

Sept. 3, 1968

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3,399,435

GROMMET ASSEMBLY

Filed Dec. 28, 1966

2 Sheets-Sheet 1

Fig. 1

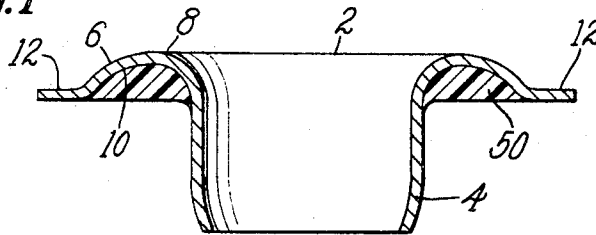


Fig. 2

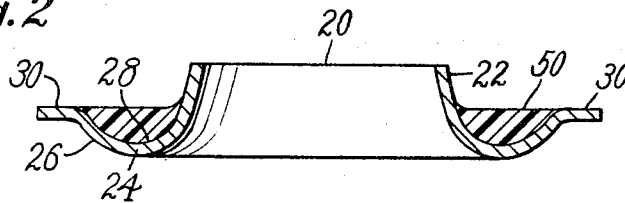
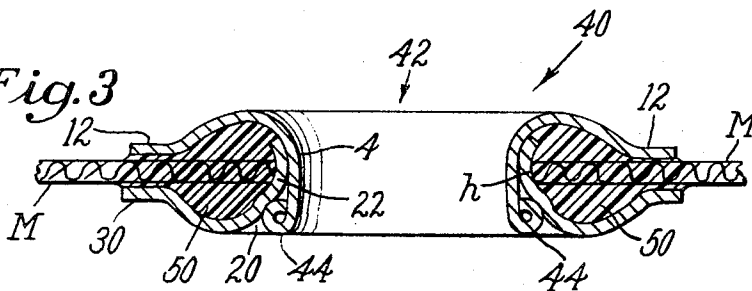


Fig. 3



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Fig. 4

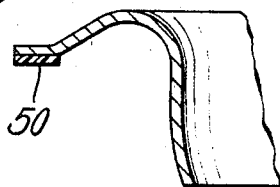


Fig. 5

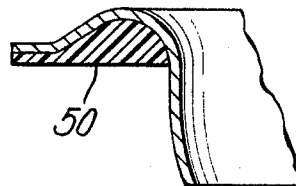


Fig. 6

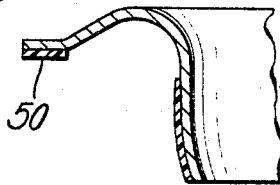


Fig. 7

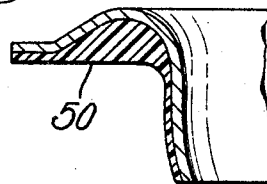


Fig. 8

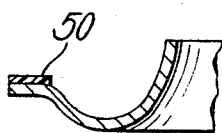


Fig. 9

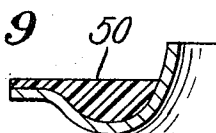


Fig. 10

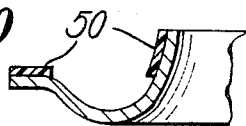
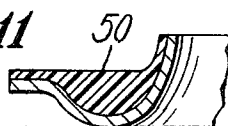


Fig. 11



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GROMMET ASSEMBLY

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ABSTRACT OF THE DISCLOSURE

A grommet assembly having a male grommet member and a female grommet member. Each member includes a barrel portion and a collar portion. A heat activatable or pressure activatable adhesive is disposed on the collar and/or barrel portions of at least one of the members so that when the adhesive is activated and the grommet is set in fabric or other sheet material, the adhesive acts to bond the grommet to the sheet material and to seal against the entrance of moisture into the grommet assembly.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates to grommet assemblies and is directed more particularly to a grommet assembly having a heat or pressure activatable cement disposed on the flange and/or barrel portion of at least one of the grommet assembly members.

Description of the prior art

Grommet assemblies, comprising a male grommet member and a female grommet member in combination, have been known to the public for some time but have been characterized by shortcomings which are overcome by the instant invention. Ordinary grommet assemblies in use today in various articles such as tents, sails, canvas bags, shower curtains and the like, tend to work loose or tear away from the material in which they are disposed. In an attempt to obtain greater holding power, grommet assemblies have been provided with "spurs" which comprise small metal pointed segments or projections on the flange portion of one of the grommet assembly members. The segments penetrate the canvas or other material and prevent to an extent movement of the grommet assembly. However, the spurs themselves tend to tear the material and after awhile the grommet assembly carries away from the material in which it is disposed. In addition, present grommet assemblies of both the regular and spur types, permit moisture to enter the grommet assembly and become entrapped, the moisture having a corrosive effect upon the grommet and a deleterious effect upon the canvas or other material.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a grommet assembly having holding power far in excess of either the ordinary grommet assembly or the spur grommet assembly.

