Enclosures and Winding Devices Thereof

Cross-reference to related applications

This application claims the benefit of Chinese Utility Model Application No. CN202221948035.4, filed on 25 July 2022, and CN202221950462.6, filed on 25 July 2022, both of which are incorporated herein by reference in their entirety.

Technical Field

The present disclosure relates to enclosures and winding devices comprising the enclosures thereof. The enclosure may be a split-type enclosure and/or an enclosure comprising multi-link rollers.

Background

With the increasing development and maturity of winding device technology, their usage is becoming more widespread. Winding devices available on the market typically consist of an enclosure, winding drive assembly, and fabric. The winding drive assembly and fabric are installed inside the enclosure, and rollers are usually placed on both sides of the bottom of the enclosure to support the winding drive assembly. The fabric slides down through fabric perforations at the bottom of the enclosure. During the fabric sliding process, the rollers on the side of the fabric through-hole rotate along with the fabric, helping to straighten the fabric and enhance its wind pressure resistance capabilities.

However, current winding device and/or enclosures available in the market are generally prefabricated, meaning that their lengths are determined based on the user's specific requirements and cut to the determined lengths in a factory. During installation, these prefabricated winding device and/or enclosures can often be too heavy due to their length, leading to difficulties in installation and potential safety hazards.

Existing split-type enclosures available on the market may require staff to work at elevated heights and they may have to manually lift the winding drive assembly to prevent any interference with the enclosure assembly. This process can result in a more difficult and inconvenient installation and may pose a safety hazard.

The current rollers are designed with a length that matches the overall length of the enclosure and are positioned through the bottom of the enclosure. However, during roller installation, they may be installed at different horizontal planes, causing the entire roller to become difficult to rotate during the fabric sliding process. Additionally, the rollers may become bent at certain locality during the fabric sliding and roller rotation process, making it challenging for the entire roller to rotate. This difficulty in roller rotation can cause the fabric to slide improperly, affecting the fabric's straightness and wind pressure resistance and thereby impacting the normal use of the winding device. Furthermore, if a portion of the roller becomes bent, the entire roller needs to be replaced, leading to an increase in maintenance costs.

It would be desirable to overcome or ameliorate at least one of the above-described problems.

Summary

The present disclosure provides a split-type enclosure, comprising a top mount cover (1), a front cover (2), and a rear cover (3),
wherein the front cover (2) and rear cover (3) are capable of being snap-fitted to the top mount cover (1) to create a mounting cavity (11) for accommodating a winding drive assembly (10),
wherein a bottom of the mounting cavity (11) comprises a fabric perforation (7),
wherein the bottom of the mounting cavity (11) comprises two support roller

assemblies (8) to support the winding drive assembly (10), and
wherein an auxiliary mounting component (6) is sandwiched between the top mount cover (1) and rear cover (3) in order to securely fasten the top mount cover (1) to the rear cover (3) and enable the winding drive assembly (10) to be lifted.

Disclosed herein is a split-type enclosure, comprising a top mount cover (1), a front cover (2), and a rear cover (3),
wherein the front cover (2) and rear cover (3) are capable of being snap-fitted to the top mount cover (1) to create a mounting cavity (11) for accommodating a winding drive assembly (10),
wherein a bottom of the mounting cavity (11) comprises a gap (7) for fabric to slide out,
wherein the bottom of the mounting cavity (11) comprises two support roller assemblies (8) to support the winding drive assembly (10), and
wherein an auxiliary mounting component (6) is sandwiched between the top mount cover (1) and rear cover (3) in order to securely fasten the top mount cover (1) to the rear cover (3) and enable the winding drive assembly (10) to be lifted;
wherein the support roller assembly (8) comprises multiple rollers (82) and multiple shafts (85), the multiple shafts (85) passing through orifices of the multiple rollers (82);
wherein the rollers (82) are independently rotatable relative to each other; and
wherein the support roller assembly (8) further comprises bearings (86) sandwiched between the rollers and the shafts.

In some embodiments, an inner side of the front cover (2) and an inner side of the rear cover (3) are semi-circular so as to form a circularly shaped the mounting cavity (11).

In some embodiments, the auxiliary mounting component (6) comprises multiple mounting sections (61), multiple suspension sections (62), and multiple

suspension ropes (63), wherein the mounting sections (61) and suspension sections (62) are alternated relative to each other and span an entire length of the enclosure, wherein the suspension ropes (63) is detachably wounded around the suspension sections (62) and detachably tied to the winding drive assembly (10).

In some embodiments, the top mount cover (1), front cover (2), and rear cover (3) are each composed of multiple shells separately joined together in the longitudinal direction.

In some embodiments, a top surface of the suspension section (62) is circular.

In some embodiments, the auxiliary mounting component (6) is sandwiched between a second snap hook (5) on the top mount cover (1) and a side of the rear cover (3).

In some embodiments, the support roller assembly (8) comprises a bracket structure (81) and multiple rollers (82), wherein the rollers (82) are successively mounted in the bracket structure (81) and are independently rotatable relative to each other.

In some embodiments, the multiple rollers (82) are linked to each other.

In some embodiments, the support roller assembly (8) further comprises multiple shafts (85) passing through orifices of the multiple rollers (82).

