

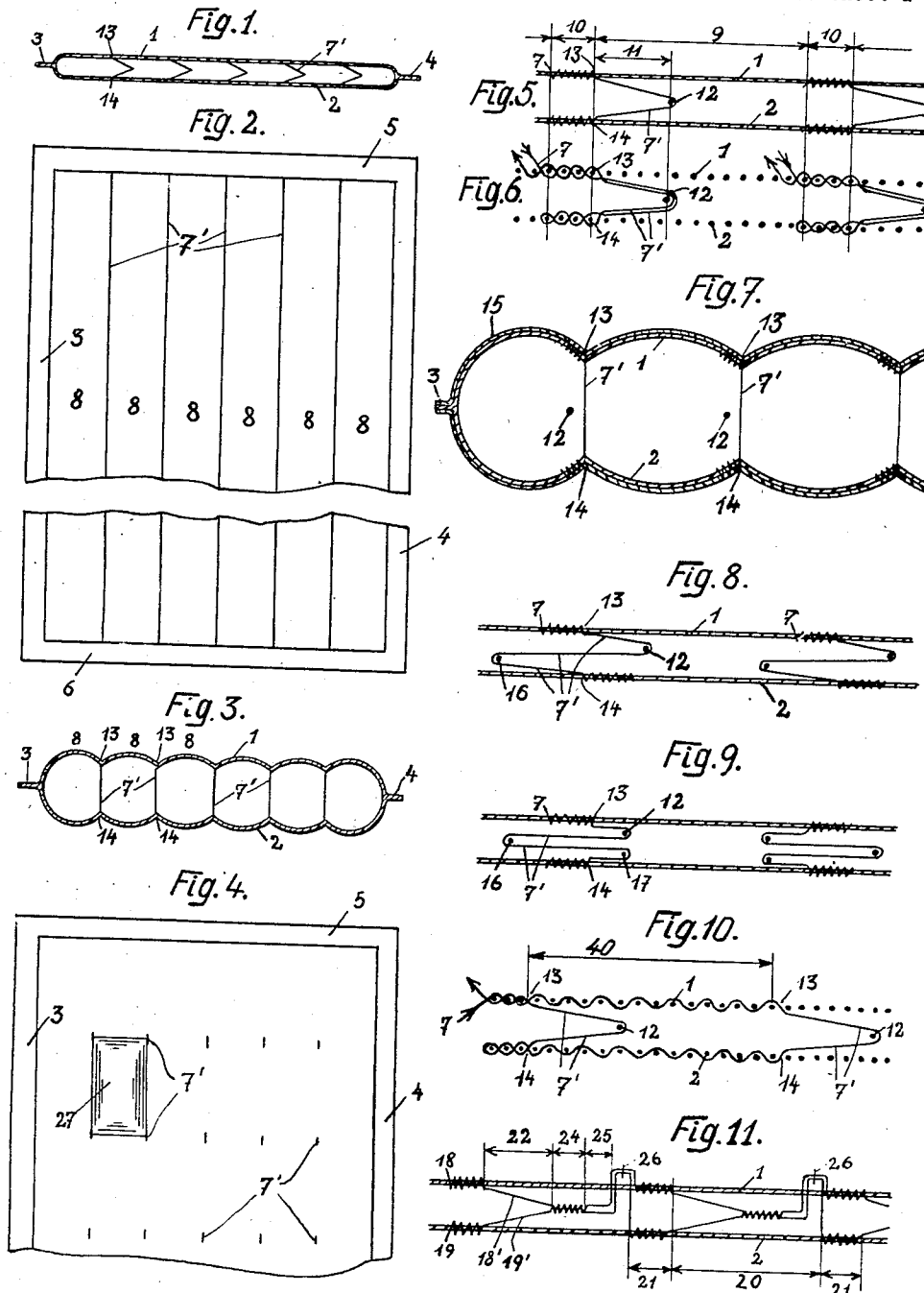
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A. SCHAAAR
TEXTILE ARTICLE

2,046,039

Filed Aug. 4, 1934

2 Sheets-Sheet 1



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June 30, 1936.

