July 15, 1958 M. G. DRUCK 2,842,783

AIR MATTRESS

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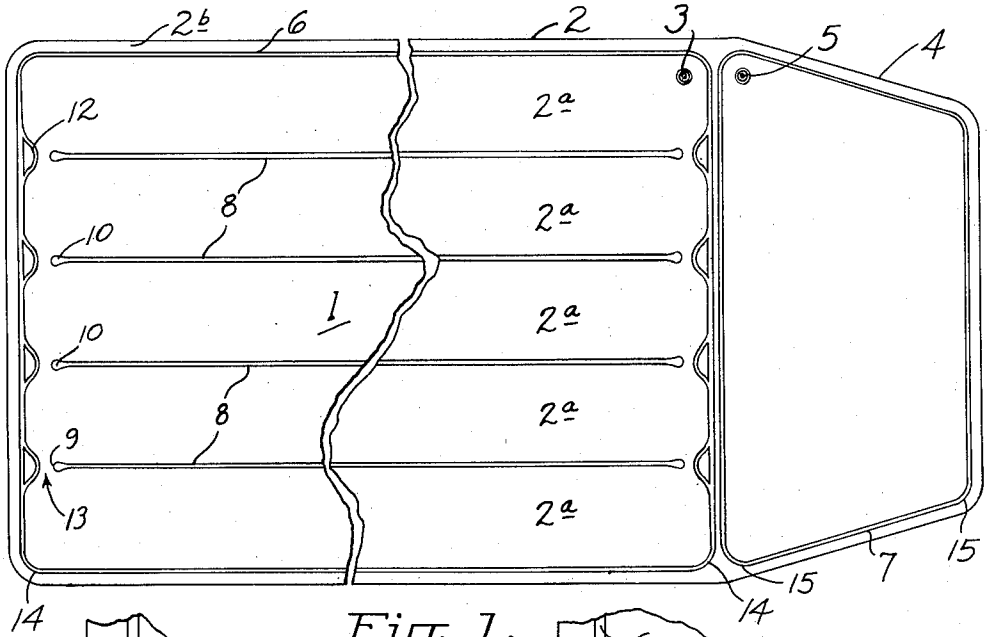

Fig. 1.

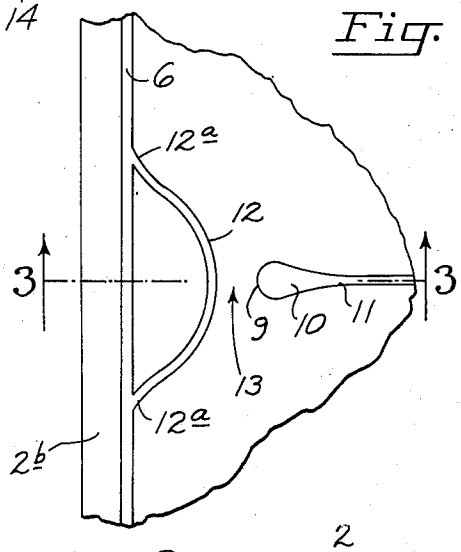

Fig. 2.

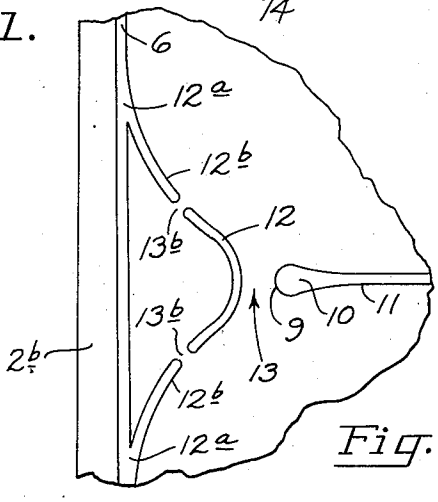

Fig. 4.

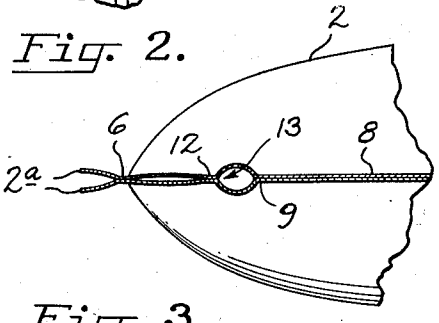

Fig. 3.

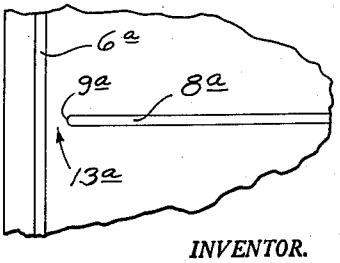

Fig. 5.

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8 Claims. (Cl. 5—348)

The present invention relates to an improved inflatable air mattress and, more particularly to an air mattress of rib-like construction comprised of interconnected compartments.