In some embodiments, the support roller assembly (8) further comprises bearings (31) located at both ends of each roller, wherein the bearings are sandwiched between the rollers and the shafts. The bearings are fitted on the outside of the shafts.

The present disclosure also concerns a winding device, comprising a winding

drive assembly (10), a fabric (20), a mounting bracket, and an enclosure according to any one of claims 1 to 10, wherein the winding drive assembly (10) is positioned inside the enclosure which is equipped with a support roller assembly (8) to hold the winding drive assembly (10) in place, wherein the fabric (20) is wound around the winding drive assembly (10), and its end is threaded through a fabric perforation (7), wherein the mounting bracket is present on both sides of the enclosure to ensure secure mounting of the device.

The present disclosure also concerns an enclosure comprising a support roller assembly (8) located on both sides of an inner bottom side of the enclosure (100) for supporting a winding drive assembly (10), and a fabric perforation (7) at its bottom side thereof,
wherein one of the support roller assembly (8) is positioned adjacent to the fabric perforation (7),
wherein the support roller assembly (8) comprises a bracket structure (81) and multiple rollers (82) successively arranged on the bracket structure (81) and independently rotatable relative to each other, and
wherein the multiple rollers (82) are linked to each other.

In some embodiments, the support roller assembly (8) further comprises multiple shafts (85) passing through orifices of the multiple rollers (82).

In some embodiments, the support roller assembly (8) comprises:
a) rollers with shafts, wherein the shaft extends from both ends of the rollers; and
b) rollers without shafts,
wherein the rollers with shafts are positioned alternatively to the rollers without shaft such that the shafts from the rollers with shafts passes into the orifice of the rollers without shafts.

In some embodiments, the support roller assembly (8) further comprises bearings (31) at both ends of each roller, wherein the bearings are sandwiched

between the rollers and the shafts.

In some embodiments, an inner bottom side of the enclosure (100) comprises bracket slots (21) that are capable of mating with the bracket structures (2).

In some embodiments, the bracket structures (2) are integrally formed with the enclosure (100).

In some embodiments, the bracket structures (81) are characterized by at least one groove (22) on an inner side of the bracket structures (81), wherein the groove (22) is configured to correspond to a surface the rollers (82).

In some embodiments, the enclosure further comprises a bristle brush (9) positioned on the bottom of the enclosure (100) and configured to face the support roller assembly (8) and protrude into the fabric perforation (7).

The present disclosure also concerns a winding device comprising a fabric (20), a winding drive assembly (10), a slot mounting bracket, and an enclosure according to any one of claims 12 to 19,
wherein the fabric (20) is wound around the winding drive assembly (10) and both the fabric and winding drive assembly are contained within the enclosure, wherein the slot mounting bracket is positioned on both sides of the enclosure.

Brief description of the drawings

Embodiments of the present invention will now be described, by way of non-limiting example, with reference to the drawings in which:

Figure 1: A schematic cross-sectional diagram of an exemplary enclosure, showing the split-type enclosure and the multi-link rollers.
Figure 2: A schematic diagram of the auxiliary mounting component, to assist in the installation of the enclosure in a state of use.

Figure 3: A schematic exploded view of an exemplary enclosure.
Figure 4: A schematic diagram of a structure of a auxiliary mounting component.
Figure 5: A schematic diagram of the A-A section in Figure 1.
Figure 6: A schematic cross-sectional view of another embodiment of the enclosure.
Figure 7: A schematic diagram of a structure of the enclosures joined to each other.
Figure 8: A schematic cross-sectional view of another winding device.
Figure 9: A schematic cross-sectional view of another winding device.
Figure 10: A sectional view of the roller and its interior.
Figure 11: A sectional view of the roller and its interior in another example.

The attached drawings identification:
1, top mount code; 11, mounting cavity; 2, front cover; 21, decorative piece; 211, LED light; 212, light cover; 22, installation slot; 3, rear cover; 4, first snap hook; 41, connecting piece; 5, second snap hook; 6, auxiliary mounting component; 61, mounting section; 611, mounting bolt; 62, suspension section; 63, suspension rope; 7, fabric perforation; 8, support roller assembly 81, bracket structure; 82, roller; 83, grooves; 84, bracket slot; 85, shaft; 86; bearing; 9, bristle brush; 10, winding drive assembly; 20, fabric; 100, enclosure.

Detailed description

The present disclosure aims to address certain problems by introducing a split-type enclosure and a winding device that comprises this enclosure thereof. Accordingly, the difficulty of installing the enclosure is significantly reduced, and the safety of the installation process is improved.

The present disclosure also concerns an enclosure with multi-link rollers and a winding device containing the enclosure thereof. Accordingly, the problem of the entire roller (along the whole length of the winding device) being difficult to

rotate due to installation on different horizontal planes or bending of a part thereof may be resolved. This also prevents any negative impact on the normal decline of the fabric and saves maintenance costs.