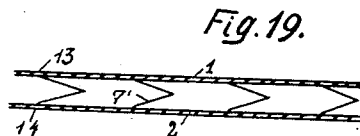
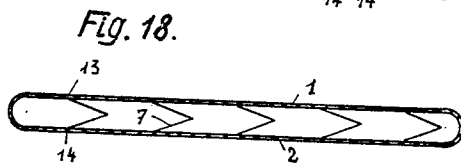
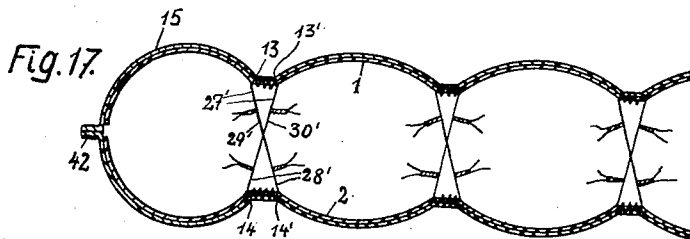
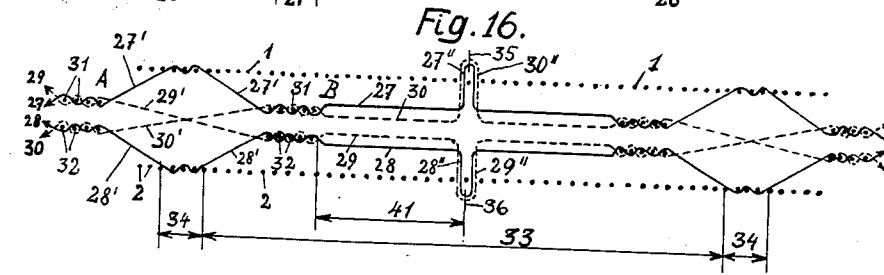
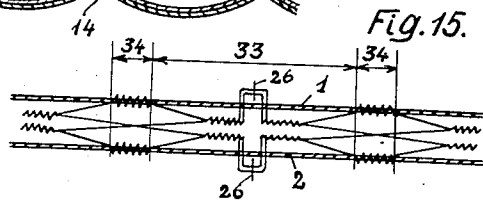
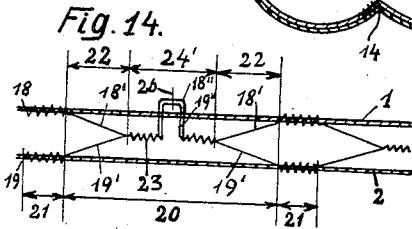
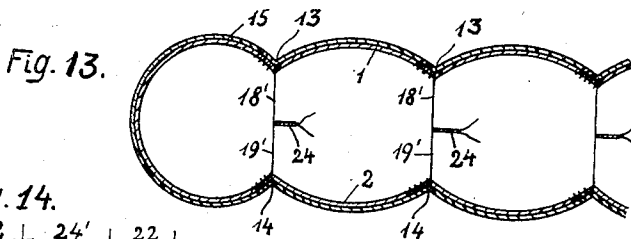
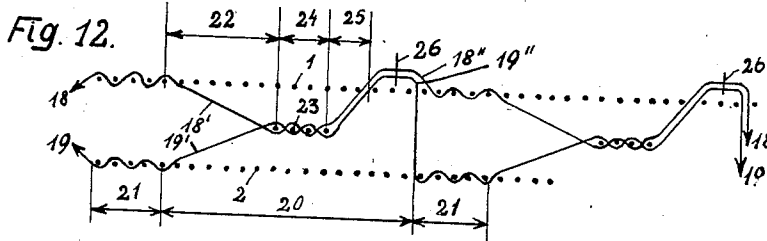
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2,046,039

TEXTILE ARTICLE

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2 Sheets-Sheet 2



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TEXTILE ARTICLE

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9 Claims. (Cl. 139—324)

This invention relates to textile articles and more particularly to hollow textile bodies for use in air cushions, mattresses and the like.

In an application, Ser. No. 556,374 the applicant deals with a textile article which is rendered airtight by applying a layer which seals it hermetically and as an inflated mattress or the like serves for supporting the human body or for other purposes. This textile article consists substantially of upper and lower woven sheets or layers or walls connected, within their edges, by woven threads. When the two layers lie flat, one upon the other, the connecting threads are substantially parallel to the same. But when the hollow body is inflated, the threads are extended and take up the internal pressure exerted on the body and prevent undue distortion thereof. The two walls or sheets are joined together at their edges in any suitable manner, as by weaving, sewing or the like, depending on the nature of the hollow body.

