storage slot, it can be ensured that the document will not move back and forth in the storage slot, thus effectively solving the problem that the document storage is adverse due to the too tight or too loose insertion of document the into the storage slot.

In this embodiment, it is preferred that the access position component 211 comprises two groups of access position components 211 symmetrically arranged along the frame 210, and the document entrance component 212 also comprises two groups of document entrance components 212 symmetrically arranged along the frame 210.

In this embodiment, the frame 210 has an opening cavity, and the access position components 211 are symmetrically arranged along the central axis of the frame 210. It should be noted that the access position component 211 comprises N space plates 2111, and $N \geqslant 1$. Preferably, the space plates 2111 are stacked at equal intervals along the frame 210. Of course, the space plates 2111 which are not arranged in equal intervals are also included in the present application. In this way, the plurality of space plates 2111 can increase the storage space of the bi-directional document storage slot 200 and improve the storage efficiency.

In this embodiment, it is preferred that, the space plate comprises a left part and a right part (not shown in the figures). A first connection plate 21111 is correspondingly arranged between the left part and the frame 210. Correspondingly, a second connection plate 21112 is correspondingly arranged between the right part and the frame 210. The first connection plate 21111 and the second connection plate 21112 are symmetrically arranged at both sides of the space plate 2111.

In this embodiment, the space plate 2111 is H-shaped, and this H-shaped space plate 2111 is arranged at intervals along the frame 210. The left part of the H-shaped

space plate 2111 is connected with the frame 210 through the first connection plate 21111, and the right part of the H-shaped space plate 2111 is connected with the frame 210 through the second connection plate 21112. Preferably, the H-shaped space plate 2111 is mirror symmetrical along both sides of the vertical central axis.

By adopting the above structure of the frame 210, the bi-directional document storage slot 200 forms a whole storage frame with an open cavity which is convenient for storing documents.

Preferably, the first connection plate 21111 and the second connection plate 21112 are concaved inwardly, wherein the first connection plate 21111 is integrated with the document storage slot clamping device 100, and the second connection plate 21112 is integrated with the document storage slot clamping device 100, so that the manufacturing efficiency of the storage slot is improved, and meanwhile the intelligent management of the bi-directional document storage slot 200 is convenient.

In this embodiment, the space plate 2111 comprises an upper part which forms a first receiving part (not shown in the figures) and a lower part which forms a second receiving part (not shown in the figures). The first receiving part and the second receiving part are symmetrically arranged in a longitudinal direction. By using the upper part and lower part to form the receiving structures, the storage slot can have the bidirectional documents storage function.

Preferably, the first receiving part and the second receiving part have the same size and shape but opposite open directions which corresponding to the open direction of the frame 210. This arrangement ensures that the first receiving part and the second receiving part can store the same documents, and facilitates the unified management of the documents stored in the bi-directional document storage slot 200.

Alternatively, the first receiving part and the second receiving part are both U-shaped, and the U-shaped structure of the first receiving part and the U-shaped structure of the second receiving part are arranged in a mirror symmetry way. The

U-shaped structure is adopted to ensure that the shapes and sizes of the first receiving part and the second receiving part are compatible with those of the document, thus facilitating the document storage and extraction.

In the present application, the bi-directional document storage slot 200 has been described in two embodiments due to the structure differences of the space plate 2111, or the first receiving part and the second receiving part, that is, the first embodiment of the bi-directional document storage slot 200 and the second embodiment of the bi-directional document storage slot 200. These two embodiments would be explained in detail as follows.

Figs. 3-5 are structural diagrams of the bi-directional document storage slot 200 according to the first embodiment, while Figs. 6-8 are structural diagrams of the bi-directional document storage slot 200 according to the second embodiment.

First embodiment of the bi-directional document storage slot

As shown in Figs. 3-5, in the first embodiment, both of the first receiving part and the second receiving part can be used to store the card-type document, so it is necessary to ensure that the size and shape of the first receiving part and the second receiving part are compatible with the size and shape of the card type document.

In this embodiment, the U-shaped bottom of the first receiving part and the second receiving part adopts an arc-shaped structure, which has the same shape as that of the card-type document, so is convenient for storing the card-type document.

Second embodiment of the bi-directional document storage slot

As shown in Figs. 6-8, in the second embodiment, both of the first receiving part and the second receiving part can be used to store book-type document, so it is necessary to ensure that the size and shape of the first receiving part and the second receiving part are compatible with the size and shape of the book-type document.

