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Swanson

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[54] **WEBBING CLIP**

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[51] **Int. Cl.** **A47 13/01,** A44b 21/00

[58] **Field of Search** ..... 24/265 C, 257, 85 B, 24/81 BP, 243 K, 243 M, 243 N, 129 B, 259 C, 259 SP, 259 R, 20 S, 20 R; 160/DIG. 15, 402, 404, 327, 399, 403; 287/DIG. 7, 111; 242/74, 74.2

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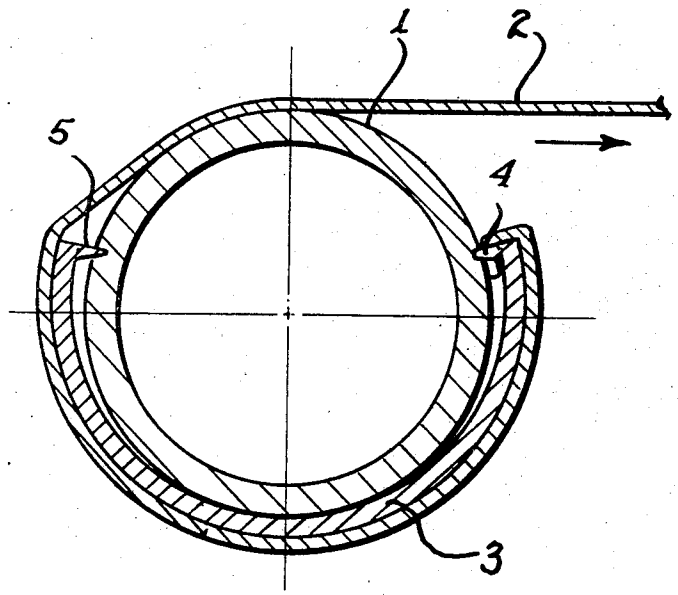
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[57] **ABSTRACT**

A C-shaped clip is disclosed for securing webbing to tubular framework. The clip is of resilient hardenable material and includes a plurality of teeth extending inwardly in a row at the extremity of each of the longitudinal sides. One end of a strip of webbing is inserted within the clip and impaled upon the prongs of one row. The webbing is then extended in a bight over the extremity of the clip and then along the outside of the clip. The clip and webbing is fitted onto the tubular framework such that each of the rows of prongs engage the tubular framework and the remaining portion of the clip is adjacent the tubular framework. The webbing is then wrapped about the clip, a portion of the exposed tubular framework and thence across the open space intermediate the framework. The force exerted upon the webbing disposed across the framework is translated to a force acting upon the rows of prongs to imbed them within the tubular framework, whereby the clip is inhibited from rotating and will securely fasten the webbing to the framework.

