A chain guide for a roller blind or roller shade of the type driven by a clutch that is activated through applying a tensile load to one end of a chain, rope or cable that engages the clutch. The chain guide comprising two or more rollers mounted to one or more
(57) Abrégé(suite)/Abstract(continued):
structural members positioned about the end of blind. The rollers engage the chain, rope or cable and direct the chain, rope or cable onto the clutch. The rollers help to maintain the position of the chain, rope or cable adjacent the clutch and helping to eliminate contact between the chain, rope or cable and the structural members of the blind, thereby reducing the mechanical noise generated by the chain, rope or cable during operation of the blind.
ABSTRACT

A chain guide for a roller blind or roller shade of the type driven by a clutch that is activated through applying a tensile load to one end of a chain, rope or cable that engages the clutch. The chain guide comprising two or more rollers mounted to one or more structural members positioned about the end of blind. The rollers engage the chain, rope or cable and direct the chain, rope or cable onto the clutch. The rollers help to maintain the position of the chain, rope or cable adjacent the clutch and helping to eliminate contact between the chain, rope or cable and the structural members of the blind, thereby reducing the mechanical noise generated by the chain, rope or cable during operation of the blind.
TITLE

Chain Guide For A Roller Blind Or Roller Shade

FIELD

This invention relates generally to roller blinds, shades and other similar types of window coverings, and in particular to a new chain guide for a roller blind or roller shade of the type driven by a clutch that is actuated through applying a tensile load to a chain, rope or cable that engages the clutch.

BACKGROUND

Most roller blinds or roller shades are constructed with a clutch mechanism that allows the blind fabric or material to be raised or lowered in front of a window pane as desired in order to block the infusion of light into a room or building. In many instances the clutch is activated through the use of a chain, rope or cable that is looped around the clutch, such that pulling on one end of the chain or rope causes the clutch to retract the fabric, whereas pulling on the opposite end of the chain or rope causes the clutch to lower the fabric in front of the window pane. Often the chains that are utilized in roller blinds are ball chains. Ball chains present a desirable aesthetic appearance and also allow the exterior
surface of the clutch to be formed with concave depressions that readily accept the exterior surface of the individual balls on the chain, presenting a drive mechanism that minimizes slippage between the chain and the clutch. In some cases the ball chains are metal while in other cases the chains are a "hybrid", formed through the attachment of metallic or composite balls onto the exterior surface of a rope or cable. In either instance the functionality of the ball chain and the clutch is essentially identical.

While ball chains have been successfully used to operate the clutch of a roller blind or roller shade for a considerable length of time, they suffer from the inherent limitation of being noisy during operation. The exterior surfaces of the balls (whether they be metal, plastic or a composite material) tend to be relatively hard such that as they come into contact with components of the blind, mechanical noise is generated. For example, when one end of a chain attached to the clutch of a roller blind is pulled in order to either raise or lower the blind, if the chain is not pulled in a precise vertical angle the balls may come into contact with structural and/or aesthetic or trim components of the blind, causing a "ratcheting" sound to be generated. Further, when a blind is opened or closed an individual will typically grasp one side of a chain that is looped around the clutch and hanging vertically downward from the blind. The side of the chain that is grasped is held in tension, whereas the opposite side of the chain loop is typically allowed to hang free. As the chain is pulled the free
side of the loop will sometimes contact components within the end of the roller blind, once again causing the generation of mechanical noise.

In order to minimize the noise created through such contact, others have attempted to coat various components of the blind’s hardware with a soft and somewhat pliable plastic or similar material that has less of a tendency to create mechanical noise. Although such action results in a reduction in the level of noise generated to some degree, the soft material tends to wear quickly on account of friction between it and the exterior surface of the chain.

**SUMMARY**

The invention therefore provides a chain guide for a roller blind or roller shade that addresses some of the deficiencies in the art.

In one of its aspects the invention provides a chain guide for a roller blind or roller shade of the type driven by a clutch that is activated through applying a tensile load to one end of a chain, rope or cable that engages the clutch, the chain guide comprising two or more rollers mounted to one or more structural members positioned about the end of the blind, said rollers engaging the chain, rope or cable and directing the chain, rope or cable onto the clutch, said rollers helping to maintain the position of the chain, rope or cable adjacent the clutch and helping to eliminate contact between the chain, rope or cable and the
structural members of the blind thereby reducing the mechanical noise generated by the chain, rope or cable during operation of the blind.

Further aspects of the invention will become apparent from the following description taken together with the accompanying drawings.