It is an object of the invention to provide an improvement in textile bodies of this general character, particularly in respect to the connecting threads which take up the internal pressure.

With this general object and others in view, the invention consists in the features, combinations, details of construction and arrangements of parts which will first be described in connection with the accompanying drawings and then more particularly pointed out in the claims.

In the drawings,—

Figure 1 is a transverse sectional view of a hollow textile body constructed in accordance with the invention;

Figure 2 is a plan view of the same;

Figure 3 is a view similar to Figure 1 showing the body inflated;

Figure 4 is a view similar to Figure 2 showing a modification;

Figures 5 and 6 are diagrammatic or explanatory views illustrating one method of weaving;

Figure 7 is a transverse sectional view of a completed and inflated article embodying the weaving method of Figure 5;

Figures 8–11 are diagrammatic or explanatory views showing different methods of weaving;

Figure 12 is a similar view illustrating on an enlarged scale the weaving method shown in Figure 11;

Figure 13 is a transverse sectional view of a completed and inflated body embodying the weaving method of Figures 11 and 12;

Figures 14 and 15 are diagrammatic or explanatory views of modified methods of weaving;

Figure 16 is a similar view illustrating on an enlarged scale the weaving method shown in Figure 15;

Figure 17 is a transverse sectional view of a completed and inflated body embodying the weaving method shown in Figures 15 and 16, and

Figures 18 and 19 are views similar to Figure 1 showing modified constructions.

The textile body according to the invention consists of an upper and an under textile layer made by any mechanical working process, such as weaving, knitting or the like, and threads connected to these layers by weaving or the like and located within the edges thereof. Each thread connects two points of the respective layers or walls that are substantially opposite each other. That is, the points are in vertical alignment. When the surfaces are lying flat, one on the other, the length of the threads far exceeds the distance separating such points.

Such a textile body is particularly suitable for the manufacture of mattresses, bolsters, cushions, floating bodies, hot water bottles and other hermetically sealed hollow bodies, a sealing layer being applied to the textile body for such purposes.

An important advantage of the invention consists in this, that it is possible to manufacture a hollow textile fabric with mechanically made marginal selvages, for instance, woven longitudinal or/and transverse selvages.

In Figures 1 and 2 there is illustrated one example of a hollow textile body made by weaving. It comprises upper and lower layers, sheets or walls 1, 2 which are connected together along the side edges by selvages 3, 4 and along the end edges by selvages 5, 6, along which selvages the threads of the two walls are woven together.

This is the preferred example of how the hollow textile body is made, as it enables a number of hollow textile bodies connected together in the longitudinal and transverse direction to be made in one loom, which are then cut out in the middle of the selvages in the longitudinal and transverse direction to form the separate hollow textile bodies.

The invention is, however, not limited to this construction, it being also possible to make the two layers 1, 2 in tubular form (Fig. 18) or without any connection at the margins (Fig. 19). Thereupon the two layers 1, 2 of the tubular body of Figure 18 are connected along the end edges in any suitable manner, for example, by sewing. This marginal connection may also be effected by sticking the edges of the two layers

together, which may be accomplished, for example, by means of the sealing layer. In the embodiment of Figure 19, the upper and lower layers 1, 2 are similarly connected along all four edges.

While the threads that connect the two walls or layers within the edges thereof may be formed and arranged in various ways, in the embodiment illustrated as an example in Figs. 5 and 6 a thread system 7 is provided which is carried to and fro, for instance, in the manner of the known figuring weft threads over a smaller width than the weft threads of the layers 1, 2. These weft threads 7 are woven in at suitable intervals 9 over a certain length 10 with the threads of the upper layer 1, then float at 7' between the layers 1, 2 (that is to say, in the hollow space of the hollow textile body shown in Figs. 1 and 2) over a certain length 11, are led back about an auxiliary thread system 12 which is preferably not woven in anywhere but is only held firmly (in the present instance, for instance, a warp thread), are then woven in with the threads of the lower layer 2 over the distance 10 and are then led back again in exactly the same way (Fig. 6) until they are returned to the place from where they started. When transverse selvages are employed, for instance, 5, 6, Fig. 1, the auxiliary thread system is at these places preferably brought to the outside where it floats, so that, on these transverse selvages being cut through, this auxiliary thread system is also cut through. From Figs. 5 and 6 it will be seen that the branching places 13, 14 of the floating thread portions 7' of the layers 1, 2 lie exactly or substantially one above the other and that the total length of each floating thread portion 7' which is led back round 12 far exceeds the distance of these branching places from one another during weaving, during which the layers 1, 2 lie one on the other.