Air mattresses of rib-like construction and made of resilient or flexible material are well known. Such flexible materials usually comprises heat sealable plastic compositions, for example plastic compositions of polyvinylchloride, vinyl acetate copolymer, etc. A heat sealable material particularly useful in the manufacture of mattresses is one known by the trademark "Krene" comprising about 85% polyvinylchloride with the balance vinyl acetate copolymer (manufactured by the Bakelite Company, a division of Union Carbide and Carbon Corporation). For convenience, such materials are referred to as rubber-like materials.

In manufacturing the inflatable mattress, a sheet of heat sealable flexible material is placed on top of another and the two joined air tight around their periphery. The peripherally joined sheets are further joined together by means of longitudinal sealing lines running across the joined sheets but terminating short of the peripheral seal, thereby defining interconnected air-fillable compartments. By terminating the longitudinal seal just short of the peripheral seal, air-connecting passageways are provided for each compartment. A valve is then attached to the inflatable mattress by means of which the mattress is either inflated or deflated. When inflated, the mattress appears to have a rib-like construction due to the sealing lines.

A problem which arises in the construction of such mattresses is in the strength of the bond holding the two sheets together, particularly at the terminating end portion of the longitudinal sealing lines where failures are prone to occur during use. It was found that when such mattresses are subjected to too great air pressure, either when inflated or when roughly handled (that is bent over and doubled), blow outs or rips or tears would occur between the sealed sheets at the terminating end portion of the sealing lines, whereby the mattresses would become damaged and lose their utility.

I have found that the cause or causes of failures in such mattresses can be greatly minimized by means of a novel sealing structure. Advantages of the novel sealing structure will clearly appear from the following description when taken in conjunction with the drawing in which:

Fig. 1 illustrates an air mattress showing an embodiment of the general use of the novel sealing structure of the invention;

Fig. 2 depicts a magnified view of the novel sealing structure shown in Fig. 1;

Fig. 3 is a cross section of the view shown in Fig. 2 taken along lines 3—3;

Fig. 4 which is similar to Fig. 2 is another embodiment of the novel sealing structure of the invention; and

Fig. 5 shows a prior art type of sealing structure in which failures are prone to occur.

Fig. 1 shows an air mattress embodying the invention indicated generally as **1**, comprising an inflatable body rest portion **2**, and, if desired, head rest portion **4** with air valves **3** and **5**, respectively. As viewed in the figure, the mattress is made of two sheets of flexible material one on top of the other sealed together peripherally at **6** to form the body rest portion, and peripherally at **7** to form the head rest portion. The mattress has a fin **2***b* of unjoined sheeting surrounding it. The flexible material is further joined by means of longitudinal sealing lines **8** which extend across the mattress as shown but which terminates short of peripheral seal **6** at **9**, the terminating end portion of the longitudinal sealing line in the particular embodiment shown comprising a tear drop configuration **10** (note Fig. 2) with a neck portion **11** and a rounded bulbous portion at **9**. The bulbous portion which is substantially two-dimensional is broader in width than the width of sealing line **8** into which it merges beyond neck **11**. Sealing lines **8** divide the mattress into compartments **2***a*.

A portion **12** of peripheral seal **6** is additionally configurated curvilinearly inwardly from said periphery opposite the tear drop portion of sealing line **8**, said curved peripheral portion being arcuately shaped with its peak substantially opposite the terminating end portion of line **8** and merging into peripheral seal **6** at **12***a* (note Figs. 2 and 3). The arcuate seal portion is preferably symmetrically located with respect to the axis of the longitudinal sealing line. Thus, an air connecting space or passageway **13** is provided between each compartment, said passageway being defined by smoothly curved lines, that is by the curvature of arcuate peripheral portion **12** and tear drop end portion **9**. It is preferred that the smoothly curved lines defining the passageway be convexed inwardly of said passageway. When these or similar conditions prevail, in the region of the air-connecting passageway, the end portion of the transverse seal is enabled to resist internal air pressure to a greater degree with a substantial decrease in the number of failures generally occurring in prior art structures.

Exemplifying this point further, reference is made to the fragmentary representation of a prior art seal structure shown in Fig. 5. This figure is similar to Fig. 2 with the exception that the peripheral seal **6***a* opposite the terminating end portion **9***a* of transverse sealing line **8***a* is not curved but, on the contrary, is straight. The end portion **9***a* is merely a continuation of **8***a* and does not have a broadened round portion as shown in Figs. 1, 2 and 4. Thus, the air-connecting passageway **13***a* (Fig. 5) is not bounded by curved lines. Hence, the mattress when inflated and subjected to internal air pressure at **9***a* generally tears and comes apart at this region during aggravated use with a consequent loss in utility.

