END-LOCKS FOR SHUTTER SLATS

FIELD OF INVENTION

The invention relates to a roller shutter assembly. More particularly, the invention relates to the end-locks of shutter slats forming the roller shutter assembly which are intended to reduce friction between the shutter slats and shutter side guide tracks that they travel in.

BACKGROUND OF THE INVENTION

A roller shutter assembly or roller shutter is a type of door or window formed from a plurality of horizontal slats that are linked together to form a shutter curtain, which are commonly mounted above a door or window and designed to be rolled down to provide a shield of protection for the door or window as needed. It has become one of the most cost-effective ways to improve security and overall aesthetic appeal of any factory or residential household. In fact, roller shutters have become increasingly popular over the past decade. The concept of a roller shutter is simple. The roller shutter operates by simply rolling up or down and its travel path is guided by the pair of shutter side guide tracks usually fitted onto both sides of the door or window. Conventionally, respective end portions of each shutter slat are each fastened with end-locks. Not only do the end-locks cover up openings at the end portions of each of the usually hollow shutter slats, they also securely retain the end portions of the shutter slats within the opposing side guide tracks, such that the roller shutter does not derail from side guide tracks.

Figs. 1 & 2 illustrate one exemplary of a conventional roller shutter assembly. Such a roller shutter assembly comprises a shutter curtain with each end portion of the shutter slat (10) being located within respective side guide tracks (30) such that the shutter

curtain can be guided by the guide tracks (30) to move between an open and a closed position, with an end-lock (20) being attached to respective end portions of the shutter slats (10) so that the end portions of the shutter slats (10) can be retained within the track (30). Specifically, each end-lock (20) comprises a first panel body (21) extended to the end portion of the shutter slats (10) for attachment, and a second panel body (22) sized to substantially cover an opening of the shutter slats.

Nevertheless, the conventional designs of the end-locks (20) are not capable of reducing friction between the shutter slats (10) and the track (30). Such problems tend to occur often during hot weather where the shutter slats (10) thermally expand and subsequently cause high friction between the end portions of the shutter slats (10) and the tracks (30).

Therefore, a need exists for the end-locks to incorporate a mechanism that can solve the problem as mentioned above. This invention provides such a roller shutter assembly and a corresponding end-lock thereof.

SUMMARY OF INVENTION

In accordance with a first aspect of the invention, there is provided a roller shutter assembly for closing an opening of a structure, the assembly comprises a shutter curtain formed by a plurality of adjacent interlocking shutter slats; at least one track engaged by end portions of the shutter slats, the track being configured to guide the shutter curtain to move between an open position and a closed position of the opening of the structure; and a plurality of end-locks, each attached to one end portion of the shutter slats for preventing the shutter curtain from disengaging from the track; characterised in that each of the end-locks are further coupled with one or more roller wheels for reducing friction between the shutter curtain and the track.

In this aspect of the invention, each end-lock may comprise a first panel body extended to the end portion of the shutter slat for attachment thereto, and a second panel body sized to substantially cover an opening of the end portions of the shutter slats. Preferably, the one or more roller wheels are coupled to the first panel body and/or the second panel body via nut and bolt attachment.

In this aspect of the invention, each end-lock can be attached to one end portion of the shutter slats via nut and bolt attachment.

In this aspect of the invention, the track can be in the form of an elongate hollow bar with an elongate opening sized to receive the end portions of the shutter slats.

In this aspect of the invention, a rotating assembly can be provided to couple with a drive mechanism to rotatably extend or retract the shutter curtain.

In accordance with a second aspect of the invention, there is provided an end-lock for use in a shutter slat, comprises a first panel body extended to an end portion of the shutter slat for attachment thereto; and a second panel body sized to substantially cover an opening of the end portion of the shutter slat; characterised in that one or more roller wheels are coupled to the first panel body and/or the second panel body.

One skilled in the art will readily appreciate that the invention is well adapted to carry out the objects and obtain the ends and advantages mentioned, as well as those inherent therein. The embodiments described herein are not intended as limitations on the scope of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

For the purpose of facilitating an understanding of the invention, there is illustrated in

the accompanying sheets of drawings the preferred embodiments from an inspection of which when considered in connection with the following description, the invention, its construction and operation and many of its advantages would be readily understood and appreciated.

Fig. 1 shows a front view of a conventional roller shutter assembly. [PRIOR ART]

Fig. 2 shows a front view of a conventional end-lock. [PRIOR ART]

Fig. 3 shows a front view of an improved roller shutter assembly which embodies therein the principal features of the invention.

Fig. 4 shows a front view of an improved end-lock for the roller shutter assembly which embodies therein the principal features of the invention.

Fig. 5 shows a top view of a shutter slat incorporating an end-lock of the present invention within a shutter side guide track.

