

[54] **REINFORCED SEAM FOR SHEET MATERIAL**

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[52] U.S. Cl. .... **161/101, 2/274, 24/207, 24/243 K, 24/255, 24/262, 52/2, 150/3, 160/124, 160/402, 161/48, 161/53**  
 [51] Int. Cl. .... **B32b 7/08, B32b 3/06, B32b 3/04**  
 [58] Field of Search ..... **229/53, 62; 24/203, 207, 243.11, 24/243.9, 243, 243 SC, 243 GC, 243 FS, 262, 255, 259, 79, 67, 67.1, 67.3, 67.5; 160/395, 399, 402, 403; 150/4, 6, 10, 23; 161/101, 48, 53; 2/274, 275; 52/584, 588, 2; 135/15 CF**

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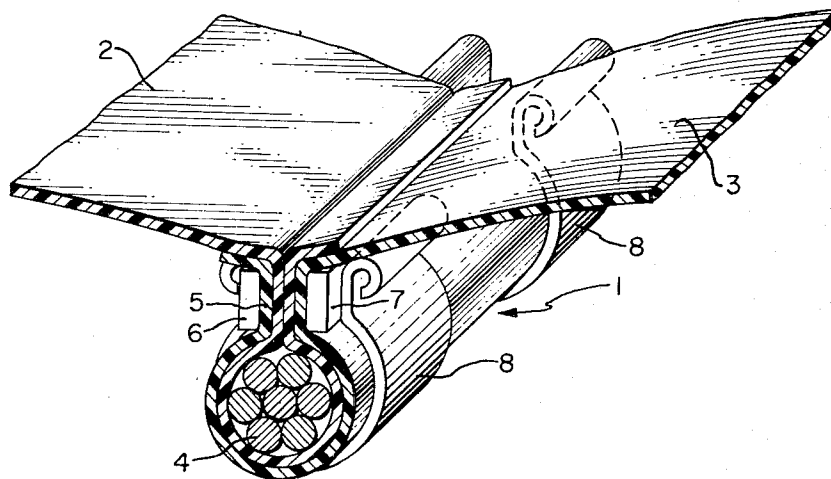
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[57] **ABSTRACT**

A seam for joining together the marginal edges of two sheets of flexible material, such as plastic or fabric, in which the edges are wrapped around a cable or other reinforcing member and clamped in the wrapped position to provide a leak-proof seam without the use of adhesives, sewing, heat sealing or other conventional fastening means. The sheets may, as an alternative, be wrapped around a filler member, then clamped to a reinforcing member. This seam is useful on inflatable buildings and other similar structures.