The sealing structure shown in Fig. 4 is similar to that shown in Fig. 2 but differs in the arcuate configuration of the peripheral portion which is convexed at **12**, concaved at **12***b*, and is finally merged with peripheral seal **6** at **12***a*. This modified convex-concave seal structure cooperates further with the contour of tear drop **10** to minimize tearing or parting at end portion **9**, provided the curvature of the contour starting at neck **11** when extended, as shown by the dotted lines, merges continuously into the curved concaved portion **12***b* of the peripheral seal opposite it. This modification provides more even distribution of pull in the general area of passageway **13** due to air pressure with the further minimization of tears at end portion **9**. If air passageway **13** is found to be too small to permit relatively

rapid inflation and deflation of the mattress, holes 13*b* may be provided through seal walls 12 to act as auxiliary air passageways.

It is preferred when carrying out the invention that the peripheral seal be substantially free from sharp corners and that the four corners 14 of the mattress and the four corners 15 of the pillow be curved. It is also preferred that the width of the tear drop end portion of the transverse sealing line be substantially greater than the width of the sealing line itself. Thus, it is desirable that the width near the broadened and rounded end portion be at least 50% greater than the width of the sealing line. Widths double that of the line width have been found very successful.

It is also preferred that the peak of the arcuately shaped peripheral portion opposite the tear drop seal lie at least one-fourth of the distance of the space between the end 9 of the tear drop and the outermost distance of the peripheral seal, that is the peripheral seal designated as 6 in Figs. 2 and 4 into which the arcuate portion merges at 12*a*. Usually the peak will be halfway or more between the two, so long as the air connecting spaces between the compartments are defined by smoothly curved sealing lines. The span of the arcuate peripheral portion is generally at least four times the breadth of the tear drop.

Although the present invention has been described in conjunction with preferred embodiments, it is to be understood that modifications and variations may be resorted to without departing from the spirit and scope of the invention, as those skilled in the art will readily understand. Such modifications and variations are considered to be within the purview and scope of the invention and appended claims.

I claim:

1. In an inflatable air mattress of rib-like construction comprised of opposed sheets of heat-sealable flexible material sealed together airtight about their periphery and also sealed to each other along rib-like lines running across said mattress, each rib-like sealing line terminating short of the sealed periphery thereby leaving an air connecting passageway between it and the sealed periphery, the sealing lines defining compartments connected to each other via said passageways, the improvement wherein the terminating end portion of each sealing line is shaped as a tear drop with its rounded end portion substantially wider than the width of the sealing line from which it projects and wherein the portion of the sealed periphery opposite said rounded end portion is curved arcuately inwardly with its peak convexed and opposite said tear drop end portion, whereby each passageway is bounded on each side by a smoothly curved sealing line.

2. The improved air mattress as defined in claim 1 characterized in that the peripheral seal is substantially free from sharply sealed corners.

3. In an inflatable air mattress of rib-like construction comprised of opposed sheets of heat-sealable flexible material sealed together airtight about their periphery and also sealed to each other along rib-like lines running across said mattress, each rib-like sealing line terminating short of the sealed periphery thereby leaving an air-connecting passageway between it and the sealed periphery, the sealing lines defining compartments connected to each other via said passageways, the improvement wherein the terminating end portion of each sealing line is shaped as a tear drop with curved contour lines and with its rounded end portion substantially wider than the width of the sealing line from which it projects and wherein the portion of the sealed periphery opposite said rounded end portion is curved arcuately inwardly with its peak convexed and opposite said end portion, the curve on each side of the peak being concaved such that the contour lines of the tear drop if extended would merge continuously into said concaved portions, whereby each passageway is bounded on each side by a smoothly curved sealing line.

4. The improved air mattress of claim 3 characterized in that the peripheral seal is substantially free from sharply sealed corners.

5. In an inflatable air mattress of rib-like construction comprised of opposed sheets of flexible material sealed together airtight about their periphery and also sealed to each other along rib-like lines running across said mattress, each rib-like sealing line terminating short of the sealed periphery thereby leaving an air-connecting passageway between it and the sealed periphery, the rib-like sealing lines defining compartments connected to each other via said passageways, the improvement wherein a portion of the peripheral seal near the region of the air-connecting passageway is curved arcuately inwardly from the periphery.

6. In an inflatable air mattress of rib-like construction comprised of opposed sheets of heat-sealable flexible material sealed together airtight about their periphery and also sealed to each other along rib-like lines running across said mattress, each rib-like sealing line terminating short of the sealed periphery thereby leaving an air connecting passageway between it and the sealed periphery, the sealing lines defining compartments connected to each other via said passageways, the improvement wherein the terminating end portion of each sealing line is shaped as a tear drop with its rounded end portion at least 50% wider than the width of the sealing line from which it projects and wherein the portion of the sealed periphery opposite said rounded end portion is curved arcuately inwardly with its peak convexed and opposite said tear drop end portion, whereby each passageway is bounded on each side by a smoothly curved sealing line.

7. The improved air mattress of claim 6 characterized in that said arcuately curved portion of the sealed periphery opposite the tear drop has a span at least four times the breadth of said tear drop portion.

8. The improved air mattress of claim 7 characterized in that the peak of said arcuate portion lies at least one-fourth of the distance of the space between the end of said tear drop and the outermost distance of said peripheral seal.

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