DETAILED DESCRIPTION OF THE INVENTION

Referring to the Fig. 3, a roller shutter assembly as illustrated therein comprises part of a shutter curtain within a shutter guide track (30) moving between an open and a closed position of an opening of a structure. By way of example, the structure can be a wall of a building such as factory, housing or even high-rise. The opening is preferably a door or window with a top, a bottom and two sides. A rotating assembly can be mounted at a position adjacent the opening of the structure. Preferably, the rotating assembly is mounted at the top section of the opening. As such, the shutter

curtain can be coupled to the rotating assembly in a way such that it can extend downwardly from or retract upwardly into the rotating assembly. The shutter curtain can be foldable or rollable into the rotating assembly. Preferably, the extension moves the shutter curtain downwardly from the open position to close the opening of the structure while the retraction moves the shutter curtain upwardly from the closed position to the open position. The rotating assembly can be associated with a drive system to drive the movement of the shutter curtain. Such drive system can be manually or electrically operated.

The shutter curtain is formed by a plurality of interconnected, elongate slats (10). The slats (10), each of which is substantially flat, having two substantially planar end portions, and preferably made of metal such as steel, stainless steel, aluminium, and etc. It should be noted that the slats (10) can be made of other materials as long as they form a structure that is rigid and relatively light in weight. Such materials may include harden plastic, wood, wood fiber and etc. Each slat (10) may be single walled or double walled. The slats (10) are interconnected by two adjacent interlocking profiles on their respective longitudinal sides. At least one layer of a finishing coating can be applied on the outer surface of each slats (10). Such finishing coating can be a zinc plate or galvanised coating.

Each end portion of the slats (10) is attached with an end-lock (40) which is functioned to cover an opening on each end portion of the slats (10) and to prevent the shutter curtain from disengaging from the tracks (30). The end-lock (40) can be made of any materials as long as they form a structure that is rigid and relatively light in weight. Such materials may include metal, plastic, wood, wood fiber and etc. As shown in Figs. 4 & 5, each end-lock comprises a first panel body (41) extended to the end portion of the slat (10) for attachment thereto, and a second panel body (42) sized to substantially cover the opening of the end portion of the slat (10). By way of example, the first panel body (41) includes a front panel body (41a) for engagement

with one side surface of the slat (10) and a rear panel body (41b) for engagement with the other opposing side surface of the slat (10). The front and rear panel bodies (41a, 41b) are extended from the second panel body (42) to form a generally U-shape cap and they are each provided with one or more attachment holes (43, 44) which can be aligned with one or more through holes (12, 13) on the end portion of the slat (10) for nut and bolt attachment (47). The second panel body (42) includes an upper flap and a bottom flap which are extended sufficiently to at least partially cover the opening of the end portion of the slats (10).

In the preferred embodiment, the end-lock (40) is characterised by having one or more roller wheels (45) coupled to the first panel body and/or the second panel body, being configured to engage with an internal surface of the track (30) so that the roller wheels (45) reduce or eliminate friction between the slats (10) and the track (30). The roller wheels (45) can be made of metal material, such as steel, stainless steel, aluminium or etc, or other types of materials, such as harden plastic, wood, wood fiber and etc. Each end portion of the slat (10) can be provided with further through hole (11) for the roller wheels (45) to be directly attached thereon via any types of fasteners (46) such as bolts, nuts, screws, studs, rivets, and etc. Size of the roller wheels (45) may vary depending on the dimension of the slat (10). Preferably, the roller wheels (45) is size between 12mm to 50mm. Preferably, a pair of tracks (30) are provided, one installed at each side of the opening of the structure, engaging with the end portions of the slats (10). As shown in Fig. 5, each track (30) is in the form of an elongate hollow bar (31) with an elongate opening sized to receive the end portions of the slats (10).

The present disclosure includes as contained in the appended claims, as well as that of the foregoing description. Although this invention has been described in its preferred form with a degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in

the details of construction and the combination and arrangements of parts may be resorted to without departing from the scope of the invention.

CLAIMS

1. A roller shutter slat (10) end-lock (40), in the form of a U-shaped cap adapted to fully embrace and cover an opening in an end portion of the shutter slat (10) comprising:

a U-shaped panel body (41) including:

an end plate (42) having front and rear panel bodies (41a), (41b) extending from opposing sides therefrom to form the U-shape;

the end plate (42) also having upper and lower flaps extending from the remaining opposing sides therefrom, to complete the capping;

wherein one or more roller wheels (45) are coupled to the first panel body (41) and/or the second panel body (42).

2. An end-lock (40) as claimed in claim 1, wherein opposed roller wheels (45) are operatively linked with fasteners (46) via a through-hole (11) located in the roller shutter slat and opposing apertures located in the end-lock (40) that are concentric with the through-hole (11).

3. An end-lock (40) as claimed in claim 1 or claim 2, wherein the end-lock is provided with a plurality of additional apertures (43), (44) to enable nuts and bolts to be connected together via through holes (12,13) located in the roller shutter slat, which are concentric with the apertures (43), (44) to secure the end-lock (40) to the roller shutter slat.

4. An end-lock (40) as claimed in any one of the preceding claims, wherein less than half of the one or more roller wheels (45) extends beyond the end face of the end plate (42).

5. An end-lock (40) as claimed in claim 3 or claim 4, wherein the centres of each of

the plurality of apertures (43), (44) are in vertical alignment in the end-lock's (40) intended attitude of operation.

6. A roller shutter slat or a roller shutter assembly incorporating an end-lock as claimed in any one of the preceding claims.

7. A structure incorporating a roller shutter assembly as claimed in claim 6.