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ATTACHMENT DEVICE FOR FLEXIBLE SHEETS

Ralph L. Kuss, Findlay, Ohio, assignor to R. L. Kuss & Co., Inc., Findlay, Ohio, a corporation of Ohio
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2 Claims

ABSTRACT OF THE DISCLOSURE

A device for attaching large flexible sheets to a rigid support member. The device includes an extruded support member adapted to be secured over the space where the flexible sheet will hang and which has opposed upper and lower channels. A rigid tube passing through a hem in the flexible sheet is positioned within the lower channel, with the sheet draped over a rounded lip on the lower channel. At least one locking lug is provided with a vertical web to be inserted in the upper channel and a horizontal locking portion, the end of which bears against the extruded support member to enclose the rigid tube and sheet hem in the lower channel. The locking lug is so dimensioned that an upward force on the rigid tube, caused by a downward force on the flexible sheet, will urge the locking lug inwardly against the extruded support to further lock the members in place.

CROSS-REFERENCE TO RELATED APPLICATION

This application is a continuation-in-part of my copending application Ser. No. 603,598 filed Dec. 21, 1966 now U.S. Patent 3,398,779.

BACKGROUND OF THE INVENTION

This invention relates to a device for releasably attaching large flexible sheets to a horizontal building member and is particularly adapted for use in securing flexible membranes to be used as building doors and partitions such as are disclosed in United States Patent 3,211,211 and in my copending application Ser. No. 603,598 mentioned above. In attaching such sheets, which support heavy rollers and which must be securely attached to the building member or lintel in order to withstand substantial forces due to wind loads, it is desirable that the attachment can be made quickly and easily utilizing a minimum number of personnel and equipment.

Accordingly, it is an object of this invention to provide a simple and inexpensive device for securely but releasably attaching large flexible sheets to a horizontal building member, which attachment device can be quickly and easily manipulated by a single worker without the use of specially designed tools.

BRIEF DESCRIPTION OF THE DRAWING

FIGURE 1 is a view in perspective of a typical installation of a rolling flexible door utilizing the attachment device of this invention, showing, in exaggerated size, several of the attachment devices used to support the flexible sheet and its associated mechanical parts; and

FIGURE 2 is a cross-sectional view taken along line 2—2 of FIGURE 1, shown on a greatly enlarged scale, and illustrating in detail the design of the attachment device of this invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring briefly to FIGURE 1, the flexible sheet 10 and its bottom roller 11 and associated drive mechanism

comprise the flexible door which is positioned below a horizontal building header or lintel 12. Secured by means of bolts, lag screws or other attachment devices to the building lintel 12 is a single extruded support member 13, whose cross-section is illustrated in FIGURE 2, and which extends substantially across the width of the door. As shown in this preferred embodiment, the support member 13 is a single piece but it is to be understood that it could be comprised of a number of shorter sections positioned in a row along the building lintel 12 and, in the case of smaller doors, the building lintel 12 could be eliminated and the support member 13 could be secured directly across the space with its ends directly attached to upright door frame members.

Referring to FIGURE 2, the extruded support member 13 has a generally flat central section 14 which is placed in direct abutment with the building lintel 12 and upper and lower curved flanges 15 and 16, respectively, which define opposed upper and lower channels 17 and 18, respectively. A rounded lip 19 of the lower curved flange 16 extends upwardly to a position so that the depth of the lower channel 18 is substantially the same but may be slightly less than its horizontal width.

Referring again to FIGURE 1, a plurality of locking lugs 20 are used to secure the flexible sheet 10 at its upper edge along the support member 13 as illustrated. The locking lugs 20, as shown in FIGURE 2, include a generally vertical web 21, the upper end of which terminates in a rounded or cylindrical bead 22 and the lower end of which joins an integrally formed, normally extending locking portion or rib 23 which extends inwardly towards the planar section 14 of the support member 13. A small ridge 24 of the lower surface of the rib 23 extends downwardly and is parallel to the end surface 25 of the rib 23. As shown in FIGURE 2, the vertical distance between the cylindrical bead 22 and the lowermost surface of the locking section 23, adjacent the ridge 24, is substantially equal to the vertical distance between the uppermost inside surface of the upper channel 17 and the rounded lip 19 so that, when the cylindrical bead 22 is placed within the upper channel 17, as shown in phantom at 20a in FIGURE 2, the locking lug 20a can be rotated, in a clockwise direction as seen in FIGURE 2, until the end 25 of the locking rib 23 abuts against the adjacent surface of the support member 13. The lower surface of the locking rib 23, as shown, rests adjacent the rounded lip 19 of the lower flange 16 and adjacent the fabric passing therebetween. The rounded lip 19 can be lower than that shown, if desired, because the end 25 of the locking lug 20 rests against the planar section 14.