Another object of the invention is to provide a grommet having means for preventing the entrance of moisture into the interior of the grommet.

Still another object of the invention is to provide such a grommet assembly which is economical to produce and which so closely resembles present grommet assemblies as to be usable in conjunction with regular or spur grommets without detracting from the appearance of the article in which it is used.

With the above and other objects in view, as will hereinafter appear, the present invention in one aspect thereof

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contemplates the provision in an ordinary grommet assembly having a male grommet member and a female grommet member of a heat or pressure activatable adhesive disposed on the flange portion and/or barrel portion of at least one of the members of the grommet assembly.

The above and other features of the invention, including various novel details of construction and combinations of arrangements, will now be more particularly described with reference to the accompanying drawings and pointed out in the claims. It will be understood that the particular devices embodying the invention are shown by way of illustration only and not as limitations of the invention. The principles and features of this invention may be employed in various and numerous additional embodiments without departing from the scope of the invention.

DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a sectional view of the male grommet member of a grommet assembly embodying one form of the invention;

FIG. 2 is a sectional view of the female grommet member of a grommet assembly embodying one form of the invention;

FIG. 3 is a sectional view of a grommet assembly comprising the grommet member of FIG. 1 and the grommet member of FIG. 2, the assembly being in place in a thickness of fabric material;

FIGS. 4-7 are partial sectional views of male grommet members, showing alternative embodiments; and

FIGS. 8-11 are partial sectional views of female grommet members, showing alternative embodiments.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to FIG. 1, it may be seen that the illustrative device includes a male grommet member 2 having a barrel portion 4 and a collar portion 6. The collar portion 6 includes an annular cup portion 8 providing a recess 10 surrounding the barrel portion 4, and a flange portion 12 disposed radially outwardly from the cup portion.

FIG. 2 shows an illustrative female grommet member 20 having a barrel portion 22 and a collar portion 24 comprising an annular cup portion 26, providing a recess 28, and a flange portion 30.

Referring to FIG. 3, it may be seen that the grommet members 2 and 20 are combined to form a grommet assembly 40 which provides an eyelet 42 in a thickness or several thicknesses of material M. In operation, the barrel portion 22 of the grommet member 20 is extended through a hole h in the material M until the flange portion 30 engages the material M. The barrel portion 4 of the grommet member 2 is then caused by means known in the art to enter the barrel portion 22 of the member 20 until the flange portion 12 of the grommet member 2 engages the material M. By means known in the art the end of the barrel portion 4 of the grommet member 2 may be caused to be rolled outwardly, as shown in FIG. 3 and designated 44, or otherwise caused to engage the member 20 in a holding manner.

The grommet assembly as thus far described is known in the art and comprises what is herein referred to as a "regular" grommet assembly. A "spur" grommet assembly is substantially the same but includes small spike-like elements (not shown) on the material-facing side of the flange portions 12, 30.

The present invention is characterized by the fact that a heat activatable adhesive 50 is disposed in the recess 10 of the grommet member 2 and the recess 28 of the grommet member 20. Under ordinary temperatures the adhesive is hard and non-tacky so as not to interfere

with ordinary shipping and handling procedures. The grommets with the adhesive may be handled in the same manner as ordinary grommets. Before the grommet assembly is placed in the material M, as shown in FIG. 3, the adhesive is activated by the application of heat. The grommet is then set in the material M in the normal way. The adhesive 50, being activated, flows through the material M if the material is porous, as shown in FIG. 3, and upon setting provides a strong bond between the grommet assembly and the material in which it is set.

In addition, the activated adhesive substantially seals the grommet assembly against the entrance of moisture.

FIGS. 4-7 show alternative embodiments of male grommet members. In FIG. 4 the adhesive 50 is on the flange portion only of the grommet member. In FIG. 5 the adhesive is disposed not only on the flange portion, but also in the recess provided by the cup portion of the collar. In FIG. 6 the adhesive is disposed on the flange portion and on the barrel portion, while in FIG. 7 the adhesive is disposed on the flange portion, the collar recess, and the barrel portion of the grommet member.

FIGS. 8-11 show female grommet members having various adhesive arrangements, that in FIG. 8 being similar to that shown on the grommet member of FIG. 4, FIG. 9 showing an arrangement similar to that shown in FIG. 5, FIG. 10 showing an arrangement similar to that shown in FIG. 6, and FIG. 11 showing an arrangement similar to that shown in FIG. 7.