**6 Claims, 12 Drawing Figures**



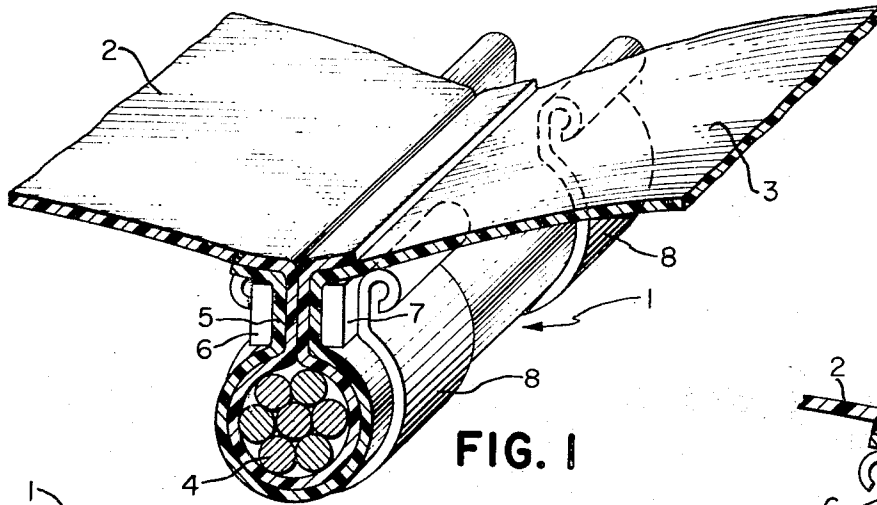


FIG. 1

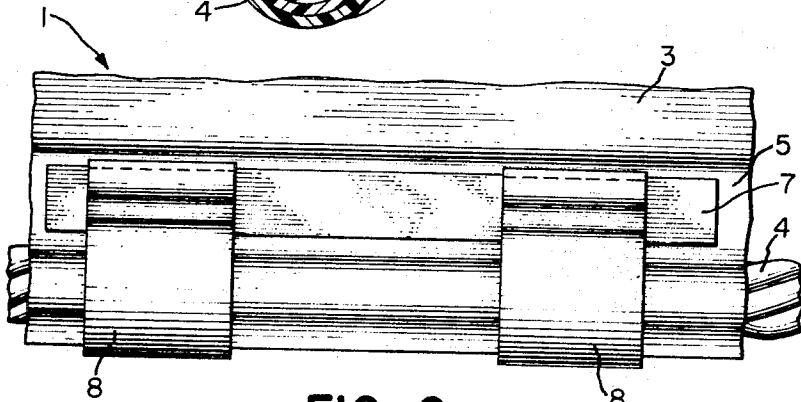


FIG. 2

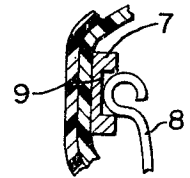


FIG. 8

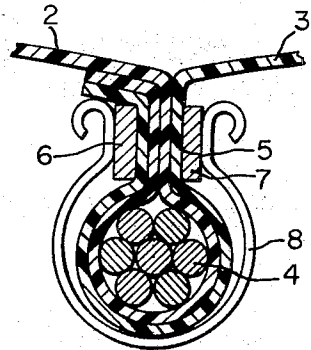


FIG. 7

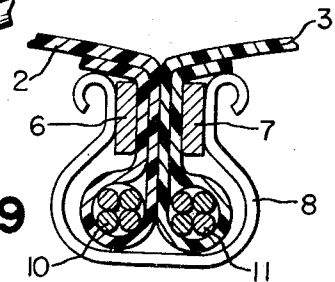


FIG. 9



FIG. 3

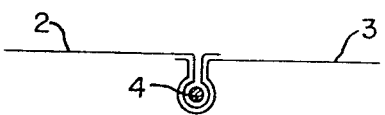


FIG. 4

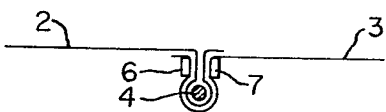


FIG. 5



FIG. 6

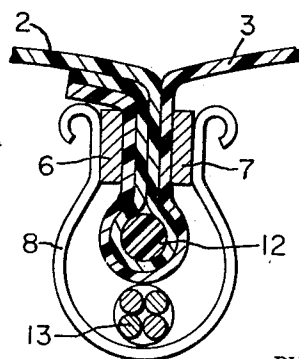


FIG. 11

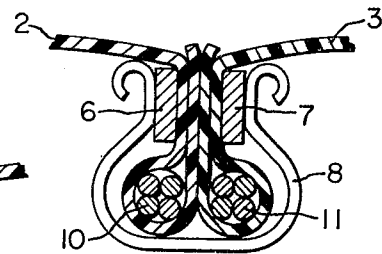


FIG. 10

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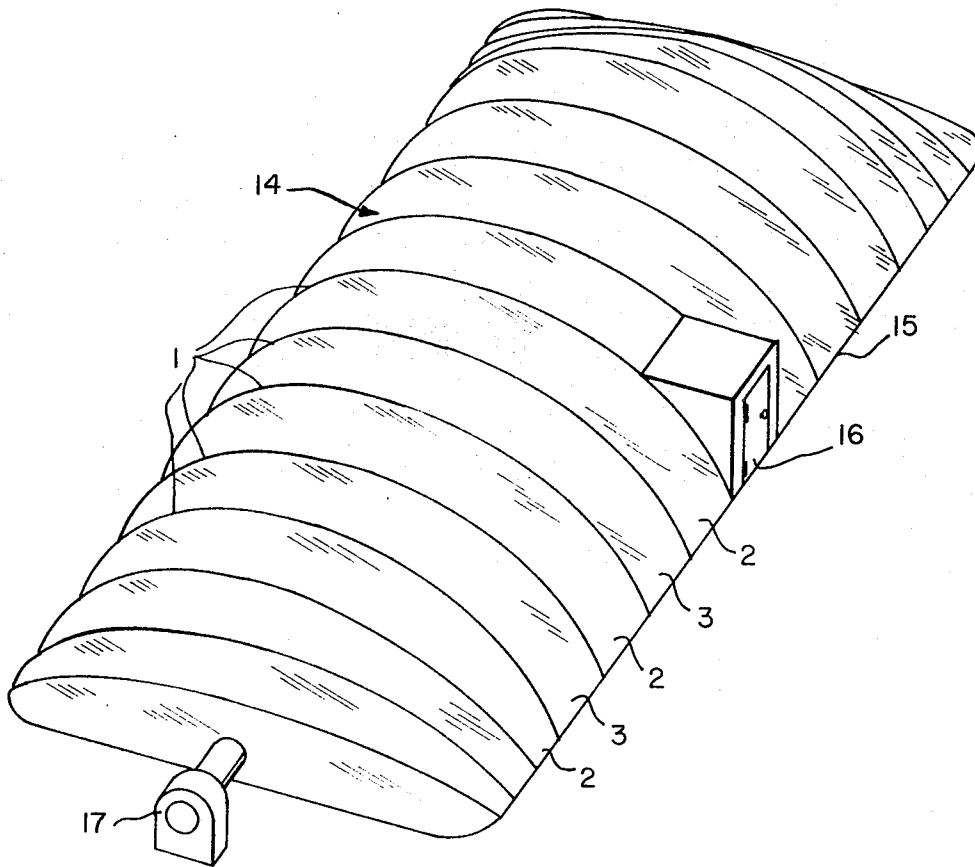


FIG. 12

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## REINFORCED SEAM FOR SHEET MATERIAL

This invention relates to a reinforced seam for joining together flexible sheets of material, such as plastic or fabric, without the use of adhesives or other conventional fastening means.

### OBJECTS OF THE INVENTION

A primary object of this invention is to provide a simple and easily assembled reinforced seam for joining together sheets of flexible material along their marginal edges. Another object of this invention is to provide a releasable seam for joining sheet material which will permit the sheet material to be easily assembled and disassembled for replacement of sheet material or for other purposes. A still further object of this invention is to provide a reinforced seam which does not require the use of adhesives, heat sealing, sewing or other conventional means of joining sheet material together. These and other objects of the invention will become more fully apparent as the description proceeds in the following specification and the accompanying drawings.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a fragmentary perspective view showing a cross-section through the seam of the invention;

FIG. 2 is a fragmentary side view through the seam shown in FIG. 1;

FIGS. 3 through 6 show the various steps in the assembly of the seam shown in FIGS. 1 and 2;

FIG. 7 is a cross-sectional view of another embodiment of the invention;

FIG. 8 is a fragmentary cross-sectional view showing a grooved pressure strip with a spring clip engaging the groove;

FIG. 9 is a cross-sectional view of another embodiment of the invention;

FIG. 10 shows a view similar to FIG. 9 but with the folds of the sheets reversed;

FIG. 11 shows another embodiment of the invention in which a filler is encased in the sheets and the cable is clamped to the sheets adjacent the filler; and

FIG. 12 is a perspective view of an inflatable building which can use the seam structures shown in FIGS. 1 through 11