Example 1

Figures 1 to 5 depict a split-type enclosure of the present disclosure. The split-type enclosure refers to a prefabricated enclosure which is assembled via its parts on site during installation. This is in contrast to an enclosure which is completely fabricated in a factory and only installed on site. This enclosure comprises a top mount cover 1, a front cover 2, and a rear cover 3. The top mount cover may be adapted to be fixed to a ceiling or wall fixture or to the ceiling or wall. The front cover 2 and the rear cover 3 may comprise protrusions and/or hooks to snap-fit and/or mate to corresponding features on the top mount cover 1. Accordingly, the front cover 2 and the rear cover 3 may be secured to the top mount cover 1, forming a mounting cavity 11 that may accommodate the installation of a winding drive assembly 10. The front cover 2 and the rear cover 3 may each further comprise portions of a bottom cover. When the top mount cover 1, a front cover 2, and a rear cover 3 are fitted together to form the mounting cavity 11, the bottom portion of front cover 2 (front bottom portion) and the bottom portion of rear cover 3 (rear bottom portion) comes together to enclose the mounting cavity 11. The front bottom portion may be substantially longer than the rear bottom portion. The length of the front bottom portion may be configured to seat the winding drive assembly 10 during assembly. For example, the length of the front bottom portion may be about 60% to about 90% relative to the cross sectional width of the enclosure. Preferably, the length is about 70% to about 85%.

The bottom portions may be separated by a gap for allowing fabric placed within the mounting cavity 11 to elute and retract. In this regard, the bottom of the mounting cavity 11 may comprise a fabric perforation 7. The fabric perforation 7 may be flanked on one or both sides thereof by a support roller assembly 8. In this regard, the front cover 2 further comprises a support roller assembly 8

on its front bottom portion thereof. The rear cover 3 may also further comprises a support roller assembly 8 on its rear bottom portion thereof. This support roller assembly 8 is responsible for holding and stabilizing the winding drive assembly 10. In addition, the top of the mounting cavity 11 may be equipped with an auxiliary mounting component 6 that can be used to lift or secure the winding drive assembly 10.

As mentioned, the split-type enclosure comprises the top mount cover 1, the front cover 2 and the rear cover 3. The top mount cover 1, the front cover 2 and the rear cover 3 may be designed for use and installed as a single enclosure, or combined depending to the length requirements. Accordingly, when compared to an integral type enclosure (or prefabricated enclosure), the split-type enclosure allows for ease of installation due to lighter weight and greatly reduces the installation difficulty of the enclosure, and thus prevents safety hazards that may arise from difficult installations.

During installation, the top mount cover 1 may be first fixed to the ceiling or wall. The front cover 2 may then be securely attached to the top mount code 1 via use of snap-fit connectors 5. The winding drive assembly 10 may then be positioned within the "open" mounting cavity 11 and may sit on the bottom portion of the front cover 2 for support. The rear cover 3 may then be securely attached to the top mount code 1 via use of snap-fit connectors 5. This makes installation a breeze and significantly reduces the level of difficulty associated with assembling the enclosure.

The top of the mounting cavity 11 may be equipped with an auxiliary mounting component 6, which facilitates the lifting of the winding drive assembly 10 during installation of the split-type enclosure. This feature reduces the installation difficulty, makes installation easier, and prevents safety accidents during the installation process. Figure 4 shows a perspective view of the auxiliary mounting component 6 removed from the split-type enclosure. The auxiliary mounting component 6 comprises at least one mounting section 61, at

least one suspension section 62 and at least one suspension rope 63. In some embodiments, auxiliary mounting component 6 comprises multiple mounting sections 61, multiple suspension sections 62 and multiple suspension ropes 63. The mounting sections 61 and suspension sections 62 are alternated relative to each other and span the length of the entire enclosure. The mounting sections 61 and suspension sections 62 are integrally formed to each other. Each suspension rope 63 is detachably wrapped around a suspension section 62 and may be tied to the winding drive assembly 10 within the mounting cavity 11, enabling the winding drive assembly 10 to be lifted easily.

In this embodiment, the top mount cover 1, front cover 2, and rear cover 3 are casings of similar length in the lengthwise direction. The installation process may begin by fixing the top mount cover 1 to the ceiling and then snap-fitting the rear cover 3 to the corresponding position of the top mount cover 1, which fixes the rear cover 3 to and underneath the top mount cover 1. The auxiliary mounting component 6 is then installed by fixing it onto the top of the mounting cavity 11, which is the top mount cover 1, using mounting bolts 611 that run through the mounting sections 61. Next, each suspension rope 63 is tied to the winding drive assembly 10 and winding the suspension rope 63 around each suspension section 62. The suspension ropes 63 are then used to lift the winding drive assembly 10 inside the rear cover 3 to a certain overhang height. The winding drive assembly 10 is secured at this height by tightening and tying a live knot underneath it to ensure that the point of impact of the winding drive assembly 10 is not on the rear cover 3 when the front cover 2 is not installed, thereby avoiding a safety hazard. The front cover 2 is then snap-fitted to the corresponding position of the top mount code 1 to fix it to and under the top mount cover 1. At this point, the front cover 2 and the rear cover 3 form a mounting cavity 11, and the bottom of the mounting cavity 11 has a fabric perforation 7. The rope at the ends of the live knot of the suspension rope 63 passes through the fabric perforation 7, as shown in Figure 2. The suspension rope 63 is then untied to slowly place the winding drive assembly 10 on the inner bottom surface of the front cover 2 and the rear cover 3. The roller

assembly 8 positioned at the bottom side of the mounting cavity 11 supports the winding drive assembly 10. The installation of the enclosure is thus completed. Through the installation of the auxiliary mounting component 6, the difficulty of the installation of the enclosure is further reduced, making installation more convenient and avoiding the need for staff to stand at a high place to assist in the installation, which can help prevent the occurrence of safety hazards.