In this embodiment, the U-shaped bottom of the first receiving part and the second receiving part adopts a smooth structure, which has the same shape as that of the book-type document, so is convenient for storing the book-type document.

It can be seen that the main difference between the first embodiment and the second embodiment is that the U-shaped bottom structures of the first receiving part and the second receiving part are different. Of course, the shape and size of the U-shaped openings of the first receiving part and the second receiving part are adaptively adjusted according to the stored documents, so as to adapt to the documents.

As shown in Figs. 4-5 and Figs. 7-8, the frame 210 is provided with a connection mechanism 213 for connecting a plurality of the frames 210 into a batch of the bi-directional document storage slots 200 for improving the documents storage efficiency.

As shown in Figs.4 and 7, the connection mechanism 213 in the present embodiment comprises a connection hole 2132 and a positioning element 2131 distributed all around the frame 210.

As shown in Figs. 5 and 8, the top and bottom of the frame 210 are arranged with the connection mechanism 213, respectively. The connection mechanism 213 on the top part comprises a first connection hole 21321 and a first positioning element 21311, while the corresponding connection mechanism 213 on the bottom comprises a second connection hole 21322 and a second positioning element 21312.

When a plurality of frames 210 are connected together, the connection mechanism 213 on the top of the frame 210 is compatible with the connection mechanism 213 on the bottom of another frame 210, so that the plurality of frames 210 are connected in series with each other. Specifically, by matching the first positioning element 21311 of a certain connection mechanism 213 on the top of a certain frame 210 with the second connection hole 21322 of the connection

mechanism 213 on the bottom of another frame 210 and matching the first connection hole 21321 on the top of the certain frame 210 with a second positioning element 21312 of the connection mechanism 213 on the bottom of a further frame 210, the plurality of frames 210 are connected into a batch of the bi-directional document storage slots 200.

The matching between the connection hole 2132 and the positioning element 2131 can employ the screw and screw hole matching, bolt and socket matching, and of course other connection manner, such as adsorption attachment and so on. The specific matching manner is not limited here. The batch of the bi-directional document storage slots formed like this has improved the document receiving efficiency.

In additional, the connection mechanism 213 can be distributed diagonally along the frame 210 without affecting the jointing stability between the plurality of frames 210. No specific restriction for such distribution is made here.

As shown in Figs. 3-5, 6-8, the document entrance component 212 is provided with a trapezoidal guiding surface at its end for facilitating the placing and extraction of the document. Herein, the trapezoidal guiding surface has a size compatible with that of the document. If the size of the trapezoidal guiding surface is too large, the document is easy to fall, while if the size of the trapezoidal guiding surface is too small, the document is difficult to be inserted. Specifically, when the bi-directional document storage slot 200 stores the card-type document, the size of the trapezoidal guiding surface is compatible with the size of the card-type document, thus ensuring that the card-type document can be smoothly inserted or extracted along the trapezoidal guiding surface. While when the bi-directional document storage slot 200 stores the book-type document, the size of the trapezoidal guiding surface is compatible with the size of the book-type document, thus ensuring that the book-

type document can be smoothly inserted or extracted along the trapezoidal guiding surface.

As shown in Figs. 9-16, a bi-directional document storage carousel 300 is provided, and its technical solution is described in detail as follows.

As shown in Fig.9, the bi-directional document storage carousel 300 comprises a plurality of bi-directional document storage slots 200, a carousel fixation and connection device 310 for fixing the bi-directional document storage slots 200 and a sensor 330 for identifying whether there is a document stored in the bi-directional document storage slot 200. The sensor 330 preferentially adopts the identification sensor, which can recognize and read the barcode, two-dimensional code, special check code and other special information on the document by using the RFID information recognition and/or OCR module information recognition method, so as to achieve the purpose of identifying the document in the bi-directional document storage slots 200.

As shown in Figs. 9-10, in the present embodiment, there are two groups of carousel fixation and connection devices 310 which are respectively arranged at the top and bottom of the bi-directional document storage carousel 300, that is the first carousel fixation and connection device 310 and the second carousel fixation and connection device 320. It should be noted that, the first carousel fixation and connection device 310 and the second carousel fixation and connection device 320 are arranged in a mirror symmetry way. The sensor 330 is arranged at the inner side of the carousel fixation and connection device 310 for identifying whether there is a document stored in the bi-directional document storage slot 200.

