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**Grommet**

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(73) Proprietor(s)  
**Scovill Japan Kabushiki  
Kaisha**

**(Incorporated in Japan)**

**22-1 Ichibancho  
Chiyoda-ku  
Tokyo  
Japan**

(72) Inventor(s)  
**Kenji Hasegawa**

(74) Agent and/or  
Address for Service  
**Swindell & Pearson  
48 Friar Gate  
Derby DE1 1GY**

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IPC sub-class F16B**

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Fig. 1

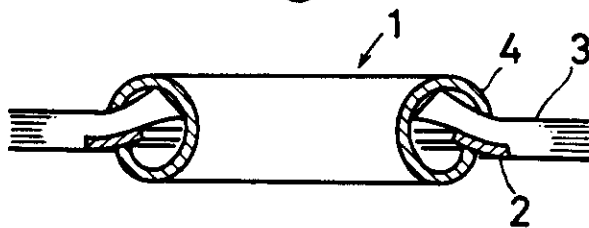


Fig. 2

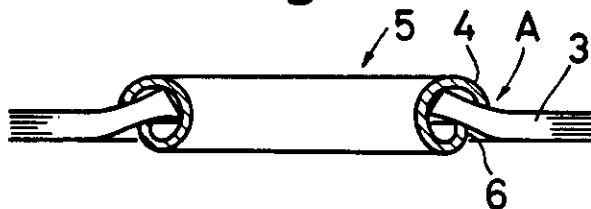


Fig. 6

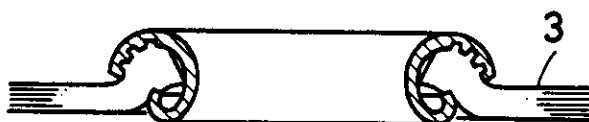


Fig. 5

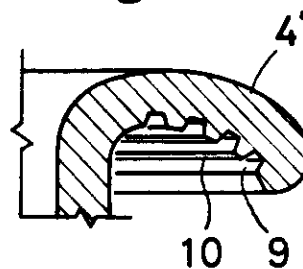


Fig. 3

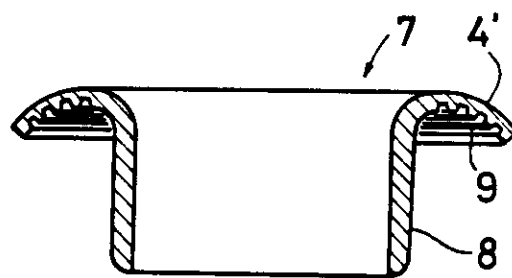
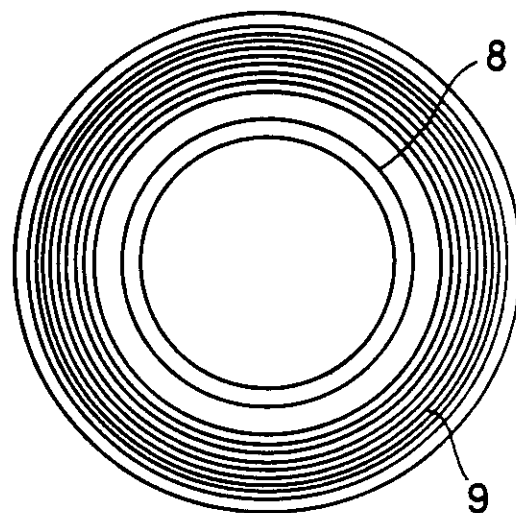


Fig. 4



Grommet

This invention relates to a grommet.

Grommets have been extensively used on breathing perforations of sports caps, shoes and the like, as eyelets of shoes, for decoration of garments, and in other diversified applications. For grommets subject to strong lateral forces, such as pulls given to eyelets for shoestrings, a washer 2 as shown in Fig. 1 is used in setting each grommet into a perforation in the object or sheetlike article 3. The washer 2 co-acts with a flange 4 of the grommet to pinch the article 3 to hold the grommet in place securely against lateral forces. For most thin articles, however, the washer proves inappropriate in that it ruins the appearance or adds to the overall weight of the grommited article.

