May 9, 1961 F. I. GROTHE 2,983,298

FLEXIBLE COVER AND METHOD OF MAKING THE SAME

Filed April 18, 1958

FIG. 1

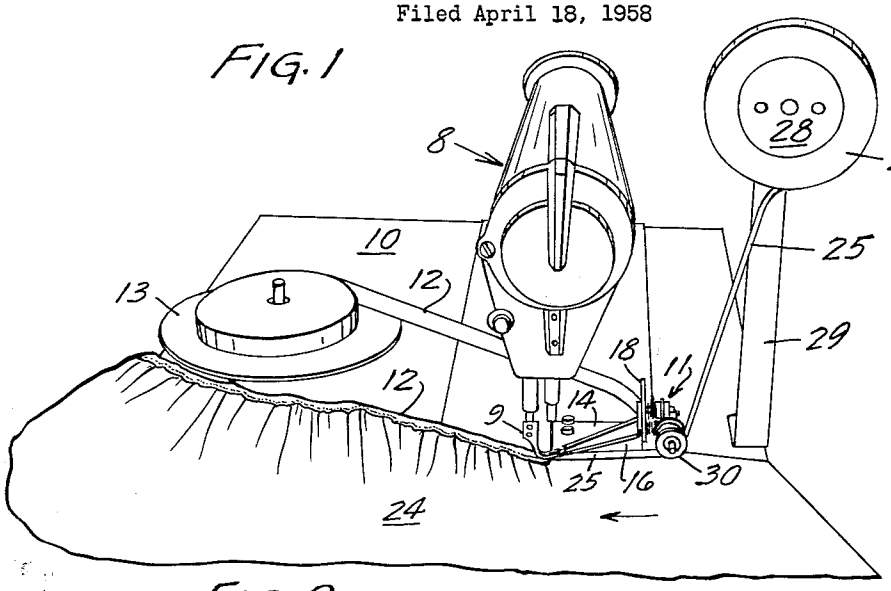


FIG. 2

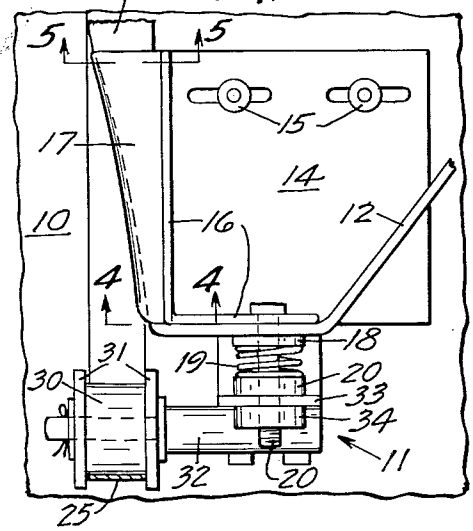


FIG. 3

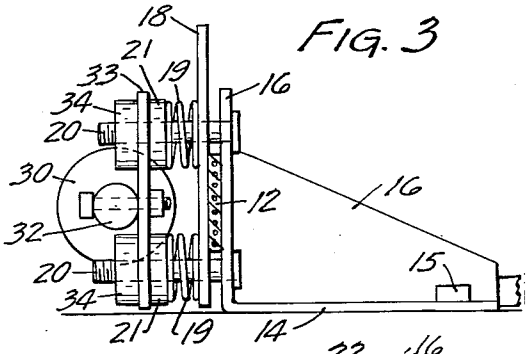


FIG. 4

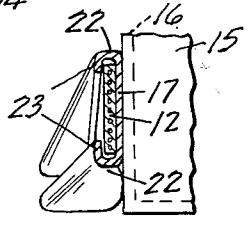


FIG. 6

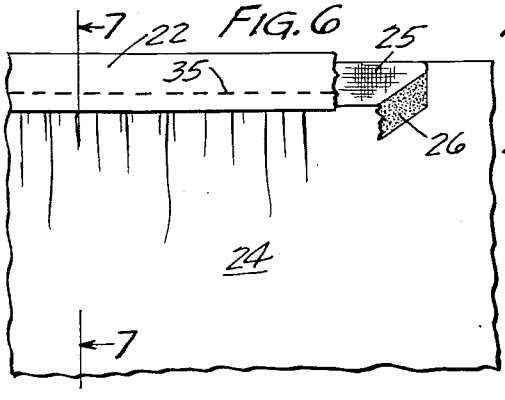


FIG. 7

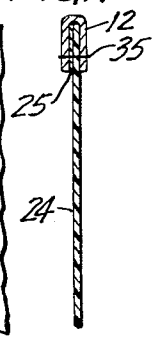
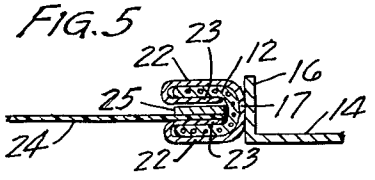