In order to hang a flexible sheet 10 with the device thus described, a rigid member 26, which, in this preferred embodiment, may be a hollow cylindrical tube as shown in FIGURE 2, is passed through a hem in the flexible sheet 10 and is placed on the lower channel 18 of the structural member 13. The diameter of the rigid member 26 is smaller than the diameter of the lower channel 18 by an amount equal to twice the thickness of the fabric so that it snugly rests within the lower channel 18 with the hem of the sheet 10 around it. Then each one of the locking lugs 20 is placed in position by inserting the cylindrical bead 22 in the upper channel 17 and rotating it inwardly, in a clockwise direction as shown in FIGURE 2, until the end 25 of the horizontal rib 23 rests against the inner surface of the planar section 14 of the support member 13. As the horizontal rib 23 is moved to this position, the small ridge 24 moves over the top of the rigid tube 26 to a position slightly to the left of the top of the tube 26. With the locking members 20 in place as shown, a downward force upon the flexible sheet 10 will cause an upward force by the rigid member 26 at its point of contact with the lower surface of the horizontal rib 23

and the small ridge 24 in the area designated by reference numeral 27. Because of the geometric configuration of the locking lug 20, the force exerted at the position 27 on the locking lug 20 will further urge the locking lug 20 in the clockwise direction as shown in FIGURE 2 to more securely lock it within the upper channel 17 of the member 13 and against the abutting portions of the lower channel 18 to positively prevent upward and outward movement of the hem of the flexible sheet 10 and the rigid member 26 inserted therethrough.

An important feature of the invention described is that it securely fastens the flexible sheet 10 to the building lintel 12 without the necessity of providing holes, grommets, or other customary attachment devices which weaken the fabric and are expensive to provide. The fabric, when attached by this invention, is contacted by only the rounded surfaces of the rigid tube 26 and the rounded lip 19 and is, thus, not subjected to undue strain or abrasion from a rough or sharp edge. Thus, if the sheet 10 moves in a direction normal to its plane of extension, as indicated by the arrow in FIGURE 2, it contacts only non-abrasive, rounded surfaces.

Another advantage of the instant invention is that it may be used to hang sheets having different thicknesses of fabric by changing only the diameter of the rigid tube 26. Thus, the extruded member 13 and locking lug 20 may be universally used with all fabric thicknesses, while the size of the rigid tube 26 is varied so that, in each case, its diameter is less than the width of the channel 18 by twice the thickness of the fabric to be used.

Other advantages of the attachment device of this invention will be apparent to those skilled in the art and several are enumerated as follows. Firstly, the locking lugs 20 may be inserted manually by a worker without the use of any special tool and may be removed with the use of only a claw hammer or other tool to pry the lowermost flange 27 away from the adjacent lip 19 of the lower channel 18. Secondly, an increased downward force upon the flexible sheet 10 serves to further lock the lugs 20 in place. Thirdly, the locking lugs 20 can be positioned anywhere along the upper edge of the flexible sheet 10, can be spaced as closely together as is necessary for uniform support, or can be separated further apart for economy reasons. In addition, attachment and detachment of the sheet from its supporting overhead member can be quickly accomplished without the use of special tools and one side or the other or certain intermediate sections of the sheet can be detached for inspection or area repair. Also, the locking lug 20 has sufficient clearance between its web 21 and the support member 13 for the head of a bolt 28 or other attaching device extending through the support member 13 and securing it to the building lintel 12.

Finally, it may be desired to provide a threaded fastener, such as a bolt 29 shown in FIGURE 2, which extends through the vertical web 21 of the locking lug 20 and is turned into a correspondingly threaded hole 30 in the flat portion of the locking member 13. This threaded attachment member 29 is not necessary for the operation of this device, but may be provided as an additional safety feature.

It is to be understood that while the device of the instant invention is designed for attaching the upper edge of a flexible sheet, such as that illustrated in FIGURE 1, its advantages also accrue to its use in attaching hori-

zontal or angular edges of flexible members or sheets and its use is not limited to that described in the preferred embodiment above. Other objects and advantages of the invention will be apparent to those skilled in the art and various modifications thereof may be made without departing from the spirit and scope of the attached claims.

I claim:

1. A hanger for a flexible sheet for an opening below a fixed structure comprising, in combination,
 - a support member adapted to be rigidly secured to said fixed structure over said opening and having a pair of opposed upper and lower channels connected by an intermediate central section, said lower channel terminating in an upwardly facing lip to define a laterally extending lower channel opening having a width and depth substantially equal to the exterior size of a rigid member enclosed by the adjacent edge of said flexible sheet, and
 - a locking lug having a vertical web with an upper edge terminating in a pivot bead adapted to be received in said upper channel and a lower end secured to a normally extending horizontal locking portion with the distance between the uppermost extremity of said pivot bead and the lowermost side of said locking portion being substantially equal to the vertical distance between the uppermost inner surface of said upper channel and said upwardly facing lip on said support member whereby said rigid member and flexible sheet, when positioned in said lower channel, are prevented from movement therefrom by inserting said locking lug between said upper and lower channels, said locking lug having an inner extension of said locking portion extending over said lower channel opening to one said of said vertical web and pivot bead whereby, when said locking lug is installed in said support member with said pivot bead placed in said upper channel and with the lowermost side of said locking portion resting upon the sheet extending over said upwardly facing lip and with the inner extension of said horizontal locking portion extending over said lower channel opening and resting against the inner surface of said intermediate central section, an upward force upon said rigid member will pivot said locking lug inwardly about said pivot bead and against said intermediate central section to thus prevent upward movement of said rigid member and sheet.
2. The hanger of claim 1 wherein said upwardly facing lip on said support member is rounded whereby said flexible sheet extending thereover will conform to said rounded lip, thereby preventing abrupt creasing or tearing of said flexible sheet.

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PETER M. CAUN, Primary Examiner

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