Nov. 9, 1971 R. M. FERDINAND 3,618,146

BORDER STABILIZER

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Fig. 1.

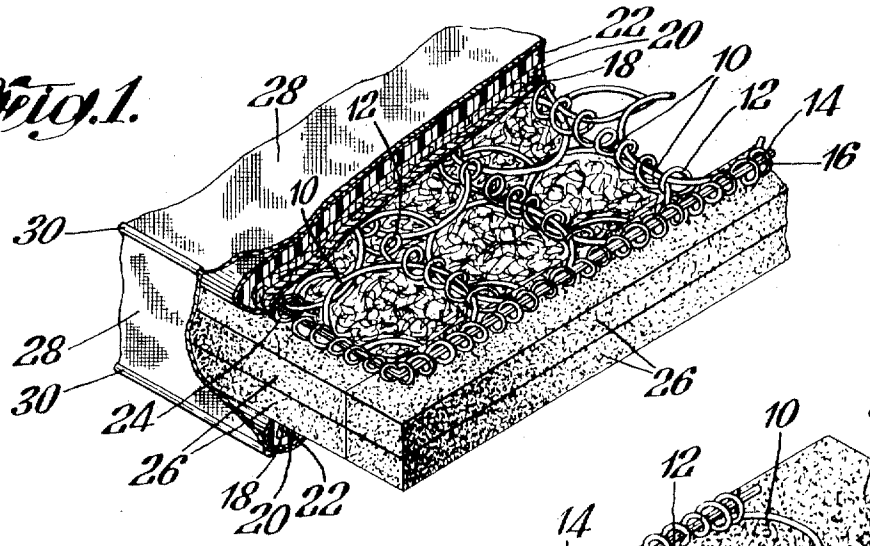


Fig. 2.

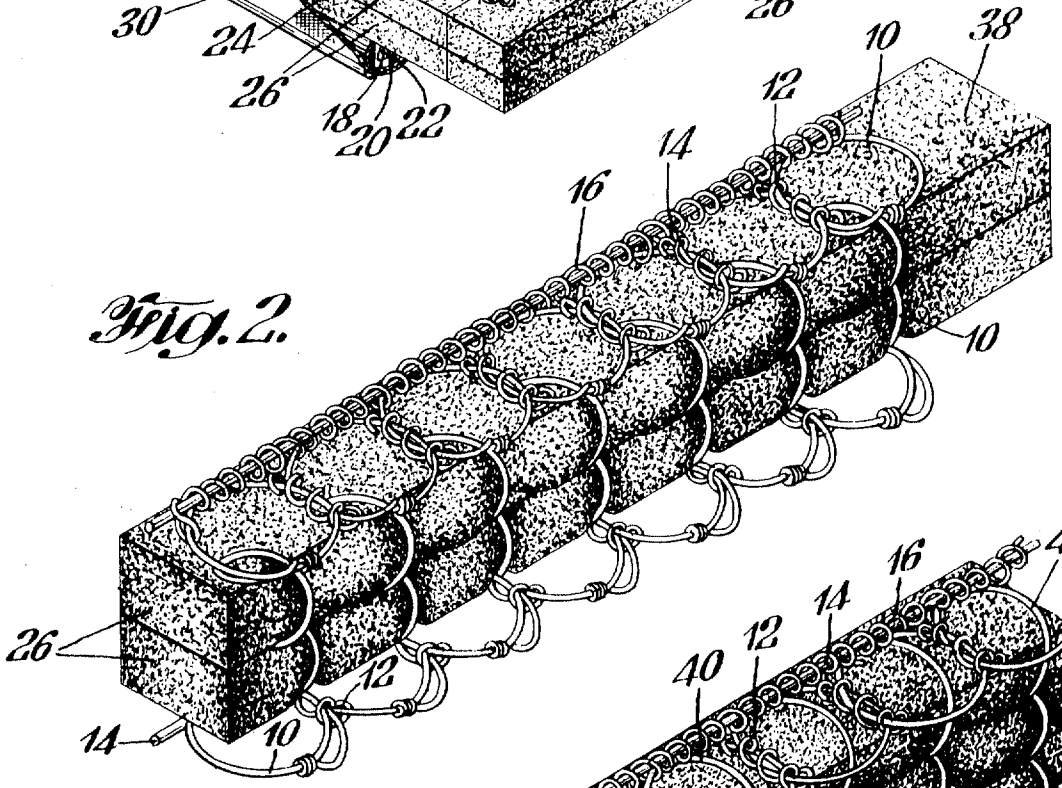
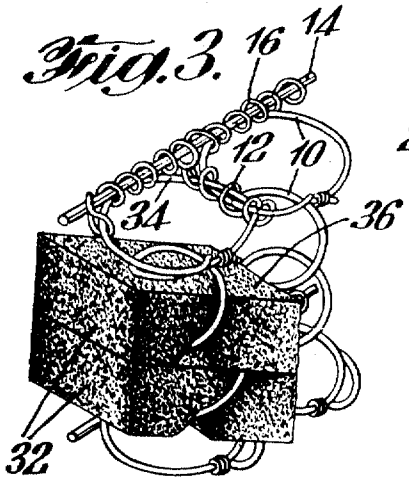