As shown in Fig.11, the carousel fixation and connection device 310 is taken for example, which comprising a storage slot connection part 311, a fixation plate 313 positioned outside of the storage slot connection part 311, and a connection support 312 connecting the storage slot connection part 311 and the fixation plate

313. Herein, the connection frame 312 can comprise a plurality of vertically distributed connection plates. In addition, a reinforcement rib can be arranged between the storage slot connection part 311 and the fixation plate 313 to cooperate with the vertically distributed connection plates to ensure the stability and accuracy of the connection between the fixation plate 313 and the storage slot connection part 311.

Specifically, as shown in Figs. 12 and 15, the fixation plate 313 is provided with a first fixation part 3131, and the upper end of the connection frame 312 is provided with a second fixation part 3122 connected with the first fixation part 3131. Preferably, the first fixation part 3131 and the second fixation part 3122 are connected by bolts, and of course, other connection methods such as snap connection or adsorption connection also can be included for connecting the connection frame 312 with the fixation plate 313.

In addition, the fixation plate 313 is also provided with a fixation part (not shown in the figures) for fixing the bi-directional document storage carousel 300 to an external device, such as a transportation device or an access device, etc.. No specific restriction for such external device is made here.

As shown in Fig. 14 and Fig. 16, the storage slot connection part 311 is provided with a third fixation part 31113, and the lower end of the connection frame 312 is provided with a fourth fixation part 3121 connected with the third fixation part 31113. Preferably, the third fixation part 31113 and the fourth fixation part 3121 are connected by bolts, and of course, other connection methods such as snap connection or adsorption connection also can be included for connecting the lower end of the connection frame 312 with the storage slot connection part 311.

In addition, as shown in Fig. 10, a reinforcement element 314 is arranged between the first carousel fixation and connection device 310 and the second carousel fixation and connection device 320, for strengthening the fixation of a

plurality of the bi-directional document storage slots 200 in the bi-directional document storage carousel 300, so as to ensure the stability of the whole bi-directional document storage carousel 300. Preferably, the reinforcement element 314 adopts multiple groups of reinforcement ribs, which enable the plurality of bi-directional document storage slots 200 to be assembled more stably in the bi-directional document storage carousel 300 through the carousel fixation and connection device 310. Of course, it is not limited to the use of the reinforcement ribs, other structures which is capable of improving the stability of the bi-directional document storage carousel 300 can also be used herein.

In the present embodiment, as shown in Fig.14, the storage slot connection part 311 comprises a storage slot fixation support 3111 arranged with at least one clamping part 31111 compatible with the bi-directional document storage slot 200.

Specifically, the shape and size of the clamping part 31111 are the same as those of the space plate 2111 of the bi-directional document storage slot 200. Preferably, the clamping part 31111 is H-shaped, and the clamping part 31111 correspondingly comprises a first clamping part and a second clamping part (not shown in the figures) arranged vertically in a mirror symmetry way and used for clamping the first receiving part and the second receiving part of the space plate 2111.

In addition, the left and right sides of the clamping part 31111 are symmetrically provided with an adjustment element 31112 used to adjust the mutual adaptation between the clamping part 31111 and the bi-directional document storage slot 200, so as to ensure that the clamping part 31111 can be accurately inserted into the bi-directional document storage slot 200.

Specifically, the adjustment element 31112 comprises a through hole 311121 arranged inside it. By adjusting the longitudinal distance and transverse distance between the through holes 311121 inside the adjustment elements 31112 on the left

and right sides of the clamping part 31111, the longitudinal distance and transverse distance between the through holes 311121 and the connection hole 2132 of the connection mechanism 213 of the bi-directional document storage slot 200 are adjusted to be the same, so as to ensure the assembly accuracy between the clamping part 31111 and the bi-directional document storage slot 200

The above descriptions are only better embodiments of the present application, and not to limit the present application. Any modification, equivalent replacement and improvement made within the spirit and principle of the present application shall be included in the protection scope of the present application.

CLAIMS

1. A document storage slot clamping device comprising two clamping elements arranged oppositely to form a document storage slot, wherein each clamping element comprising ~~a~~ two horizontal reference connection part, ~~a~~ one horizontal clamping part, and ~~an~~ two elastic inclination parts, wherein one elastic inclination part is arranged between ~~the~~ one horizontal reference connection part and the horizontal clamping part, wherein a first pair of the horizontal reference connection part and the elastic inclination part are symmetrically arranged with a second pair of the horizontal reference connection part and the elastic inclination part in a mirror symmetry way ~~the horizontal reference connection part and the elastic inclination part are symmetrically arranged along a central axis of the horizontal clamping part respectively~~;

an inclination degree between the elastic inclination part and the horizontal reference connection part is compatible with a distance between the horizontal reference connection part and the horizontal clamping part;

a chamfer connection part is arranged between the horizontal clamping part and the elastic inclination part;

the document storage slot stores a card-type document and a book-type document.