FIG. 5



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FLEXIBLE COVER AND METHOD OF MAKING THE SAME

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4 Claims. (Cl. 150—52)

This invention relates to improvements in flexible covers of the type having elastic bound margins adapted to be expanded to fit over and be secured to the perimeter of an object to be covered, and includes an improved method for reinforcing the margins of such covers.

The invention is particularly, although not exclusively, adapted for use in the construction of readily removable water impervious covers for open boats and other open vehicles where the covers are often subjected to strong winds tending to tear the cover sheet material from the elastic binding. Many covers of this class are of large size and are frequently subjected to severe stresses both when in use and during the operations of attaching them to and detaching them from the objects to be covered.

It is an object of my invention to provide a low cost cover of the class described which may be constructed largely from inexpensive fabric or sheet material and having a reinforced margin and elastic binding adapted to be expanded to grip the perimeter of an object to be covered whereby to provide greatly increased resistance to tearing and reduced danger of separation of the elastic binding from the main sheet or fabric.

A further object is to provide an efficient low cost method for securing a reinforcing tape along a margin of the main sheet of flexible cover material, and simultaneously securing an elastic band to the reinforced margin while the band is held under tension whereby to form a multiplicity of folds in the reinforced margin when tension on the band is released.

A further and particular object is to provide a method for reinforcing the margins of flexible covers which may be performed by the use of a sewing machine having an elastic binding attachment of conventional type and a special attachment for feeding a reinforcing tape to the margin of the flexible material simultaneously with the fastening of the elastic binding to the margin.

The invention also includes certain other novel features of construction and procedural details which will be hereinafter described.

Referring to the accompanying drawing which illustrates, by way of example and not for the purpose of limitation, a preferred embodiment of my cover structure together with mechanism for performing the method:

Figure 1 is a perspective view showing a suitably modified sewing machine and a fragmentary marginal portion of the cover in operative relation to the machine elements;

Fig. 2 is a detail, fragmentary top plan view showing a special attachment for applying a reinforcing tape to the margin of the sheet material, in operative relation to an elastic binding attachment of common type;

Fig. 3 is an elevational view of the mechanism shown in Fig. 2, as seen from the right side thereof;

Figs. 4 and 5 are enlarged sectional views taken on the lines 4—4 and 5—5 respectively of Fig. 2;

Fig. 6 is a fragmentary front elevational view showing portions of the flexible cover sheet and elastic binding and reinforcing tape along the margin of the sheet, and

Fig. 7 is a cross sectional view taken on the line 7—7 of Fig. 6.

Referring to Fig. 1, a sewing machine of common type is indicated generally by the numeral 8. This machine has a foot assembly of the lock stitch type indicated at 9, a table 10 and an elastic binding attachment indicated generally at 11. Elastic binding material 12 is fed to the binding attachment from a roll carried by a reel 13 adapted to rotate about a vertical axis, being supported on the table 10.

The elastic binding attachment 11 forms no part of the present invention and may be of any of several suitable kinds that are available. As shown, the binding attachment comprises a normally horizontally extending plate 14 adapted to be secured by bolts 15 to the table 10 and formed with an upright flange 16 upon which is mounted a folder 17. To frictionally retard the band 12 in its movement through the folder to the foot assembly 9, a vertical plate 18 is pressed against one side of the tape 12 and toward the flange 16 by springs 19. These springs are confined on bolts 20 by nuts 21.

As best shown in Figs. 4 and 5, the folder 17 has flanges 22 extending along its upper and lower edges and is formed with inwardly bent edge portions 23 for confining the margins of the band 12. These flanges and edge portions converge toward the foot assembly so that the band 12 which is flat as it enters one end of the folder is folded to channel shape and embraces the margin of the main body of the cover material and reinforcing tape, hereinafter described, as the latter are fed beneath the foot. The needle of the foot assembly operates in the usual manner through the several thicknesses of material as the elastic band leaves the delivery end of the folder 17.