### PREFERRED EMBODIMENTS OF THE INVENTION

Referring now to FIGS. 1 and 2, the seam assembly is designated as a whole by the numeral 1. A pair of sheets 2 and 3 of plastic film are shown joined together by the seam assembly 1. It will be understood that although plastic film is shown in the preferred embodiment of the invention, this seam assembly is equally applicable to other flexible sheet material, such as fabric and the like, and it is immaterial whether the material be transparent or opaque. The main characteristic of the sheet material is that it must be sufficiently flexible to permit it to be folded around a reinforcing member as will be described in further detail herein. The particular sheet material illustrated by FIGS. 2 and 3 is a clear plastic film material of the type used on inflatable buildings such as those disclosed in U.S. Pat. Nos. 3,035,590 issued to E.N. Helmers or 3,353,309 issued to J.P. Kwake or the building illustrated in FIG. 12 of this application. The overall configuration of the building in FIG. 12 is quite similar to prior art structures and has a flexible envelope 14 comprised of elongated sheets 2 and 3 joined by seam assemblies 1 having a cable 4 therein as will be described later. The opposite ends of the cables 4 and the sheets 2 and 3 are sealingly attached to the periphery of the base 15 by any well-known means to form an airtight enclosure. The building has a typical access door 16 and an inflation blower 17. As best shown in FIG. 1, the marginal edge of the sheet 2 passes around a reinforcing cable 4 and after passing around the cable, extends a short distance in face-to-face relationship with the main portion of the sheet 2. The sheet 3 passes around the outside of the portion of the sheet 2 surrounding the cable 4 and extends a short distance in

overlapping relationship to the sheet 2. Thus, it may be seen that at a portion immediately adjacent the reinforcing cable 4, the sheets 2 and 3 are folded over in overlapping relationship so that there is a thickness of four layers of sheet material forming a gripping or pressure area indicated by the numeral 5. A pair of pressure strips 6 and 7 is placed on each side of the pressure area 5 and are held in position by a plurality of spring clips 8 which pass around the film encased cable 4 and bear against the pressure strips 6 and 7 to hold them firmly against each side of the pressure area 5 and thereby clamp together the four thicknesses of material so that they will be securely held in the wrapped or folded position around the cable 4 and will not only retain the cable within the wrapped film, but will provide a leakproof seam between the sheets 2 and 3 without the need of adhesive or other conventional sealant and securing means. One of the primary advantages of this type of seam is that it can be disassembled as readily as it is assembled. This is particularly useful in an inflatable building which is moved from place to place and which must be dismantled periodically for such moves. This type of seam is also advantageous if it becomes necessary to replace part or all of the sheet material on the structure. Referring now to FIGS. 3 through 6, it may be seen how easily this seam may be assembled. In FIG. 3, the sheets 2 and 3 are placed with their marginal edges in overlapping relationship and the cable 4 is placed immediately above the overlapping portion, preferably near the center of the overlap and running longitudinally of the overlapped portion. In FIG. 4, the overlapped portion is folded around the cable. In FIG. 5, a pair of pressure strips are placed on each side of the overlapped portion after it has been passed around the cable. In FIG. 6, a spring clamp is attached to the seam extending around the wrapped cable and bearing against both of the pressure strips on each side of the fold to tightly grip the folded material and hold it in position around the cable.

FIG. 7 is a variation of the embodiment shown in FIG. 1 but with both sheets folded in the same direction around the cable instead of being folded in opposite directions. For simplicity, identical parts to those shown in FIG. 1 will bear identical numerals. In assembling FIG. 7, the edges of sheets 2 and 3 are placed side by side and then folded around the cable 4. The pressure strips 6 and 7 are placed on each side of the pressure area 5 formed by the folded sheets 2 and 3, and a plurality of spring clips 8 are clamped around the sheet-encased cable and bear against the pressure strips 6 and 7 to hold them in position and to hold together the folded sheets 2 and 3 and the cable 4.

FIG. 8 shows a fragmentary view of a portion of the assembly similar to FIG. 7, but with a groove 9 along the outer face of the pressure strip 7. One end of the spring clip 8 is in contact with the groove 9 which aids in preventing the clip 8 from slipping off the pressure strip 7. Of course, any of the pressure strips shown in any of the embodiments in this application may be grooved similar to that illustrated in FIG. 8.