5 Claims, 3 Drawing Figures



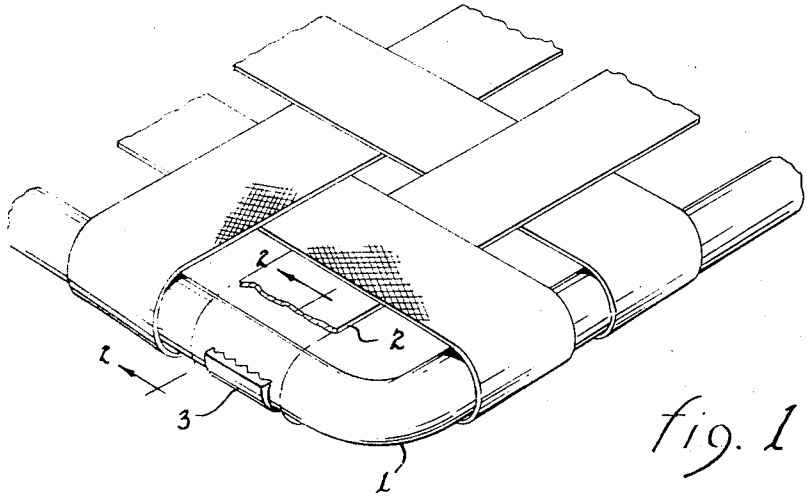


fig. 1

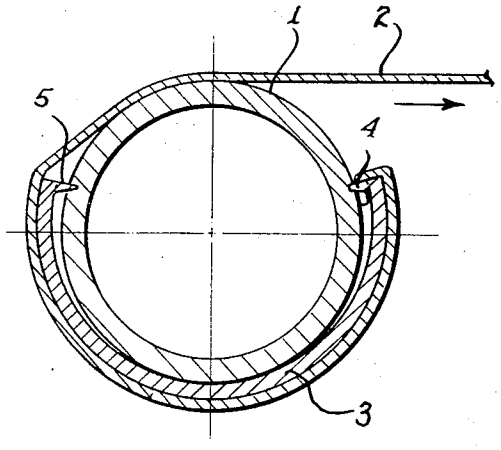


fig. 2

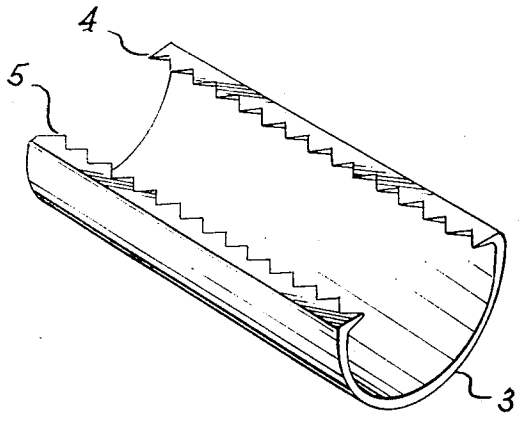


fig. 3

WEBBING CLIP

The present invention relates to devices for securing strips of webbing to a tubular framework.

Furniture, such as lawn or patio furniture, is often constructed of aluminum tubular framework. Webbing, which may be plastic or other synthetic material, extends across the framework in a weave to form the seat, backrest, or sides of the particular piece of furniture. This type of furniture is designed to be inexpensive and the basic materials therefor are so selected. As with many products, the major cost of the product lies not in the cost of the materials but in the cost of manufacture. In the field of lawn furniture, the previously used methods of attaching the webbing to the tubular framework has been through the employment of screws fitting within the framework threaded through apertures in the webbing. To reduce the cost even further, some manufacturers have resorted to riveting the webbing to the framework. This latter method, although inexpensive, is not practical in that the user is generally not able to replace the webbing without great expense or an undue exertion of effort. The method of using screws to attach the webbing does permit the user to replace the webbing simply by unscrewing the existing webbing and replacing it. This method is, however, very tedious and requires accurate measurement of each strip of webbing in order to obtain the requisite tension thereon.

In order to reduce the cost of the labor involved, there have been developed a plurality of clips, generally C-shaped, which may be fitted about the framework and thereby secure the webbing to the framework. This method of attachment is superior in terms of time to the use of screws; however, the design of the clips must be such that they are prevented from rotating and that they secure the webbing without slippage despite extended use. Of the clips presently known, which have been developed for this purpose, each type suffers from one or more major disadvantage. One type of clip fits over the webbing and relies upon spring strength of the clip to secure prongs extending through the webbing into the framework. Its major disadvantage is that any force tending to separate the webbing from the framework will necessarily withdraw the prongs from their embedded position in the framework. Another type of clip has prongs along one edge with the other edge being smooth. Herein, the webbing is wrapped in bight fashion about the smooth end and extends over the outside of the clip and across the framework. The arrangement of the webbing to the clip does tend to embed the prongs more deeply into the framework; however, the webbing has a tendency to slip over the smooth edge and, with use, ultimately disengage from the clip. A still further type of clip has a prong extending therefrom which co-operates with a hole in the framework. In operation, the webbing must be wrapped about the framework and over the hole therein. The prong of the clip is then inserted through the webbing to engage the hole in the framework. The disadvantage of this type of clip is the requirement of an additional manufacturing step of providing a hole in the tubular framework. In a modification of this clip, the end of the webbing may be impaled upon the extending prong and extended in a bight fashion about the end of the clip, and then wrapped about the clip and the webbing. This modification distributes the stresses imposed on the webbing on a greater area of the webbing and thereby may prolong the life of the webbing; however, it suffers from two major disadvantages. First, the strength of this holding means is greatly dependent upon the tightness and strength of the weave of the webbing. Secondly, the normal action of the webbing as the furniture is being used may tend to lift or disengage the prong from the hole in the framework.

It is therefore a primary object of the present invention to provide a clip for tubular framework to securely attach webbing thereto.

Another object of the present invention is to provide a clip for tubular framework which incorporates the expected forces of the webbing to aid the clip in securing the webbing to the framework.

Another object of the present invention is to provide an inexpensive clip for tubular framework to satisfactorily secure webbing thereto.

Still another object of the present invention is to provide a clip which interacts with a tubular framework to secure webbing thereto.

Other objects of the present invention will become apparent to those skilled in the art as the description thereof proceeds.

The invention will now be described with more specificity with reference to the following drawings, in which:

FIG. 1 illustrates a clip as taught by the present invention used in a section of a tubular framework having webbing woven thereacross.

FIG. 2 is a cross-sectional view of the clip according to the present invention co-operating with tubular framework and webbing.

FIG. 3 is a perspective view of the clip according to the teachings of the present invention.