Thereupon, the layers 1, 2 lying against one another, a hermetically sealing layer, for instance, of rubber, may be applied, outside of the hollow textile body in a known manner, which layer is marked 15 in Fig. 7. On the finished hollow body being inflated the floating thread portions 7' become extended (Figs. 3 and 7) and form erect connecting threads between the oppositely situated points 13, 14 of the walls 1, 2 of the hollow body. These connecting threads take up the pressure of the inflated air and control the ultimate shape of the inflated body. The auxiliary thread system 12 does not hinder the extension of the thread portions 7', as it is nowhere woven in, but is only held in its position during the weaving process and yields to the pull of the thread portions 7' when the hollow body is inflated.

These connecting threads 7' can either be arranged next to one another without interruption in the entire length of the manufactured hollow body (Fig. 2), in which case belled longitudinal strips 8 will be formed, or these connecting threads 7' may be arranged only locally (Fig. 4), in which case the bellying will extend as in the known horsehair or like mattresses both in the transverse direction and in the longitudinal direction, as is indicated at 27.

From Figs. 1, 3 and 7 it will be seen that the longitudinal selvages 3, 4 do not hinder the extension of the connecting threads 7', that is to say, do not prevent them being stretched straight and adopting a vertical position, and that for this extension a displacement of the two layers 1, 2 with respect to one another in the direction

of the cross section is not necessary, as the branching points 13, 14 of these connecting threads of the layers 1, 2 lie exactly or substantially one above the other, that is to say, are not offset with respect to one another.

In the exemplification shown in Fig. 8 the figuring weft threads 7 after being woven in with the threads of the upper layer are passed round two auxiliary thread systems 12 and 16 instead of round only one such system and are then woven in with the threads of the under layer 2. With this construction, the floating thread portion 7' has a zig-zag course and so has a greater length than in the embodiment of Figures 5-7, although the distance traveled by the figuring shuttle remains the same. As a result, when the body is inflated its height, i. e. depth, is correspondingly greater.

In Fig. 9 the floating portion 7' of the figuring weft thread 7 is passed round three auxiliary thread systems 12, 16 and 17, so that its total length becomes still greater.

In all cases the adjacent figuring shuttles may work either in the same direction or in opposite directions to one another, and in the second case the adjacent figuring threads are guided symmetrically to one another.

In Fig. 10 is shown how one and the same figuring shuttle produces the floating thread portions 7' not only one behind the other in the warp direction, but also, for instance, two floating thread portions 7', lying next to one another in the weft direction at a distance 40, the figuring weft thread 7 being woven in between the said adjacent thread portions 7', 7' with the threads of the two layers 1, 2.

According to the exemplification shown in Figs. 11 and 12 two thread systems 18, 19 are introduced between the layers 1, 2, for instance, as continuous wefts which are woven in along their length at intervals 20 over a certain length 21 with the threads of the upper and lower layers 1, 2 respectively. The thread systems 18, 19 float over a certain length 22 at 18'', 19'' between these woven in places 21 and are thereupon woven together over a certain length 24 by means of a third, common thread system 23 (which in this case is for instance a warp). Thereupon the thread systems 18, 19 preferably float again along a short distance 25 and before being woven in again at 21 are preferably taken to the outside through the same layer 1 at 18'', 19'', whereupon the thread system 18 is again woven in with the threads of the layer 1 and the thread system 19 with the threads of the layer 2 along a certain length 21.