~~2. The document storage slot clamping device according to claim 1, wherein a chamfer connection part is arranged between the horizontal clamping part and the elastic inclination part.~~

~~3~~2. The document storage slot clamping device according to claim 1, wherein the clamping element has a thickness compatible with a document thickness.

~~4. The document storage slot clamping device according to claim 1, wherein an inclination degree between the elastic inclination part and the horizontal reference~~

~~connection part is compatible with a distance between the horizontal reference connection part and the horizontal clamping part.~~

~~5~~3. The document storage slot clamping device according to claim 1, wherein the horizontal reference connection part can be connected with an external device.

~~6~~4. A bi-directional document storage slot comprising a frame, and an access position component and ~~an documenta~~ a document entrance component arranged on the frame, wherein the access position component and the document entrance component are in one by one correspondence, wherein the access position component is arranged with the document storage slot clamping device according to any one of claims 1-~~5~~ 3 at its both sides~~.~~

~~7. The bi-directional document storage slot according to claim 6, wherein;~~ the access position component comprises N space plates, wherein $N \geq 1$~~.~~

~~8. The bi-directional document storage slot according to claim 7, wherein;~~ the space plate comprises a left part and a right part, wherein a first connection plate is correspondingly arranged between the left part and the frame, a second connection plate is correspondingly arranged between the right part and the frame~~.~~

~~9. The bi-directional document storage slot according to claim 8, wherein;~~ a first receiving part is arranged on an upper part of the space plate, a second receiving part is arranged on a lower part of the space plate, wherein the first receiving part and the second receiving part are symmetrically arranged in a longitudinal direction~~.~~

~~10. The bi-directional document storage slot according to claim 9, wherein;~~ the first receiving part and the second receiving part are both used for storing ~~a~~ the book-type document, wherein the first receiving part and the second receiving part both have a size and a shape compatible with those of the book-type document~~.~~

~~11. The bi-directional document storage slot according to claim 9, wherein~~ ; or the first receiving part and the second receiving part are both used for storing ~~a~~ the

card-type document, wherein the first receiving part and the second receiving part both have a size and a shape compatible with those of the card-type document.

~~12~~5. The bi-directional document storage slot according to claim ~~6~~4, wherein the frame is provided with a connection mechanism for connecting a plurality of the frames into a batch of the bi-directional document storage slots.

~~13~~6. The bi-directional document storage slot according to claim ~~12~~5, wherein the connection mechanism comprises a connection hole and a positioning element distributed all around the frame.

~~14~~7. The bi-directional document storage slot according to claim ~~6~~4, wherein the document entrance component is provided with a trapezoidal guiding surface at its end, and the trapezoidal guiding surface has a size compatible with ~~that of the~~ a size of a document.

~~15~~8. A bi-directional document storage carousel comprising the bi-directional document storage slot according to any one of claims ~~6-14~~4-7 and a carousel fixation and connection device for fixing the bi-directional document storage slot.

~~16~~9. The bi-directional document storage carousel according to claim ~~15~~8, wherein the bi-directional document storage carousel is provided with a sensor for identifying whether there is a document stored in the bi-directional document storage slot.

~~17~~10. The bi-directional document storage carousel according to claim ~~15~~8, wherein the carousel fixation and connection device comprises a first carousel fixation and connection device arranged at a top of the carousel fixation and connection device and a second carousel fixation and connection device arranged at a bottom of the carousel fixation and connection device.

~~18~~11. The bi-directional document storage carousel according to any one of claims ~~15-17~~8-10, wherein the carousel fixation and connection device comprises a storage slot connection part, a fixation plate positioned outside of the storage slot

connection part, and a connection support connecting the storage slot connection part and the fixation plate.

~~19~~12. The bi-directional document storage carousel according to claim ~~18~~11, wherein the storage slot connection part comprises a storage slot fixation support arranged with at least one clamping part compatible with the bi-directional document storage slot.

~~20~~13. The bi-directional document storage carousel according to claim ~~18~~11, wherein the bi-directional document storage carousel is attached to an external device through the fixation plate