A joint for foldable and inflatable impact-absorbing vehicle air bags formed by bending inwardly the edges of two sections of material joined to form a downwardly depending lip, abutting the lips and sewing the lips together with a double thread lock stitch. A U-shaped band is placed over the sewn lips and sewn to the lips by another double thread lock stitch. Finally, the main portion of the section is sewn to the U-shaped band and the lips by another double thread lock stitch arranged between the other two seams.
The present invention relates to joints for foldable and inflatable containers which may be coated with a synthetic resin, a plastic film, or alike coating and which are exposed to an internal superatmospheric pressure in the inflated condition, such as an impact-absorbing air bag for vehicles, particularly automobiles.

In the automobile industry, at least in the United States, the use of so-called "air bags" will be a compulsory requirement within the foreseeable future. The known types of air bags are foldable and inflatable containers of coated or uncoated textile fabrics or other suitable materials which are inflated with superatmospheric pressure when a predetermined deceleration of the vehicle has been exceeded, this inflation taking place within an extremely short time period, generally within 20–30 milliseconds. During inflation, not only is the container material subjected to a high stress due to peak pressure, but also the joints of the containers which are composed of several components undergo high stress.

The present invention provides a joint and a method for forming a joint which satisfies the high stress requirements. In accordance with the invention the portions of the container to be joined together are bent in a U-shaped manner toward the inside to form a lip along their corresponding edges and the lips, which have been brought into approximately congruent contact with each other are sewn together by means of a double thread lock stitch. The sewn lips are then bordered in a U-shaped fashion by means of a band and the lips are sewn together with the trimming band by means of an additional double thread lock stitch proximate to the end of the legs of the U-shaped trimming band. Finally, the lips of the fabric, the trimming band, and the main portion of the container sections which cover the trimming band on the outside are sewn together to form a pressure resistant joint for the container.

It is therefore an object of the present invention to provide a joint for foldable and inflatable containers.

It is another object of the present invention to provide a joint for inflatable containers which is highly resistant to pressure stresses.

These and other objects, features and advantages of the present invention will become more obvious from the following description when taken in conjunction with the accompanying drawings, wherein:

FIGS. 1a and 1b are sectional views of the configuration of a joint according to the present invention for securing the textile pieces of the air bag; and

FIG. 2 is a schematic view of the individual phases of the sewing procedure.

Referring now to the drawings wherein like reference numerals designate like parts throughout the several views and more particularly to FIGS. 1a and 1b, reference numerals 1 and 2 designate sections of the air bag. The sections 1 and 2 are bent inwardly at their edges to form lips 3 and 4, respectively, which are brought into congruent contact. The lips are sewn together near the free ends thereof by means of a double thread lock stitch 5. As shown, a trimming band 6 is inserted over the lips 3 and 4 to form a U-shaped member and is sewn to the lips by means of another double thread lock stitch 7 arranged proximate to the free ends of the legs of the trimming band. The two double thread lock stitch 5 and 7, the container sections 1 and 2 as well as the trimming band 6 and the lips 3 and 4 are then sewn together by means of the further double thread lock stitch 8. As shown in FIG. 1b, the container sections 1 and 2 which are arranged in parallel relationship in FIG. 1a for the joint formation, are flapped toward the outside for use as a container.

In FIG. 2, the different double thread lock stitch are shown schematically. Thus, at the lower portion of the Figure there is shown the seam 5, by means of which the lips 3 and 4 are sewn together with the double thread lock stitch 7 utilized for sewing the lips 3 and 4 and the trimming band 6 together being shown there above. Finally at the top portion of the Figure, there is shown the double thread lock stitch 8, utilized for sewing the container sections 1 and 2 together with the short legs and the trimming band.

Obviously, many modifications and variations of the present invention are possible in the light of the above teachings. It should therefore be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

I claim:

1. Method of forming a joint for sections of textile material which are joined together to form a foldable inflatable container such as an impact-absorbing air bag for a vehicle wherein the joint is exposed to internal superatmospheric pressure in the inflated condition of the container comprising the steps of forming a downwardly depending lip along the edge of sections of material and forming, abutting the lips of two sections of material in a substantially congruent manner, sewing the lips together with a first seam, inserting a U-shaped trimming band over the joined lips of the two sections of material such that a leg of the U-shaped trimming band is arranged between the lip and main portion of each section of material, sewing the trimming band and the lips together with a second seam at a position proximate to the free end of the legs of the trimming band, and sewing the trimming band, the lips and the main portion of the sections of material together with a third seam at a position between the other two seams to form a joint capable of withstanding high stress.

2. A method as defined in claim 1 wherein each seam is sewn by double thread lock stitching.

3. A method as defined in claim 2 wherein the first seam is sewn at a position proximate to the free end of the lips.

4. The method as defined in claim 2 wherein the step of forming a downwardly depending lip includes bending the edge portion of the section of material inwardly upon itself.

5. The method as defined in claim 4 wherein each section of textile material is coated.

6. In a foldable and inflatable air bag for vehicles formed of joined sections of textile material, at least one joint capable of withstanding high stress in the inflated condition of the air bag comprising first and second sections of material each having a downwardly depending lip along an edge portion thereof, said lip being substantially parallel to the main portion of the section and spaced therefrom, said lips being in substantially congruent abutting relation, first means passing
through each of said lips for securing said lips together, a U-shaped trimming band having one leg thereof arranged in the space formed by said lip and said main portion of each section, second means passing through said U-shaped band and said lips for securing said U-shaped band to said lips, and third means passing through said main portion of said sections and said U-shaped band and said lips at a position between said first and second securing means for securing said main portion to said U-shaped band and said lips.

7. A joint as defined in claim 6 wherein each of said securing means is a double thread lock stitch.

8. A joint as defined in claim 7 wherein said first securing means is arranged proximate to the free end of said lips and said second securing means is arranged proximate to the free end of said legs of said U-shaped trimming band.

9. In an air bag as defined in claim 8 a plurality of joints joining plural sections of the air bag.