If the thread systems 18, 19 be cut through at their externally lying parts 18'', 19'' along the line 26, which may be effected either automatically on a loom successively as the weaving progresses or subsequently in one operation, then the hollow textile body will have somewhat the appearance shown in Fig. 1. The thread portions 18', 19' will then lie freely with the adjoining short woven in portion 24 between the two layers 1, 2, as the warp 23 is preferably only woven together with the thread systems 18, 19 but not with the threads of the layers 1, 2 or with the transverse selvages 5, 6 connecting the latter.

In order that the subsequent application of the sealing layer may not be detrimentally affected by thread ends standing out at the cut places 26, it is only necessary slightly to raise the upper layer 1 and lay it down again on the lower layer 2. By this means most of the thread ends

will be drawn into the interior of the hollow textile body.

On the finished hollow body being inflated (Fig. 13), each two interwoven portions 18', 19' of the thread systems 18, 19 will form erect connecting threads between each two vertically aligned points 13, 14 of the walls 1, 2 of the hollow body. These connecting threads take the internal pressure and control the form of the body under inflation. The textile body shown in Figure 13 is made in the form of a sack, as shown in Figure 18. That is, it does not have the longitudinal selvages 3, 4.

Figure 14 illustrates a modification of the embodiment shown in Figures 11 to 13, the threads in this case being arranged symmetrically. The continuous wefts 18, 19 are, after floating at 18', 19' along the distance 22 woven together by means of the third thread system along the distance 24', which is about twice the distance in the previous case, floating thread portions 18', 19' following immediately, positioned symmetrically. Approximately in the middle of the woven in place 24' the thread systems 18, 19 are taken to the outside at 18'', 19'' for being cut through. After the cutting apart at 26 and the inflation of the finished hollow body its appearance will be similar to that shown in Fig. 13.

The hollow textile body shown in Figs. 15 to 17 differs from that just described, more particularly in that more than three thread systems are used for producing crossing connecting threads between the two layers. In this case, between the layers 1, 2 of the hollow textile body four thread systems 27, 28, 29 and 30 (Fig. 16) which extend, for instance, substantially in the weft direction, and two thread systems 31 and 32 which extend for instance in the warp direction, are used. The thread systems 27, 28 are woven in, in their longitudinal direction, at intervals 33 and along a suitable short length 34, with the threads of the upper and under layers 1, 2 respectively. At the weaving in places 34 of the thread systems 27, 28 the thread systems 29, 30 float and cross one another at 29', 30', while at the intervals 33 of the thread systems 27, 28 they are woven in with the latter by means of the two thread systems 31, 32 over a certain length. That is, in the group A the thread systems 27, 29, 31 are woven together, as are also the thread systems 28, 30, 32. In group B, because of the crossing of the thread systems 29, 30, the thread systems 27, 30, 31 are woven together, as are also the thread systems 28, 29, 32. The thread systems 27 and 28 also float between each two weaving in places at 27', 28' over a certain length.

Furthermore, the thread systems 27, 28, 29, 30 are taken, at 27'', 28'', 29'', 30'', to the outside through the layers 1, 2 approximately in the middle of the places where they are woven together (Fig. 15) or after floating again over a length 41 (Fig. 16) so that externally situated cutting places 35, 36 result. Preferably all these thread systems are taken to the outside through the same layer (for instance, 1), in order that they may be cut through at a single cutting place.

After the operations of cutting, applying the sealing layer and inflating the hollow body have been performed (Fig. 17), the floating thread portions 29', 30' each lengthened by two floating thread portions 27', 28' form crossing connecting threads between the layers 1, 2 of the hollow body, the said thread portions being connected together by the narrow woven pieces which have been formed. In this embodiment while the con-

necting points 13, 14 and 13', 14' respectively (Fig. 17) lie exactly or substantially so one above the other, the connection is cross-wise, so that 13 is connected to 14' and 13' to 14. This gives the same effect as in the direct connection of 13 to 14 and 13' to 14'.

Fig. 17 also shows an example in which the textile body is formed from two textile layers or sheets, not connected at their edges, as shown in Figure 19. The edges are struck together at 42 by means of the applied sealing layer 15.

In all the embodiments it is possible to bring the warp threads instead of the weft threads between the layers 1, 2 in the various ways described for forming the connecting threads.