Preferably, the front cover 2 and/or the rear cover 3 have a curved or semi-circular inner configuration so that the mounting cavity 11 can be circular in shape. This semi-circular design increases the internal structural tension of the covers, making them stronger and less likely to break at the corners compared to using an L-shaped bend in the interior. As a result, the overall structural stability of the enclosure is improved.

In some embodiments, the interior of the front cover 2 and the rear cover 3 may also be designed to have other shapes such as oval, square, double cavity, etc.

Preferably, the top surface of the suspension section 62 is curved or circular in shape. The suspension section 62 may have a cross sectional shape of either a semi-circle or a circle. This design allows the suspension rope 63 to smoothly slide over the suspension section 62 during the lifting process of the winding drive assembly 10. Moreover, it prevents the suspension section 62 from cutting the suspension rope 63 and interfering with the installation of the enclosure.

For the front cover 2 and rear cover 3 to mate with the top mount cover 1, both the front cover 2 and the rear cover 3 may be equipped with a plurality of first snap hooks 4. In particular, two first snap hooks 4 may be positioned on both the top surface of the front cover 2 and the rear cover 3. The top mount cover 1 comprises a plurality of second snap hook 5 on its bottom surface thereof, which are designed to be complementary to the first snap hooks 4. This enables

the front cover 2 and the rear cover 3 to be snap fitted to the top mount cover 1 and securely fixed to the top mount code 1, thus minimizing the risk of safety hazards.

By utilizing a second snap hook 5 and a first snap hook 4, the front cover 2 and rear cover 3 can be easily and efficiently installed under the top mount cover 1. This simple and straightforward method of attachment greatly reduces the difficulty of assembling and installing the enclosure.

The auxiliary mounting component 6 may be positioned such that it is sandwiched between a second snap hook 5 and a side surface of the rear cover 3. The side surface may be a side of a first snap hook 4. The auxillary mounting component 6 acts to further securely fastens the top mount cover 1 to the rear cover 3, by preventing the first snap hook 4 from accidentally dislodging from the second snap hook 5. In this regard, the auxiliary mounting component 6 acts as a stopper.

The first snap hook 4 located on the front or top side (i.e., outer side) of the front cover 2 may be reinforced and securely attached to the second snap hook 5 of the top mount cover 1 via a connection piece 41. This ensures that the first snap hook 4 on the front side of the front cover 2 does not become dislodged from the second snap hook 5 of the top mount cover 1, which could otherwise cause the front cover 2 to detach from the top mount cover 1. By improving the safety of the enclosure, this design feature enhances its overall functionality.

To prevent the connection piece 41 from being exposed on the exterior of the front cover 2, a covering may added during installation. Specifically, the front cover 2 may comprise an installation slot 22 on its front side thereof, through which the connection piece 41 may be inserted and to engage the front cover 2 with the top mount cover 1. A decorative piece 21 may be inserted into the installation slot 22 and configured such that its exposed surface thereof is

flushed with the front side of the front cover 2. This covers the connection piece 41, improving the overall aesthetic of the front cover 2.

The front cover 2 may also comprise a slot on its outer bottom side thereof for housing a decorative piece 21. This decorative piece can be an LED light set, which includes an LED light 211 and a light cover 212 as shown in Figures 1 to 3. The LED light 211 may be installed at the bottom of the installation slot 22, and the light cover 212 is affixed to the top of the installation slot 22. This LED light set serves both as a decorative feature and a source of lighting for the user's convenience. Alternatively, in other embodiments, the decorative piece 21 may take the form of other decorative items, such as those shown in Figure 6, to enhance the overall aesthetic appeal of the enclosure and increase the user enjoyment.

The outer sides of both the front cover 2 and the rear cover 3 may be substantially flat, which is suitable for most users' installation requirements and reduces the enclosure's installation space. Additionally, to strengthen the structure and improve stability, the inner sides of both the front cover 2 and the rear cover 3 are designed to be semi-circular while the outer sides remain flat. This design provides added strength to the structure of the front cover 2 and rear cover 3.

The mounting cavity 11 may comprise symmetrical bottom sides, each equipped with a support roller assembly 8. Accordingly, the front cover 2 and the rear cover 3 both comprises two support roller assemblies 8. These assemblies serve to support the winding drive assembly 10 inside the mounting cavity 11, which is wound with a fabric 20 on the outside.

The support roller assembly 8 on the rear cover 3 is positioned on one side of the fabric perforation 7, while a bristle brush 9 is located on the other side of the fabric perforation 7. This configuration ensures that when the fabric 20 slips through the fabric perforation 7, the support roller assembly 8 presses against

one side of the fabric while the bristle brush 9 presses against the other side, resulting in a high degree of straightness and wind pressure resistance. In addition, the bristle brush 9 cleans the fabric 20 as it slides through the fabric perforation 7, ensuring that the fabric's surface remains clean at all times.