Fig. 3.



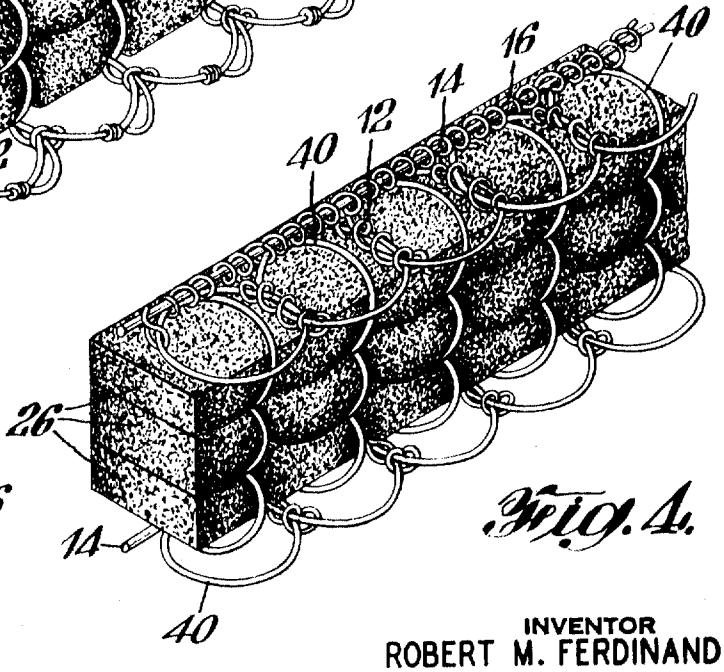


Fig. 4.

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Fig. 5.

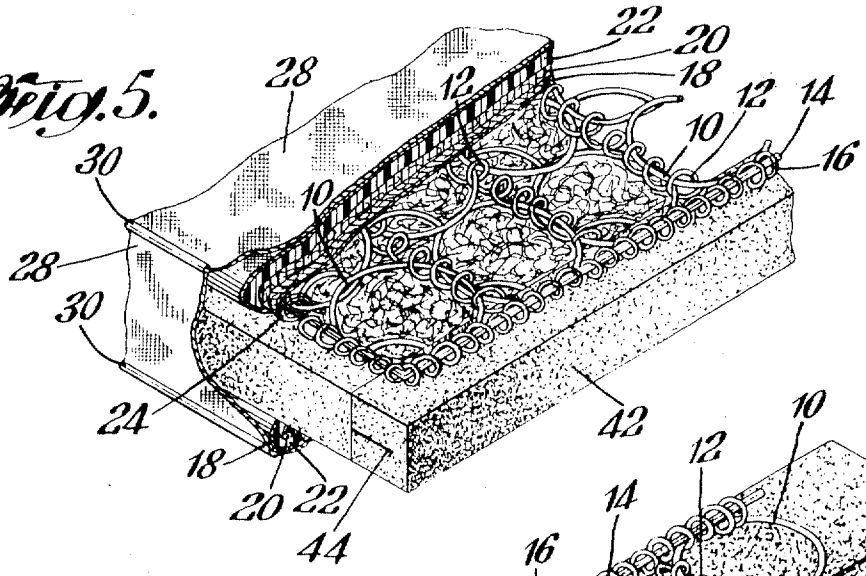


Fig. 6.