In all the embodiments described, when the upper and lower layers lie flat one on the other the floating thread portions 7' etc. are folded, so to speak, into angular or zig-zag arrangement. When the body is inflated, however, the angles open out and the thread systems are extended to straight form.

The floating thread portions 7' or 18', 19' etc., may at different places be of different length, so that, when the hollow body has been inflated, they will form between layers 1, 2 erect connecting threads of different lengths, which at the different places give the inflated hollow body different heights (thicknesses). By this means the two layers 1, 2 may be given any desired external shape, when the hollow body is inflated, which differs more or less from that shown in Fig. 3.

What I claim is:—

1. A textile body serving for the reception of hermetically sealing material for use in an inflatable hollow body, comprising an upper and lower textile layer, threads which, at points located between opposing edges of said textile layers, are connected to the latter over relatively short lengths and float between said layers, said floating thread portions at intervals connecting two substantially superposed points (13, 14) of these layers, and at least one auxiliary thread system (12) about which said floating thread portions are taken, whereby said floating thread portions have a length greatly exceeding the distance between said superposed points when the layers are relatively close together, said auxiliary thread system being capacitated to be made ineffective and thereby permit the threads connecting the layers to extend upon inflation of the hollow body.

2. A textile body serving for the reception of hermetically sealing material for use in an inflatable mattress, comprising upper and lower woven textile layers, two thread systems (18, 19) one of said thread systems, at points located between opposing edges of said layers, being woven into one of said layers over relatively short lengths, the other of said thread systems, at similarly located points, being woven into the other of said layers, said thread systems starting from substantially superposed points (13, 14) of said layers and floating between the layers, the floating thread portions (18', 19') having a woven connection over relative short lengths with an auxiliary thread system (23) located between said layers, said floating thread portions being led out through at least one of said layers to provide cutting places (26), whereby each pair of floating thread portions (18', 19') connected together may finally form standing connecting threads between said layers, said auxiliary thread system being capacitated to be made in-

effective and thereby permit said threads connecting the layers to extend upon inflation of the mattress (Figs. 11-14).

3. A textile body according to claim 1, in which the auxiliary thread system, prior to inflation of the hollow body, is held firmly between the layers without being worked into the same, the thread ends being free.

4. A textile body according to claim 2, in which the thread system (23), prior to inflation of the mattress, is held firmly between the layers and woven in with the two other thread systems (18, 19) only, the thread ends being free.

5. A textile body according to claim 1, in which the plurality of connecting threads for the layers are formed of a continuous thread.

6. A textile body serving for the reception of hermetically sealing material for use in an inflatable mattress, comprising upper and lower woven textile layers, four through-running thread systems (27, 28, 29, 30), one of said systems (27) being woven into the upper layer at intervals, a second thread system (28) being woven into the lower layer, said two thread systems (27, 28) starting from substantially superposed double points (13, 13', 14, 14') of said layers and floating between the layers, each upper and lower floating thread portion having a woven connection with a third and fourth through-running thread system (31, 32) respectively each by means of an auxiliary thread system, the said four thread systems being taken out through at least one of said layers to form cutting places, whereby every three floating thread portions (27', 29', 28' and 27', 30', 28') connected together may finally form two crossing

connecting threads for the layers which are repeated at intervals (Figs. 15-17).

7. A textile body according to claim 6, in which the two auxiliary thread systems (31, 32), prior to inflation of the mattress, are held firmly between the layers and are woven in with said four thread systems only, the thread ends being free.

8. A textile hollow body as claimed in claim 1, in which the floating parts of the threads connecting the two layers together at at least two substantially superposed points have different lengths at different places so that they give the hollow body when inflated different heights at different places.

9. A textile body serving for the reception of hermetically sealing material for use in an inflatable mattress consisting of an upper and lower woven textile layer, threads which, at points located within the marginal boundaries of the said textile layers, are woven into the latter over relatively short lengths and float between the layers, said floating thread portions at intervals connecting substantially superposed points (13, 14) of these layers, and at least one auxiliary thread system (12) about which said floating thread portions are taken, whereby said floating thread portions have a length greatly exceeding the distance between said superposed points when the layers are relatively close together, said auxiliary thread system being capacitated to be made ineffective and thereby permit the threads connecting the layers to extend upon inflation of the hollow body.

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