FIGS. 9 and 10 show an embodiment of the invention in which each of the sheets is individually folded around a separate cable and then pressure strips are applied to each side of the folds and then clamped together by spring clips. In FIG. 9, sheet 2 is folded around a cable 10 and sheet 3 is folded around a cable 11. The ends of the sheets 2 and 3 are folded outwardly from each other around the cables and then pressure strips 6 and 7 are placed on each side of the folds and the usual spring clips 8 are clamped in position around the sheet-encased cables and the ends of the clips 8 bear against the pressure strips 6 and 7 to hold the entire assembly in position.

FIG. 10 is similar to FIG. 9 except that the sheets 2 and 3 have their ends folded inwardly around the cables instead of outwardly. Identical numerals will be used to identify the parts in FIG. 10 which are identical to those in FIG. 9. Since the assembly of FIG. 10 is similar to FIG. 9 in all other respects, no further detailed description will be given.

FIG. 11 shows a different embodiment in which the sheets 2 and 3 are both folded around a filler member 12, preferably

made of plastic or other suitable material, instead of being folded around a cable or reinforcing member as shown in all the previous figures. A reinforcing cable 13 is placed adjacent to and parallel with the filler member 12 and the pressure strips 6 and 7 are placed in position similar to that described in the previous embodiments and the spring clips 8 are clamped around the sheet-encased filler strip 12, the cable 13 and bearing against the pressure strips 6 and 7 to hold the entire assembly together. The advantage of the embodiment shown in FIG. 11 is of particular advantage when this seam structure is used on an inflatable building. In such a structure, the cable is completely inside the cover of the building and is more protected from any moisture which might accumulate on the roof of the building and work its way in between the sheets to reach the cable when the cable is encased within the sheets. Another advantage is that it is possible to clamp together all of the assembly shown in FIG. 11, with the exception of the cable, with one set of clamps and then to clamp the cable to the rest of the assembly by a separate set of clamps. In some instances, this may have advantages in ease of assembly. In other instances, however, it may be preferred to assemble the entire seam along with the filler strip and the cable before applying the spring clips. It will, of course, be understood that the reinforcing member 4 can be made of any material, such as a metallic cable as illustrated or a fibrous rope or any other suitable material. The pressure strips 6 and 7 can be made of wood, plastic, metal or any suitable material. The clips 8 are made preferably of spring steel or other similar resilient metal; however, any other suitable material may, of course, be used. It will be understood that the number of clips used, the length of the clips and the length of the pressure strips 6 and 7 is a matter of design choice and can be varied as needed, depending upon the particular size of the structure being produced. Since the embodiments shown in FIGS. 9 and 10 are more susceptible to leakage due to some separation of the sheets 2 and 3 under some stress conditions it may be necessary to supplement the sealing action of the two clamped sheets by addition of a strip of tape to the outside of the seam or other suitable

ble sealing means. These and various other modifications may be made without departing from the invention.

What is claimed is:

1. A flexible reinforced seam for joining together sheets of flexible material comprising:
  - A. a pair of sheets each having one of their marginal edges positioned contiguous to the adjacent marginal edge of the other;
  - B. an elongated flexible reinforcing member positioned in the area of contiguity and running longitudinally therewith;
  - C. both said sheets being folded around the reinforcing member to encase the member therein;
  - D. elongated pressure strips placed on each side of the folded portion of the sheets; and
  - E. resilient gripping means extending around the reinforcing member and the folded portion of the sheets and bearing laterally inwardly against the pressure strips to hold the sheets in the folded position around the reinforcing member;
  - F. the pressure strips having a groove therein to receive a portion of the gripping means.
2. A reinforced seam as claimed in claim 1 wherein the reinforcing member is a metallic cable.
3. A reinforced seam as claimed in claim 1 wherein the reinforcing material is a fibrous rope.
4. A reinforced seam as claimed in claim 1 wherein a second elongated flexible reinforcing member is held by the gripping means adjacent to the first reinforcing member which is encased in the folded flexible sheets, said second reinforcing member being separated by the sheet material from direct contact with the encased reinforcing member.
5. A reinforced seam as claimed in claim 4 wherein the second reinforcing member has greater tensile strength than the first reinforcing member.
6. A reinforced seam as claimed in claim 1 wherein the gripping means is a plurality of spring clamps.

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