Furthermore, the support roller assembly 8 may comprise a bracket structure 81 and a plurality of rollers 82. The number of rollers 82 is determined by the length of the enclosure, and they are mounted on the bracket structure 81 in successive rows to ensure that they are both independent and can run through the entire enclosure to fully support the fabric 20. During the movement of the fabric 20, the rollers 82 can rotate independently without interfering with adjacent rollers 82. This means that even if one part of the plurality of rollers 82 is bent or mounted on a different level, the other rollers 82 can still rotate, ensuring that the fabric 20 can slide down normally. This helps to improve the straightness of the fabric 20 and enhance its resistance to wind pressure. In the event that one part of a roller 82 is bent, only that specific part needs to be replaced, which significantly reduces maintenance costs.

The present disclosure also describes a winding device that includes a winding drive assembly 10, a fabric 20, a mounting bracket, and an enclosure. The mounting cavity 11 formed by the front cover 2, the rear cover 3, and the top mount cover 1 and accommodates the fabric 20 and the winding drive assembly 10. The fabric 20 is wound on the exterior surface of the winding drive assembly 10, and its end is passed through a fabric perforation 7. Mounting brackets are present on both sides of the enclosure, and the winding drive assembly 10 ends move up and down within the slots of the mounting brackets using pulleys during operation.

The winding device comprises a split-type enclosure which overcomes the challenges associated with the weight of the enclosure during installation, and minimizes safety hazards. Additionally, the rear cover 3 and the top mount cover 1 may be securely fixed to each other by an auxiliary mounting component 6,

which helps lift the winding drive assembly 10 within the mounting cavity 11 and simplifies the installation process. This design further enhances safety during installation.

Both the front cover 2 and the rear cover 3 may be secured to and beneath the top mount cover 1 using first and second snap hooks 4 and 5. This simple and easy-to-operate mechanism streamlines the assembly and installation of the enclosure, minimizing complexity.

Moreover, the interior of both the front cover 2 and the rear cover 3 may be semi-circular, providing high structural tension and making the enclosure robust and stable. Overall, these features make the enclosure more solid and the structure of the winding device more stable.

Example 2

As shown in Figure 7, top mount cover 1, front cover 2, and rear cover 3 may each be composed of multiple shells or casings, and separately combined in the lengthwise direction to obtain a suitable length for installation. The split-type enclosures may then be joined together in the length direction as needed. The spliced split-type enclosure is lighter and easier to install than an integral prefabricated enclosure, reducing installation difficulties and preventing safety hazards.

The split-type enclosure comprises a top mount code 1, a front cover 2, and a rear cover 3. The front cover 2 and the rear cover 3 are fixed by snap hooks underneath the top mount code 1. The top mount code 1, the front cover 2, and the rear cover 3 can be designed to be spliced or integrated in the length direction according to length requirements. This design prevents installation difficulties caused by the enclosure's weight and also avoids safety hazards during installation. Additionally, an auxiliary mounting component 6 is provided on the inner side of the snap joint between the rear cover 3 and the top mount code 1, which can be used to lift the winding drive assembly 10 inside the

mounting cavity 11 to assist in installing the split-type enclosure, further reducing installation difficulty and avoiding safety accidents during installation. Moreover, both the front cover 2 and the rear cover 3 can be fixed under the top mount code 1 by snap hooks, which is a simple and convenient operation, making the assembly and installation of the enclosure easier. In addition, the interior of both the front cover 2 and the rear cover 3 are designed in a semi-circular shape, which increases the structural tension of the front cover 2 and the rear cover 3, making the structure of the enclosure stable and more secure.

Example 3

The present disclosure also concerns an enclosure with multi-link rollers, as shown in Figures 1 and 3. The enclosure may be a split-type enclosure as described above, or a fully formed enclosure. The enclosure is equipped with support roller assemblies 8 on both sides of its inner bottom side thereof to support the winding drive assembly 10. The bottom of the enclosure comprises a fabric perforation 7. One of the support roller assemblies 8 may be positioned on a side of the fabric perforation 7. The support roller assembly 8 comprises a bracket structure 81 and multiple rollers 82, which are arranged successively on the bracket structure 81 and are independently rotatable relative to each other.

A bristle brush 9 may be located on the inner bottom side of the enclosure. The bristle brush 9 may protrude into the fabric perforation 7. Ends of the bristle brush 9 may be configured to face the support roller assembly 8.

The present disclosure may be used in a winding device, and can be applied to both single-layer and double-layer fabric winding devices. In this particular embodiment, a single-layer fabric winding device is exemplified, which comprises an enclosure, a winding drive assembly 10, and a fabric 20. The fabric 20 is wound around the winding drive assembly 10, and both the winding drive assembly 10 and the fabric 20 are located inside the enclosure.

The enclosure is equipped with supporting roller assemblies 8 on both sides of its inner bottom sides thereof, which are used to support the winding drive assembly 10 inside the enclosure. The bottom of the enclosure is also provided with a fabric perforation 7, with one of the supporting roller assemblies 8 and a bristle brush 9 placed on a side of the fabric perforation 7. The fabric 20 passes the supporting roller assembly 8 nearest to the fabric perforation 7, through the bristle brush 9 before entering the fabric perforation 7 and then sliding out through it.