Referring to FIG. 1, there is shown a tubular framework 1 having webbing woven therebetween. Webbing 2 is shown as cut off short of the tubular framework 1 in order to show the position of clip 3 on the tubular framework 1.

FIG. 2 illustrates with more specificity the relationship of the tubular framework 1, the webbing 2, and the clip 3. The tubular framework 1 may be manufactured from aluminum or other light, relatively inexpensive material, or other material which permits manufacture of relatively cheap, light, lawn furniture. The use of webbing rather than other materials extending across the framework to provide the seat and backrest for lawn furniture has several advantages. It is relatively inexpensive, light, and is manufactured in a plurality of colors to permit the lawn furniture to be used in a color co-ordinated decor. Secondly, it is relatively strong in that any individual piece of webbing will support any of the normally expected loads to which the lawn furniture may be subjected. Thirdly, it may be attached to the tubular framework with relative ease by incorporating the clip as taught in the present invention.

In FIG. 2, there is shown in a cross-sectional view the interrelationship between the aluminum tubing of the tubular framework 1, the webbing 2, and the clip 3. For explanatory purposes, it is assumed for the moment that FIG. 2 as seen in the drawings represents the right-hand side of a webbed seat for a lawn chair. Thus, the force exerted upon webbing 2 by the occupant of that chair would be a tensional force in the direction of the arrow adjacent the horizontal portion of webbing 2. As the webbing 2 is partially wrapped around the tubing 1,

the wrapped portion of webbing 2 will tend to unwrap if the end thereof is not fixed. If the end is fixed, the tensional force will tend to cause the webbing-securing means to rotate about the aluminum tubing 1 in a clockwise direction. The means of attaching the webbing must satisfy the requirements of, first, preventing the webbing from unwrapping by some securing means and, secondly, prevent the securing means from rotating about the aluminum tubing.

The clip as shown in perspective in FIG. 3 will now be described in conjunction with its operational characteristics as best shown in FIG. 2. Clip 3 is manufactured from a sheet-like segment of resilient, hardenable, metallic material and formed into an arc of a predetermined radius. The arcuate length of the clip 3 should be somewhat greater than 180°. In this manner, the resilient clip, when mounted on a tubular member such as tubing 1, will be opened whereby the longitudinal edges will exert a force upon the tubing. As the longitudinal edges are displaced from each other along the arcuate clip by more than 180°, the net effect of the force of the longitudinal edges will be that of attempting to draw the center longitudinal portion of the clip toward the tubing 1 and thereby lock the clip onto tubing 1. Thus, the clip by itself and without the aid of any outside forces will be retained about tubing 1.

In order for clip 3 not to rotate about tube 1, some frictional or mechanical locking means must be incorporated within the clip. In accordance with the present invention, each of the longitudinal edges of clip 3 has disposed therein a plurality of adjacent triangular-shaped teeth extending for the length thereof. Each of these sets of teeth are bent inwardly toward the axis of the arc of the clip so that they are in effect normal to a line tangential and perpendicular to the longitudinal edge. The previously discussed 180°-plus arcuate length of the clip is intended not to include the bent portion of material constituting the toothed edge. These teeth, designed to have sharp edges, will interact with tubing 1 and due to the resilient force of clip 3, will tend to embed themselves within tubing 1. As the clip 3 is made from hardenable as well as resilient material, well known heat-treating processes may be employed to harden the bend leading to the teeth as well as the teeth themselves. In this manner, the force exerted by the clip upon the teeth when the latter contact tubing 1 will not be sufficient to deform or unbend the teeth.

The co-operation of clip 3 with webbing 2 will now be described. The assembly process of clothing the tubular framework with the woven webbing may be accomplished through the following steps. The end of a piece of webbing, such as webbing 2, is impaled upon the teeth of one of the longitudinal edges and extended in a bight about the end of clip 3. The length of the teeth and their design should be such that they will penetrate the webbing with at least a portion extending on the other side thereof. In practice, the previously mentioned triangular-shaped teeth 4 accomplish this purpose. The height of the teeth must, of course, be related to the thickness of the webbing. The clip may now be attached to tubing 1 of the seat as shown in FIG. 2 by attaching it to tubing 1 from the bottom in a receiving relationship. The clip is thus pushed upwardly until its inner center point contacts tubing 1 and prevents further upward movement. At this time, the teeth 4, 5 will engage the outside of tubing 1 and due to the resilient nature of the clip, will tend to at least partially extend into tubing 1. The webbing is then wrapped about the clip in a clockwise direction and onto the tubing 1, across the framework onto the opposite side of tubular framework (not shown). The other end of the webbing 2 may then be attached to the corresponding tubing 1 of the tubular framework in the manner described aforesaid.