For these reasons washerless grommets, as illustrated at 5 in Fig. 2, have come into use on the thin stuff. The grommet 5 is attached with its flange 4 bent in the direction of the arrow A to cooperate with a lower curled portion 6 to pinch the article tightly. The grommet of this type presents no problem in the bending of the flange 4 when it is formed of a very thin sheet metal or the like (less than about 0.3 mm in thickness) and used on a sheetlike article perforated in advance. It is known that the bending of the flange calls for much greater force when the grommet is made of a thicker

sheet (more than about 0.3 mm) and intended for piercing unperforated stuff. In the latter case, the bending work often damages the flange surface and also fails to bend the flange properly because of its rigidity.

The present invention has for its object to eliminate the disadvantages of the conventional grommets formed of thick sheets and provide a grommet of the washerless type capable of holding the grommited part of an article securely with adequate retaining force against lateral pulls that would otherwise deform such part, thereby widening the range of applications of the washerless type that has hitherto been limited to use on breathing holes and for decoration.

According to the present invention there is provided a grommet comprising an annular member having a flange formed integrally around an opening in one end thereof, the flange having a plurality of concentric circular grooves formed in an outermost surface thereof.

The grommet can be formed in one piece of a thick sheet metal or the like (about 0.3 mm or thicker), with the plurality of concentric circular grooves formed in the undersurface of a flange extending radially outward from the upper end opening. The grooves decrease the bending rigidity of the flange and allow the grommet to be attached to an article

with greater ease than usual. They also reduce the external forces normally required to be given to the grommet at the time of grommeting.

The grommet formed of a thick sheet has no possibility of its flange being damaged by bending, because that portion can be easily bent by force weaker than that usually applied. Despite the omission of the washer, the grommet of the invention exerts unabated clinching pressure upon the article part being grommeted. When attached in place, the grommet adds less to the overall weight of the article than does a conventional grommet. Moreover, it does not mar the appearance of the back side of the article.

An embodiment of the present invention will now be described by way of example only with reference to the accompanying drawings, in which :-

Fig. 1 is a sectional view of a conventional grommet using a washer;

Fig. 2 is a sectional view of a conventional washerless grommet;

Fig. 3 is a sectional view of a grommet having a grooved flange in accordance with the present invention;

Fig. 4 is a plan view of the grommet shown in Fig. 3;

Fig. 5 is a fragmentary sectional view, on an enlarged scale, of the grooved flange of the grommet shown in Fig. 3;

and

Fig. 6 is a sectional view of the grommet of Fig. 3 as attached to a sheetlike article.

Referring to the drawings, a grommet 7 is made in one piece of a thick sheet metal or the like (about 0.3 mm or more in thickness). It comprises a sleeve 8 open at both ends and a flange 4' formed integrally around the upper end opening. The undersurface of the flange 4' has a plurality of circular grooves 9 formed concentrically to reduce its bending rigidity. In attaching the grommet to a sheetlike article, the lower end of the sleeve 8 piercing the article is curled radially outward into contact with the back side of it. At the same time, the flange 4' is so bent as to pinch the article part 3 firmly between itself and the curled lower end. With the bending rigidity reduced by the plurality of circular grooves 9 formed in the undersurface, the flange 4' is easily bent by a force not strong enough to damage it.

Thus, the flange 4' can take whatever shape at the optimum for fixing the grommet in place on the article 3 with adequate retention strength to resist any lateral pull as given by a string. Ribs 10 defined by the grooves 9 bite the article and allow the grommet to take a firmer grip of the article, or as securely as by the washered grommets in common use.

Claims :

1. A grommet comprising an annular member having a flange formed integrally around an opening in one end thereof, the flange having a plurality of concentric circular grooves formed in an outermost surface thereof.
  2. A grommet according to claim 1, wherein the annular member has the other end adapted to pierce an article.
  3. A grommet according to claim 2, wherein the other end is adapted to be bent toward the flange.
  4. A grommet according to any of claims 1 to 3, wherein, at said one end, the flange is curved in directions both outwardly endwise and radially outwardly, and then curved in a parallel but opposite direction to the outwardly endwise direction, and a radially inward direction.
  5. A grommet substantially as hereinbefore described with reference to the accompanying drawings.
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Applicant:  
Scovill Japan Kabushiki Kaisha (Japan), 22-1 Ichibancho, Chiyoda-ku, Tokyo, Japan

Inventor:  
Kenji Hasegawa, 22-12 Tenjincho 2-chome, Fujisawa-shi, Kanagawa-ken, Japan

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Address for Service: 48  
Swindell & Pearson, 44 Friar Gate, Derby, DE1 4BA

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