During the sliding process of the fabric 20, the support roller assemblies 8 rotate independently along with the fabric 20, and the bristle brush 9 presses and cleans the fabric 20. Through the rolling and squeezing of the support roller assemblies 8 and the pressing of the bristle brush 9, the large swinging of the fabric 20 caused by wind can be prevented, and the straightness of the fabric 20 can be ensured.

The support roller assembly 8 consists of a bracket structure 81 and multiple rollers 82 that act on the fabric 20. The number of rollers 82 is determined by the length of the enclosure, and multiple rollers 82 may be independently arranged and installed in succession on the bracket structure 81 to ensure that they are both independently arranged and can extend the entire enclosure to fully act on the fabric 20. During the fabric 20 sliding process, the rollers 82 may rotate independently without interfering with each other. This means that even if one part of the multiple rollers 82 is bent or installed at different horizontal planes, the other rollers 82 can still rotate along with the fabric 20, avoiding any potential failure of the entire support roller assembly 8 and preventing any negative impact on the normal sliding of the fabric 20. This results in an improvement in the straightness of the fabric 20 and enhances its ability to resist wind pressure. Moreover, when one part of the rollers 82 is bent, it is only necessary to replace that part of the rollers 82, greatly reducing maintenance costs.

The bracket structure 81 is an integral bracket that at least partially encompasses multiple rollers 82. In this regard, the bracket structure 81 is formed or moulded as a single piece. The inner side of the bracket structure 81 may comprise at least one groove 83 configured to correspond to a surface of the rollers 82. The grooves 83 may be circular or curved. When multiple circular grooves 83 are present on the integral bracket, the grooves 83 act together to encircle multiple rollers 82 on the side closest to the enclosure, thereby holding the rollers 82 in place within the bracket structure 81. For example, three grooves may be present and spaced apart relative to each other in order to support the rollers 82. The upper portion of the circular grooves 83 limits the upward movement of the multiple rollers 82, while the lower part provides support, resulting in smoother rotation of the multiple rollers 82 within the integral bracket. This design prevents the rollers 82 from becoming dislodged from the integral bracket during rotation, which could adversely affect the normal use of the cover.

The inner bottom sides of the enclosure may be equipped with two bracket slots 84 that match the bracket structure 81. The bracket structure 81 may be installed within the bracket slots 84, which enhances its installation stability and consequently strengthens the stability of the support roller assembly 8. The matching between the bracket slots 84 and the bracket structure 81 ensures a more secure installation and better support for the roller assembly.

Moreover, the enclosure has a bristle brush 9 at the bottom on the side opposite to the support roller assembly 8 where the fabric perforation 7 is situated. The bristle brush 9 applies pressure on the fabric 20, while multiple rollers 82 apply pressure on the fabric 20 from the other side, resulting in dual-sided pressure that significantly enhances the fabric's resistance to wind pressure and its flatness. Furthermore, as the fabric 20 slides underneath, the bristle brush 9 acts as a cleaner, exerting pressure on the fabric 20 to keep it clean.

It is possible to utilize plastic pipes for the roller 82, which can be conveniently shaped and processed, resulting in decreased processing costs for multiple rollers 82. The lightweight nature of the plastic pipes significantly reduces the complexity of installing the enclosure, while their exceptional corrosion resistance enhances the longevity of the enclosure. Furthermore, in alternative embodiments, the roller 82 can also be fashioned from circular material pipes, such as nylon or aluminum alloy pipes.

The present disclosure also provides a winding device (shown in Figure 1) that includes a fabric 20, a winding drive assembly 10, and the enclosure mentioned above. The fabric 20 is wound around the winding drive assembly 10, and both the fabric 20 and the winding drive assembly 10 are installed inside the enclosure. Two side support roller assembly 8 hold up the winding drive assembly 10, and the end of the fabric 20 passes through a support roller assembly 8 located near the fabric perforation 7 and exits through the same perforation.

The support roller assembly 8 comprises a bracket structure 81 and multiple rollers 82 that act on the fabric 20. The number of rollers 82 is determined based on the length of the enclosure, and several rollers 82 are independently arranged and installed on the bracket structure 81 in a row. During the downward sliding of the fabric 20, the rollers 82 can rotate independently, and adjacent rollers 82 do not interfere with each other. This means that if part of the rollers 82 bend or are installed at different horizontal planes, the remaining rollers 82 can still rotate, enabling the fabric 20 to slide down normally without affecting the entire support roller assembly 8. This improves the fabric 20's flatness and enhances its ability to resist wind pressure. Additionally, if part of the rollers 82 bends, only that section needs to be replaced, leading to significant maintenance cost savings.

The slot mounting brackets may be located on both sides of the enclosure, and during operation of the winding drive assembly 10, its two ends slide up and down in the grooves of the slot mounting bracket via pulleys.