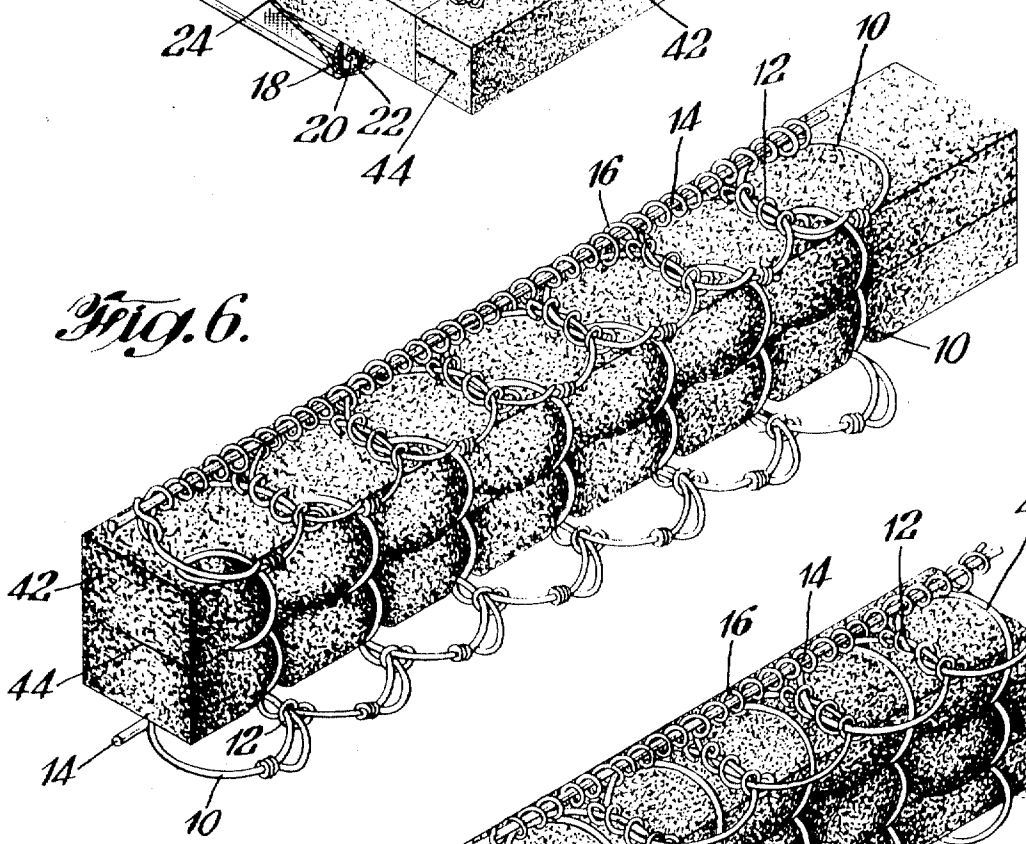


Fig. 7.

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BORDER STABILIZER

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Filed Apr. 24, 1969, Ser. No. 818,925

Int. Cl. A47c 23/04, 25/00

U.S. Cl. 5—351 15 Claims

ABSTRACT OF THE DISCLOSURE

A border stabilizer for inner spring mattresses, cushions, etc. is provided in a resilient foam strip inserted between adjacent convolutions of each of the coils in a peripheral row of coils in the spring assembly.

The edges of mattresses, box springs, seat cushions, upholstered items and the like are subject to added stresses and strains as compared to the main portions of the mattresses or the like. Because of this, special measures are necessary to resist sagging and stabilize the border of structures. When the construction of the item includes a plurality of coil springs tied together the most common form of border stabilizer is some type of flat wire spring or clip which is attached to upper and lower perimeter wires around the coil springs and thereby provides added stability and resistance to compression at the edges.

Typical stabilizers of this type are described in U.S. Pat. 2,974,326 to Ross, U.S. Pat. 2,709,819 to Wise and U.S. Reissue Pat. 25,742 to Martin. It has also been suggested to wrap a piece of foam rubber or the like around the perimeter of the mattress between the top and bottom perimeter wires of the spring structure to provide a smooth edge and to supply the additional resistance to compression of the foam strip. Such a stabilizer is described in U.S. Pat. 2,826,769 and while this type helps provide a smoother appearing edge for the mattress the foam itself does not sufficiently resist compression so as to materially stabilize the border.

I have now developed a new and improved border stabilizer which not only improves the edge appearance of the mattress and itself resists compression, but also reinforces and improves the compression resistance of the peripheral row of springs at the edge of the cushion, mattress or the like. The border stabilizer of my invention comprises at least one strip of resilient foam positioned along at least a portion of the outer side of a peripheral row of the coil springs of the mattress or cushion or the like. This resilient foam strip extends into the coils of the peripheral row between two adjacent convolutions of each of the coils.

In the drawing:

FIG. 1 is a partially sectioned view of a corner of a mattress, showing incorporation of a border stabilizer according to the invention consisting of two parallel strips of resilient foam.