Suitable sheet material constituting the main portion of the cover is indicated at 24 and a reinforcing tape at 25. The tape 25 is made of a relatively strong, inelastic material and is preferably coated on one side with a pressure-sensitive adhesive 26 (Fig. 6) adapted to securely join the tape to the main sheet 24 when the tape is pressed against the margin of the sheet by the foot of the assembly 9.

As shown in Fig. 1, the reinforcing tape 25 is fed from a roll 27 mounted on a reel 28 adapted to be rotated about a horizontal axis. The reel is supported on a bracket 29 secured to the table 10. From the roll 27 the tape 25 is guided over the periphery of a freely rotatable roller 30 between flanges 31 formed on the roller. A horizontal shaft 32 supports the roller 30 and is secured to a bracket 33 which is removably fastened to the bolts 20 by nuts 34 threaded on these bolts.

By operation of the sewing machine, a row of lock stitches 35 is passed through the elastic band 12 and through the underlying reinforcing tape 25 and margin of the sheet material 24 while the elastic band is under tension and held under pressure and in contact with the sheet material and reinforcing tape by the machine foot. It will be understood that during this operation the machine dogs (not shown) coact with the foot in advancing the work and maintaining substantial and adequate tension in the elastic tape. Simultaneously with the sewing to form the stitches 35, the machine foot applies sufficient pressure to the reinforcing tape to cause the adhesive 26 to securely fasten the tape to the underlying margin of the sheet material 24. When the work is released by the foot and machine dogs engaging the lower side of the sheet 24, tension on the elastic band is released and the binding gathers the margin of the material into a multiplicity of folds, as indicated in Fig. 1.

For most uses the cover is provided with reinforced, elastic binding extending continuously along all sides. Thus the margins may be elongated by applying tension

to the binding when the cover is to be placed in engagement with the perimeter of the boat or other object to be covered. A number of flexible materials suitable for use as the sheet **24** are known. Examples are rubber coated or impregnated woven fabric and any of a number of available plastic sheet materials having adequate strength and durability under the changing temperature and weather conditions to which the covers are exposed. The relatively tough and inelastic reinforcing tape **25** is preferably a woven fabric having a coating **26** of pressure sensitive adhesive adapted to form a secure bond with the underlying sheet **24**. Adhesive tapes such as those in general use for surgical dressings are suitable for my cover margin reinforcement.

I claim:

1. A cover of the class described comprising, a flexible sheet, having insufficient strength without marginal reinforcement, a flexible inelastic reinforcing tape of relatively strong material extending along a margin of said sheet, means fastening said tape in overlapping relation to said margin, a flexible elastic band folded over said tape and over the margin of said sheet, and means securing said sheet and tape to the elastic band at intervals such that said margin and reinforcing tape are normally gathered into a multiplicity of folds and are adapted to be extended by elongation of the elastic band, and elongation of said band being limited by said inelastic tape rather than by said margin of the sheet.

2. A cover of the class described comprising, a flexible sheet having insufficient strength without marginal reinforcement, a flexible inelastic reinforcing tape of relatively strong material extending along a margin of said sheet, an adhesive fastening said tape in overlapping relation to said margin, a flexible elastic band folded over said tape and over the margin of said sheet, a row of lock stitches securing said sheet and tape to the elastic band, said stitches being so spaced as to cause said band to gather the margin and reinforcing tape into a multiplicity of folds adapted to be extended by elongation of the elastic band, and elongation of said band being limited by said inelastic tape rather than by said margin of the sheet.

3. A method of forming reinforced and elastic margins on sheet material which comprises applying and securing to at least one side of a marginal portion of said sheet an inelastic reinforcing tape, folding an elastic band in overlapping relation to said tape and to both sides of said margin of the sheet material, elongating said elastic band under tension and securing said elastic band while extended under tension in overlapping relation to the reinforcing tape and sheet margin to normally retain the reinforced margin of the sheet in contracted folds and permitting elongation of the margin by the application of tension to the elastic band.

4. A method of forming reinforced and elastic margins on sheet material which comprises applying to at least one side of a marginal portion of said sheet an inelastic reinforcing tape having a coating of pressure sensitive adhesive for contact with the sheet margin, pressing the adhesive coated side of the tape against said margin, and simultaneously, folding an elastic band in overlapping relation to said tape and to both sides of said margin of the sheet material, extending said elastic band under tension upon said tape and margin, and sewing said elastic band while extended under tension in overlapping relation to the reinforcing tape and sheet margin to normally retain the reinforced margin of the sheet in contracted folds adapted to be elongated by the application of tension to the elastic band.

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