Example 4

In Figure 8, the main difference between this embodiment and the one above is the design of the bracket structure 81. In this embodiment, the bracket structure 81 is integrated with the enclosure 100. A circular groove 84, which matches the shape of the roller 82, is positioned on the inner side of the bracket structure 81. The circular groove 84 surrounds multiple rollers 82 on the side closest to the enclosure through the bracket structure 81. In other words, the while the rollers 82 sits within and are rotatably held within the bracket structure 81, part of the rollers 82 are exposed and in contact with the winding drive assembly 10. More specifically, the upper part of the circular groove 84 is located above multiple rollers 82, and the lower part of the circular groove 84 supports multiple rollers 82, allowing the rollers 82 to rotate more smoothly within the bracket structure 81. This design also prevents multiple rollers 82 from dislodging from the bracket structure 81 during the rotation process and interfering with the normal operation of the cover.

Example 5

In Figures 9 and 10, multiple cylindrical shafts 85 are incorporated into multiple rollers 82, and each cylindrical shaft 85 is positioned between adjacent rollers 82. In this regard, an end of the shaft 85 is staggered relative to an end of the roller 82. For example, the setup may comprise two types of rollers: a first roller with shaft 85 passing therethrough its orifice, and a second roller without shaft. When the shaft is associated with the rollers, the shaft 85 may extend a length longer than the length of the roller. The shaft may extend outwardly from both ends of the roller, or from one end of the roller. For example, the length of the shaft may be about two times the length of the roller, wherein the shaft extends from both ends of the roller. The extension of the shaft from each end of the

roller may about half the length of a roller. Accordingly, in use, the rollers with shaft may be positioned alternately with rollers without shaft.

As the outer diameter of each cylindrical shaft 85 is smaller than the inner diameter of the roller 82, and the cylindrical shaft 85 is cylindrical, it only functions as a connection and its rotation does not affect the rotation of the outer roller 82. Consequently, multiple rollers 82 may still be independently installed and arranged successively on the bracket structure 81. During the sliding process of fabric 20, the rollers 82 can rotate independently and do not interfere with adjacent rollers 82. Therefore, if any part of multiple rollers 82 is bent or installed on different horizontal planes, other rollers 82 can still rotate while the fabric 20 slides, preventing the entire support roller assembly 8 from malfunctioning and impairing the normal sliding of the fabric 20. This enhances the straightness and wind pressure resistance of the fabric 20. Furthermore, replacing only the affected roller 82, in case of bending, significantly saves maintenance costs.

Multiple bearings 86 may be positioned inside each of the multiple rollers 82, as shown in Figure 11. These bearings are located at both ends of each roller 82 and mounted within the rollers 82 and on the outside of cylindrical shafts 85. The bearings may be sandwiched between the rollers and the shafts. The rollers may be configured to house the bearings 86. Alternatively, the shaft 85 may be configured to house the bearings 86. Since the outer diameter of the bearing 86 is smaller than the inner diameter of the roller 82 and the bearing is cylindrical in shape, it only serves to make the rotation of each roller 82 smoother. Importantly, the rotation of the bearing 86 does not affect the rotation of the outer roller 82, allowing each of the multiple rollers 82 to rotate independently without any interference from adjacent rollers 82.

The present disclosure also provides a support roller assembly 8 located at the bottom of the enclosure 100, which consists of a bracket structure 81 and multiple rollers 82. The quantity of rollers 82 is determined based on the length

of the enclosure 100, and they are independently arranged and installed in succession within the bracket structure 81. This design enables each roller 82 to rotate independently without interfering with the adjacent ones. As a result, if a portion of the rollers 82 become bent or are installed on different horizontal planes, the other rollers 82 can continue to rotate as the fabric 20 slides down. This feature prevents the entire support roller assembly 8 from malfunctioning and affecting the normal downward sliding of the fabric 20, leading to improved flatness of the fabric 20 and enhanced resistance to wind pressure. Additionally, if one or more rollers 82 become bent, only those rollers need to be replaced, which significantly reduces maintenance costs.

It will be appreciated that many further modifications and permutations of various aspects of the described embodiments are possible. Accordingly, the described aspects are intended to embrace all such alterations, modifications, and variations that fall within the spirit and scope of the appended claims. For example, it should be noted that the accompanying drawings are merely some embodiments of the present disclosure, and other drawings can be created based on these drawings by those skilled in the art without any additional creative effort.

It is important to note that in the description of the present disclosure, certain terms such as "up," "down," "left," "right," "inside," and "outside" are used to indicate orientations or positional relationships based on those presented in accompanying drawings. These terms are meant to facilitate and simplify the description of the present disclosure and should not be taken to imply that the device or element being referred to must have a particular orientation, nor should they suggest that the device must be constructed or operated in a specific manner.

Similarly, the terms "first," "second," "third," "fourth," and so on, are used for descriptive purposes only and are not intended to limit the scope of the present

disclosure in any way. Furthermore, these terms do not indicate or imply relative importance.

It is important to note that in the description of the present disclosure, the terms "mounted," "connected," and "attached" should be understood in a broad sense, unless otherwise expressly specified and limited. For instance, these terms may refer to a fixed connection, a removable connection, or a one-piece connection; a mechanical connection or an electrical connection; a direct connection or an indirect connection through an intermediate medium; or a connection within two components. It is assumed that a person of ordinary skill in the art will understand the specific meaning of these terms in the context of the present disclosure, depending on the specific case.