FIG. 2 is a view of a portion of a peripheral row of coil springs with two resilient strips inserted between convolutions according to the invention.

FIG. 3 shows the attitude which pieces of foam assume if inserted between the convolutions of only one coil.

FIG. 4 is a view of a portion of a peripheral row of coil springs with three resilient strips inserted between convolutions according to the invention.

FIG. 5 is a partially sectioned view of a corner of a mattress showing incorporation of the border stabilizer according to the invention consisting of a single strip of resilient foam slit to fit over a convolution of the coils.

FIG. 6 is a view of a portion of a peripheral row of coil springs with a single strip of resilient foam having one slit fitted over the middle convolution of each coil.

FIG. 7 is a view of a portion of a peripheral row of coil springs with a single strip of resilient foam having two slits fitted over the two middle convolutions of each coil.

In the mattress embodying the invention shown in FIG. 1 a plurality of coil springs **10** are attached to one another by cross helical wires **12** to form a spring unit. The coil springs **10** around the perimeter of the unit are secured to the spring border wires **14** by border helical wires **16**. On top of the coil springs **10** is laid a latex-impregnated sisal pad **18**. On top of this goes a felt pad **20** and then a foam pad **22**. These pads **18**, **20** and **22** are greater in area than the spring unit and extend beyond the spring border wire **14**, being wrapped around the wire **14** and secured to convolutions of the peripheral coil springs **10** by hog rings **24**. On the opposite side of the spring unit identical pads **18**, **20** and **22** are laid on and secured in the same manner. Blocks or strips of resilient foam **26** according to the invention are inserted between the convolutions of the coil springs **10**. The whole unit is then covered with ticking **28** seamed at the edges **30**.

In FIG. 2 is shown a portion of the peripheral row of coil springs **10** from the mattress of FIG. 1. Two strips of resilient foam **26** have been inserted between the convolutions of the coil springs **10**. The strips **26** are of such thickness that they fit snugly between the convolutions and are held by the slant of the convolutions of the helical coils of the coil springs **10**.

This holding effect is illustrated in FIG. 3 where short pieces of resilient foam **32** have been inserted between the convolutions of a single coil spring **34**. The pieces of foam **32** follow the slant of the convolutions and the foam pieces **32** assume a position such that the surfaces **36** of the foam pieces **32** are at an acute angle to the plane of the spring border wire **14** which is the plane of the top surface of the spring unit. When however as in FIG. 2 a foam strip **26** is inserted between the convolutions of a plurality of adjacent coil springs **10**, the strip **26** is forced to a position where the plane of its top surface **38** is parallel to the plane of the top surface of the spring unit. Thus forced to a parallel position, the resilient foam strip **26** is tightly held by the convolutions of the coil springs **10**.

In FIG. 4 is illustrated the use according to the invention of three resilient foam springs **26** between the convolutions of the coil springs **40**. In the embodiment shown the coil springs **40** have been rotated 180° from the position of similar springs **10**, in FIG. 2, thereby permitting the foam strips **26** to be centered between the border wires **14**.

In FIG. 5 is illustrated a mattress embodying the invention wherein the conventional mattress elements, the coil springs **10**, cross helical wires **12**, spring border wire **14**, border helical wires **16**, sisal pad **18**, felt pad **20**, foam pad **22**, hog rings **24**, ticking **28** and edge seams **30** are identical to those in FIG. 1 and are assembled in the same sequence and manner. The resilient foam strip of this embodiment of the invention is slit strip **42** having longitudinal slit **44** which fits over the convolutions of the coil springs **40**.

In FIG. 6 is shown a portion of the peripheral row of coil springs **10** from the mattress of FIG. 5. The slit strip of resilient foam **42** is positioned with the convolutions of the coils **10** extending into the slit **44** and the portions of resilient foam on either side of the slit **44** extending between adjacent convolutions of the coils **10**. These portions are sufficiently thick so as to fit snugly between the convolutions and be held by the slant of the convolutions of the helical coils of the coil springs **10**.

In FIG. 7 is illustrated a doubly slit strip of resilient foam **46** having two parallel slits **44** which fit over con-

volutions of the coil springs **40**. These springs **40** have been rotated 180° from the position of similar springs **10** in FIG. 6 thereby permitting the foam strip **46** to be entered between the border wires **14**. The portion of the foam strip **46** between the slits **44** extends between the middle adjacent convolutions of the coil springs **40** while the portions on the other sides of the slits **44** are held by adjacent convolutions of the coil springs **40**. These portions of the foam strip **40** fit snugly between the convolutions and are held firmly by the slant of the convolutions of the helical coils of the coil springs **40**.