It will be obvious that the selection of a particular male grommet member and female grommet member for combination to form a grommet assembly is a matter of choice. The adhesive may be selected from a wide range of compounds, including compounds not ordinarily referred to as an "adhesive" or a "cement" such as commercially available thermoplastics which are activatable upon application of heat. It is intended that the meaning of the term "adhesive" as used herein, be extended to include all such compounds. The grommets of the present invention are susceptible to use in factory grommet setting installations where present machinery need only be modified to apply heat to the grommet prior to its being set. Induction heating and high frequency heating have proved successful. Infra-red heating, hot air heating and use of heated set tools are satisfactory for relatively lower production rates. Cold setting with subsequent heating is acceptable but results in lower holding power than that gained by the other heating methods.

Grommets of the type described have a holding power approximately six times the holding power of regular grommets and about three and a half times the holding power of the spur grommets in tight woven fabrics, the precise holding power of the grommet assembly depending upon the type of male and female members used. Even where only one of the grommet members is provided with adhesive and the other grommet member is "plain," tests have shown the grommet with adhesive to have a holding power about three times greater than a regular grommet and about two times greater than a spur grommet. Of course, with adhesive on only one of the grommet members, moisture entrapment again becomes a factor with probable eventual rotting of the fabric in which the grommet is set. Tests conducted with the adhesive male grommet member alone show that the single member has greater holding power than the regular and spur grommets. Of course, with no female grommet member, the holding power is dependent almost entirely upon the thermoplastic bond.

The grommets of the present invention are also readily usable in home work shops, where a blow torch, electric iron, or any like heat radiating device may be used to activate the adhesive. The grommet is then set as would be a regular or spur grommet. The adhesive may even be activated to a degree sufficient to obtain a bond by heating with a cigarette lighter or the like when in out-

of the-way places, such as in making emergency repairs to camping equipment or to sails.

As an alternative to heat-activatable adhesive, particularly in industrial grommet setting, there may be used a pressure activatable cement. Such cements, known in the industry, comprise as by micro-encapsulation, quantities of adhesive held in captivity until released by application of pressure which bursts the capsules in which the adhesive is retained.

Since certain obvious changes may be made in the illustrated device without departing from the scope of the invention, it is intended that all matters contained herein be interpreted in an illustrative and not a limiting sense.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. A grommet assembly for setting in sheet material, said assembly comprising a grommet member having a barrel portion and a collar portion, and adhesive in an inactive state disposed on said collar portion, said adhesive being exposed and having a non-tacky surface, said adhesive being activatable by application of energy from an outside source and when activated flowable to provide a bond between said grommet member and said sheet material.

2. The invention according to claim 1 in which said adhesive is heat-activatable.

3. The invention according to claim 1 in which said adhesive is pressure-activatable.

4. A grommet assembly for setting in sheet material, said assembly comprising a male grommet member having a first barrel portion and a first collar portion, a female grommet member having a second barrel portion and a second collar portion, said second barrel portion being adapted to receive said first barrel portion, and adhesive in an inactive state disposed on the collar portion of at least one of said grommet members, said adhesive being exposed and having a non-tacky surface, said adhesive being activatable by application of energy from an outside source to flow whereby to provide a bond between said grommet member and said sheet material.

5. The invention according to claim 4 having said adhesive disposed on the outside wall of at least one of said barrel portions.

6. The invention according to claim 4 in which said adhesive is activatable by heat.

7. The invention according to claim 4 in which said adhesive is activatable by pressure.

8. A grommet assembly for setting in sheet material, said assembly comprising a male grommet member having a first barrel portion and a first collar portion, a female grommet member having a second barrel portion and a second collar portion, said second barrel portion being adapted to receive said first barrel portion, said collar portions including recessed portions and flange portions, and adhesive disposed on the material-facing side of said flange portions, said adhesive being activatable to flow whereby to bond said flange portions to said material and to seal said grommet assembly, thereby to prevent entrance of moisture into said grommet assembly.

9. The invention according to claim 8 having said adhesive disposed in said recessed portions, whereby upon activation of said adhesive in said recessed portions said last-mentioned adhesive flows to further bond said grommet to said fabric.

10. The invention according to claim 9 having said adhesive disposed on the outside wall of said barrel portions.

11. A grommet assembly for setting in sheet material, said assembly comprising a grommet member having a barrel portion and a collar portion, an adhesive in an inactive state disposed on said barrel portion, said adhe-

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sive being exposed and having a non-tacky surface, said adhesive being activatable by application of energy from an outside source and when activated flowable to provide a bond between said grommet member and said sheet material.

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