It is important to note that the terms "installation", "connection", and "linking" should be interpreted in a broad sense, unless specifically defined and limited. These terms may refer to a fixed connection, a detachable connection, or an integral connection. Additionally, they may denote a mechanical connection or an electrical connection, and may refer to either a direct or indirect connection through an intermediate medium. Connections may also occur within two components. Ordinary technicians in this field should interpret the meaning of these terms in this disclosure based on the specific context.

Throughout this specification and the claims which follow, 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.

Throughout this specification and the claims which follow, unless the context requires otherwise, the phrase "consisting essentially of", and variations such as "consists essentially of" will be understood to indicate that the recited element(s) is/are essential i.e. necessary elements of the invention. The phrase

allows for the presence of other non-recited elements which do not materially affect the characteristics of the invention but excludes additional unspecified elements which would affect the basic and novel characteristics of the method defined.

The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as an acknowledgment or admission or any form of suggestion that that prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

Claims

1. A split-type enclosure, comprising a top mount cover (1), a front cover (2), and a rear cover (3),
wherein the front cover (2) and rear cover (3) are capable of being snap-fitted to the top mount cover (1) to create a mounting cavity (11) for accommodating a winding drive assembly (10),
wherein a bottom of the mounting cavity (11) comprises a gap (7) for fabric to slide out,
wherein the bottom of the mounting cavity (11) comprises two support roller assemblies (8) to support the winding drive assembly (10), and
wherein an auxiliary mounting component (6) is sandwiched between the top mount cover (1) and rear cover (3) in order to securely fasten the top mount cover (1) to the rear cover (3) and enable the winding drive assembly (10) to be lifted;
wherein the support roller assembly (8) comprises multiple rollers (82) and multiple shafts (85), the multiple shafts (85) passing through orifices of the multiple rollers (82);
wherein the rollers (82) are independently rotatable relative to each other; and
wherein the support roller assembly (8) further comprises bearings (86) sandwiched between the rollers and the shafts.

2. The split-type enclosure according to claim 1, wherein an inner side of the front cover (2) and an inner side of the rear cover (3) are semi-circular so as to form a circularly shaped the mounting cavity (11).

3. The split-type enclosure according to claim 1 or 2, wherein the auxiliary mounting component (6) comprises multiple mounting sections (61), multiple suspension sections (62), and multiple suspension ropes (63), wherein the mounting sections (61) and suspension sections (62) are alternated relative to each other and span an entire length of the enclosure, wherein the suspension ropes (63) is detachably wounded around the suspension sections (62) and

detachably tied to the winding drive assembly (10).

4. The split-type enclosure according to any one of claims 1 to 3, wherein the top mount cover (1), front cover (2), and rear cover (3) are each composed of multiple shells separately joined together in the longitudinal direction.

5. The split-type enclosure according to claim 3, wherein a top surface of the suspension section (62) is circular.

6. The split-type enclosure according to any one of claims 1 to 5, wherein the auxiliary mounting component (6) is sandwiched between a second snap hook (5) on the top mount cover (1) and a side of the rear cover (3).

7. The split-type enclosure according to any one of claims 1 to 6, wherein the support roller assembly (8) comprises a bracket structure (81) , wherein the rollers (82) are successively mounted in the bracket structure (81).

8. The split-type enclosure according to claim 7, wherein the bracket structure (81) is characterized by at least one groove (83) on an inner side of the bracket structure (81), wherein the groove (83) is configured to correspond to a surface the rollers (82).

9. The split-type enclosure according to any one of claims 1 to 8, wherein the bearings (86) are at both ends of each roller.

10. The split-type enclosure according to any one of claims 1 to 9, wherein the support roller assembly (8) comprises:

a) rollers with shafts, wherein the shaft extends from both ends of the rollers; and

b) rollers without shafts,

wherein the rollers with shafts are positioned alternatively to the rollers without shaft such that the shafts from the rollers with shafts passes into the orifice of

the rollers without shafts.

11. The split-type enclosure according to any one of claims 1 to 10, wherein the top mount cover (1) comprises a plurality of second snap hooks (5) that are capable of mating with first snap hooks (4) on the front cover (2) and the rear cover (3).

12. The split-type enclosure according to any one of claims 1 to 11, wherein the top mount cover (1) comprises at least two second snap hooks arranged in series to each other for mating with at least two first snap hooks (4) on the front cover (2), and at least two second snap hooks arranged in series to each other for mating with at least two first snap hooks (4) on the rear cover (3).

13. The split-type enclosure according to any one of claims 1 to 12, wherein the front cover (2) is further attached to the top mount cover (1) by a connection piece (41).

14. The split-type enclosure according to claim 13, wherein the connection piece (41) is covered by a decorative piece (21).

15. The split-type enclosure according to any one of claims 1 to 14, wherein the split-type enclosure further comprises a bristle brush (9) protruding into the gap (7) and facing the support roller assembly (8).

16. A winding device, comprising a winding drive assembly (10), a fabric (20), a mounting bracket, and a split-type enclosure according to any one of claims 1 to 15, wherein the winding drive assembly (10) is positioned inside the enclosure which is equipped with a support roller assembly (8) to hold the winding drive assembly (10) in place, wherein the fabric (20) is wound around the winding drive assembly (10), and its end is threaded through a fabric perforation (7), wherein the mounting bracket is present on both sides of the enclosure to ensure secure mounting of the device.