When weight is exerted upon webbing 2, a tensional force in the direction of the arrow will occur. This tensional force, due to the wrapping of the webbing 2 about the clip 3 and tubing 1, will tend to force teeth 5 into the aluminum tubing. As the teeth may be made more hard than that of the aluminum tubing, the teeth will not deform but will dig into, or partially embed themselves within tubing 1. This embedment will create a physical barrier whereby rotation of the clip with respect to the tubing is inhibited. The thickness of the clip in addition to the length of the bend wherefrom the teeth emanate act as a leverage arm to add a greater force for embedding the teeth 5 into the aluminum tubing 1. As the end of webbing 2 is secured to tubing 1 by teeth 4 and clip 3, the tensional force translated about the clip through the webbing will tend to exert a force perpendicular to the point of attachment to tubing 1 as well as a force tangential to the point of attachment on tubing 1. The force normal to tubing 1 will tend to further embed teeth 4 within the tubing, while the tangential force will be translated through the clip 3 and through teeth 5 to tubing 1. As the teeth 5 are firmly embedded in tube 1, the clip will not rotate and the tangential force will have no effect on the clip 3.

An additional advantage of securing webbing to tubular framework by a clip as taught in the instant invention is that of permitting the quiescent tensional forces of the webbing to be adjusted after the lawn furniture has been in use. Almost any type of webbing will, after use, stretch to some degree and cause the seat or back of the furniture to sag. With the invention, this sag may be corrected by simply grasping the clip and webbing in one's hand, removing it, rotating it, and repositioning the clip about the tubing until the webbing is once again taut across the framework. At its new position, the clip will automatically seat itself in accordance with the distribution of forces previously discussed. Thus, the useful aesthetic life of lawn furniture may be extended by use of the clip as taught in the instant invention. When the webbing has become worn or frayed, it may be easily replaced simply by cutting the existing webbing and unwrapping it from about the tubular framework. It can easily be disengaged from the clip by prying the clip loose from the tubing. As the clip is manufactured from resilient material, the clip will not be deformed by this operation.

In some prior art clips, the teeth, such as shown at 4 and 5, were not normal to the tubing 1 or were not intended to extend from the clip in a line passing through the axes of the arc. Instead, these clips were bent at an angle from the clip toward the tubular framework which was less than 90°. with this arrangement, the forces exerted by the webbing tended to flatten out the depressions, and in some cases teeth, extending inwardly from the clip. This, of course, presented, with time, an unsatisfactory clip and substantially reduced its holding power. A thought at the time was that if the teeth or the inwardly deformed portion were directed toward the existing force of rotation, the teeth or de-

formed portion would attempt to dig into or further embed itself should any rotation of the clip occur. In practice, the clip did not operate in this fashion; instead, the density of even soft aluminum tubing created sufficient resistance for the teeth or deformations to dig thereinto so that the teeth or deformations would be flattened out prior to their further embedment within the tubular framework.

I claim:

1. A webbing attachment clip for securing webbing to a tubular framework, said clip comprising:

A. an arcuate segment having a constant radius extending through an angle materially greater than 180°, said segment being formed from a sheet of resilient metallic material;

the opposite end edges of said segment being bent inwardly normal to said segment thereby forming a flanged portion at each end, each flange portion being aligned with a radial of the arc of said segment, each flanged portion including a plurality of cut-out prongs along the free edge, said prongs being short, rigid, and pointed at their ends;

whereby, a strip of webbing, formed in a bight over one end and around said clip to extend from the other end, is secured to the tubular framework by said clip.

2. An attachment clip as claimed in claim 1, wherein said prongs comprise adjoining triangular-shaped teeth.

3. An attachment clip as claimed in claim 1, wherein the material of said segment is of hardenable material, whereby deformation of said prongs is inhibited.

4. An attachment clip as claimed in claim 3, wherein said prongs have sharp right angle edges for embedding in the tubular framework.

5. A piece of furniture, said piece comprising in combination:

A. a tubular framework;

B. a plurality of strips of webbing material, said strips extending across selected parts of said tubular framework; and

C. a plurality of clips for securing the ends of each said strip to said tubular framework, each of said clips being formed of an arcuate segment of resilient sheet material, each said arcuate segment extending for an angle materially greater than 180° the opposite end edges of said segment being bent inwardly normal to said segment thereby forming a flanged portion at each end, each flange portion being aligned with a radial of the arc of said segment, each flanged portion including a plurality of cut-out prongs along the free edge whereby, each said strip being formed in a bight about the prongs and flange portions of one end of said segment and wrapped around the periphery of said segment is secured to said tubular framework by said prongs of each said clip being bitingly engaging smooth portions of said tubular framework.

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