**BRIEF DESCRIPTION OF THE DRAWINGS**

For a better understanding of the present invention, and to show more clearly how it may be carried into effect, reference will now be made, by way of example, to the accompanying drawings which show exemplary embodiments of the present invention in which:

Figure 1 is a lower side perspective view of a typical roller blind or roller shade that is actuated by a ball chain and that utilizes the chain guide in accordance with an exemplified embodiment of the present invention.

Figure 2 is a lower perspective view of the roller shade of Figure 1 having its bottom and rear trim plates removed.

Figure 3 is an end view of the roller blind shown in Figure 1 having its exterior trim plate removed.
Figure 4 is an exploded perspective view of the end of the roller blind shown in Figure 3 having its roller and roller tube removed.

Figure 5a is a bottom non-exploded view of the end of the roller blind shown in Figure 4.

Figure 5b is an enlarged detail view of portion A of Figure 5a.

Figure 6a is an upper side perspective view of the roller hub shown in Figure 4.

Figure 6b is a side elevational view of the roller hub shown in Figure 4.

Figure 7a is an upper side perspective view of the roller sleeve shown in Figure 4.

Figure 7b is a side elevational view of the roller sleeve shown in Figure 7a.

Figure 8 is an upper side perspective view of an alternate embodiment of the roller hubs and sleeves in accordance with the present invention.
DESCRIPTION

The present invention may be embodied in a number of different forms. The specification and drawings that follow describe and disclose some of the specific forms of the invention.

In the attached drawings there is shown a typical roller blind or roller shade designated generally by reference numeral 1. It will be appreciated that much of the particular form and structure of the roller blind is of little consequence in the present invention. However, for illustration purposes the blind shown in the attached figures is comprised generally of a pair of end plates or brackets 2, a head box enclosure 3 (formed generally from a bottom plate 4 and a rear plate 5), blind fabric 6 and a chain 7. The blind fabric 6 is received about a roller tube 8, which is in turn connected to and driven by a clutch 9. As is shown more specifically in Figures 3 and 4, chain 7 is looped about a portion of the exterior surface of clutch 9 such that pulling on one end of the chain causes the clutch to rotate in one direction, whereas pulling on the opposite end of the chain causes the clutch to rotate in the opposite direction. Thus, pulling or applying a tensile force to the chain will cause the blind fabric to be raised or lowered, depending upon which portion of the chain loop is grasped.
In accordance with the invention there is provided two or more rollers 10 that are mounted to one or more structural members in end brackets 2. Rollers 10 engage the chain and assist in directing the chain onto the clutch to thereby help maintain the positioning of the chain adjacent to the clutch and to help eliminate contact between the chain and the structural members of end brackets 2, and roller blind 1 in general. In the attached drawings two rollers are utilized, however, it will be appreciated that in other instances it may be desirable to use more than two rollers to help maintain the positioning of the chain.

With specific reference to Figures 3 and 4, in one embodiment of the invention rollers 10 are mounted on a pair of fixed shafts 11, that are in turn mounted on end bracket 2. In this embodiment, the rollers are comprised generally of a roller hub 12 that is received over shaft 11 and that is free to rotate relative thereto. Securing hub 12 to shaft 11 can be accomplished in a variety of different ways using a wide variety of different fasteners and fastening means. In the particular embodiment shown in the attached drawings, the outer ends of the shafts have an enlarged circumferential rib or lip 13 that exceeds the internal diameter of hub 12. The hub contains a slit 14 along its lateral axis that allows the hub to be expanded slightly, thereby increasing its internal
diameter to allow it to be pushed over the end of shaft 11. With the hub located over the shaft releasing the hub causes it to return to its original configuration such that its internal diameter is less than that of rib 13, but still slightly larger than that of shaft 11. In this manner the hub will be retained securely upon the shaft but free to rotate thereabout.

In order to assist rollers 10 in accepting the exterior surface of chain 7, in one preferred embodiment of the invention the exterior surface of the rollers is concave with an outer dimension that approximates the outer dimension of the chain. With the concavity of the exterior surface of the rollers approximating the diameter of the chain there exists a tendency for the rollers to maintain contact with the chain as it is operated, thereby reducing the likelihood of contact between the chain and other structural components of the blind.

Each of the rollers 10 may include an exterior sleeve 15 formed from a pliable relatively soft flexibly resilient material. It is expected that in most instances the sleeves will be formed from a rubber, silicone or similar type of material that can be stretched over and received about the exterior surface of hub 12. In that regard, sleeves 15 may also be formed with a concave exterior surface, similar to that of the hub. The sleeves may also be of a size results in the application of an external compressive force to the hub in order to maintain slit 14 in a closed configuration and to assist in keeping the hub from accidentally
being ejected over rib 13 on shaft 11. The relatively soft and resilient nature of the material from which sleeve 15 is formed will further serve the function of helping to prevent slippage between the rollers and the chain, and will reduce the likelihood of mechanical noise being generated through the operation of the blind.

In the construction of a roller blind, the size of the clutch and the roller tube are often a function of the length of blind fabric that is to be received and wound about the tube. To minimize the number of different component parts required to assemble blinds of different sizes and configurations, manufactures often attempt to utilize common end brackets for blinds of different clutch and/or roller tube dimensions. For that reason, the end brackets 2 of the roller blind may include means to permit shafts 11 to be positioned at different locations on the end brackets. Altering the location of the positioning of the shafts upon the end brackets allows the end brackets to accommodate clutches of different size diameters, while still enabling the rollers 10 to direct the chain properly onto the exterior surface of the clutch and to minimize contact of the chain with the structural components of the blind. In the embodiment of the invention shown in Figures 3 and 4, end brackets 2 contain additional holes 16 through which fasteners can be received in order to position shafts 11 at alternate locations within the end brackets.
Figure 8 shows yet a further embodiment of the invention where shafts 11 are received upon a plate 17 that can then be secured at a desired location within the end bracket. In this manner the manufacturer or installer has the option of incorporating the rollers into the end bracket construction were desired, or eliminating them where it is deemed that they may not be necessary. Further, the manufacturer and installer are presented with the flexibility of positioning plate 17 within the end bracket at its optimal location and not limited to pre-set positions of holes 16. The incorporation of shafts 11 and rollers 10 upon plate 17 also allows the rollers to be retrofitted into existing blinds without having to replace the end brackets or other components of the blind. It is noted that in Figure 8 plate 17 is shown with three shafts mounted thereto, however, it will be appreciated that the plate could also be configured with two or more shafts.

The employment of the above-described invention will thus present a mechanism that will help to maintain the positioning of the chain in a roller blind with respect to the location of the blind’s clutch and structural components to help eliminate contact between the chain and other components and to reduce mechanical noise. The invention also helps to prevent contact between the chain and structural components which can result in frictional wear and a general deterioration of the blind components.
It will be appreciated that what have been described are the preferred embodiments of the invention. It will also be appreciated that alterations to the embodiments could be made. For example, although the clutch depicted in the attached drawings and described above is operated by a ball chain, the clutch could equally be operated by a rope, cable or other form of chain. The scope of the claims should not be limited by the preferred embodiments set forth in the examples described, but should be given the broadest interpretation consistent with the description as a whole.
CLAIMS

WE CLAIM:

1. A chain guide for a roller blind or roller shade of the type driven by a clutch that is activated through applying a tensile load to one end of a chain, rope or cable that engages the clutch, the chain guide comprising two or more rollers mounted to one or more structural members positioned about the end of blind, said rollers engaging the chain, rope or cable and directing the chain, rope or cable onto the clutch, said rollers helping to maintain the position of the chain, rope or cable adjacent the clutch and helping to eliminate contact between the chain, rope or cable and the structural members of the blind thereby reducing the mechanical noise generated by the chain, rope or cable during operation of the blind.

2. The chain guide as claimed in claim 1 including two rollers secured to the end plate of the blind and positioned adjacent to the clutch.

3. The chain guide as claimed in claim 2 wherein each of said rollers comprise a roller hub mounted on a fixed shaft.

4. The chain guide as claimed in claim 3 wherein the exterior surfaces of said roller hubs are concave and of a dimension that approximates the outer dimension of the chain, rope or cable, said concavity of the exterior surfaces of said hubs tending to maintain contact between the chain, rope or cable and said rollers when the chain, rope or cable is operated thereby reducing the likelihood of contact of the
chain, rope or cable with structural components of the blind.

5. The chain guide as claimed in claim 4 wherein at least the exterior surfaces of said hubs are comprised of a pliable material to enhance engagement with the chain, rope or cable, prevent slippage between said hubs and the chain, rope or cable and to further reduce mechanical noise associated with operation of the blind.

6. The chain guide as claimed in claim 4 wherein each of said rollers includes an exterior sleeve, said sleeve formed from a pliable material and received about the exterior surface of said hub, said sleeve having a concave exterior surface that approximates the outer dimension of the chain, rope or cable when said sleeve received about said hub.

7. The chain guide has claimed in claim 3 wherein said shafts are releasably securable to the end plate of the blind to permit the positioning of said rollers at a location to accommodate clutches of different diameters.

8. The chain guide as claimed in claim 3 wherein said shafts are mounted on a plate, said plate releasably securable to the end bracket of the roller blind.