It will be seen that in the drawing the foam strips are all in the most preferred position of extending past the center lines of the coil springs **10** and **40**. While this is preferred the invention is operable as long as the foam strips or portions thereof extend far enough into the coils between the convolutions to permit the convolutions to bear on the foam strip when the coil springs are depressed. A major advantage of my invention is that it increases the resistance to compression of the spring coils in the peripheral row of the spring unit and thereby firms and stabilizes the edge of the mattress, cushion or the like. A further advantage is that the firming and stabilization is uniform along the entire edge where the foam strip is employed, and is not concentrated at intervals as in the case of the wire clips and flat springs previously employed.

The resilient foam used for the invention can be any suitable foam, such as foam rubber, latex foam, or polyurethane foam, which has sufficient tensile strength to resist tearing. The degree to which the foam will resist compression will depend on its density and degree of rigidity, which can be varied as desired.

An innerspring mattress was made up in the manner of the mattress illustrated in FIG. 5 except that a so-called "flexolator crown" was first placed on top of the coil springs in the center third of the spring unit. This flexolator consisted of spring steel wires 1¼ inches apart running from side to side in the center third and secured by hog rings. The mattress was full size, 53" x 75" and the spring unit contained 312 coils of 13 ga. wire with five convolutions per coil. A six pound cotton felt pad used over a 2.8 ounce per square foot latex-impregnated (one side) sisal pad. A ¾ inch urethane pad covered the felt pad. All materials extended 1½ to 2 inches over the perimeter border wires of the spring unit and were wrapped or flanged around the border wire and secured with hog rings. Between the identical top and bottom flanges at the sides of the mattress was a three inch space.

Into the three inch space was forced a 3 x 3 inch polyurethane foam strip which had a slit 2½ inches deep along its length. The slit was forced over the center convolutions of the perimeter coils and the portion of foam on either side were forced in past the center lines of the coils. The foam was a polyurethane foam of 1.5 lb. per cubic foot density cell count. The ticking, quilted on the top and bottom to ¼ inch foam was added and stitched to side panels of ticking to complete the mattress. The edges were taped and sewn in conventional manner.

The mattresses as described above were tested with a 275 pound octagonal roller 36 inches wide and 19 inches in diameter which was rolled back and forth from side to side of the mattress in the center thereof. The coils are thereby compressed and allowed to expand with each pass of the roller. This action simulates motion encountered in normal home use, but is greatly accelerated and abnormally severe at the roller edges. After 401,168 passes of the roller the mattress remained in relatively good condition with no broken coils and no appreciable setting of the innnerspring unit. The 3 x 3 inch polyurethane foam strip remained in its original position throughout the complete test. Some coil indentation into the foam strip was evidenced at the edge of the mattress in the roller path. The foam strip was in no way adversely affected by the test.

In order to more thoroughly test the ability of the foam strip to remain in place during use, a special test was run on a mattress identical in construction to that described about but of twin size, 38 x 75 inches, rather than full size. The same 36 inch wide 275 pound roller was used, but instead of being rolled across the mattress as in the conventional mattress test, the roller was rolled lengthwise of the mattress back and forth. Thus the full weight of the roller was borne by a much smaller mattress and the edges of the roller were just above the perimeter strips along three sides, thereby exerting maximum force to dislodge the strips. This abnormally severe non-standard test was discontinued after 204,000 passes of the roller had broken 7 coils and otherwise severely damaged the mattress as a whole. The 3 x 3 inch foam strips, however, remained in place around the perimeter of the spring unit, proving the ability of the strips to resist dislodgement.

The invention has been illustrated in combination with a bed spring covered with successive layers or pads of sisal, felt and foam. It is to be understood however that the invention is not limited to such a combination. The resilient foam strips of the invention can be used in the borders of any mattress, cushion, box spring or similar item having coil springs, regardless of the padding, covering or other structural details.

What is claimed is:

1. In a mattress or like device containing a plurality of coil springs, in combination therewith an improved border stabilizer comprising at least one strip of resilient foam positioned along at least a portion of the outer side of an outermost row of said coil springs, portions of said foam extending inwardly beyond the outer edges of said outermost coil springs into the area between two adjacent convolutions of each of said coil springs for a distance to at least the vertical center line of said coil springs.

2. In a combination according to claim **1** a border stabilizer wherein said strip of foam extends between said convolutions beyond the center lines of said coils.

3. In a combination according to claim **1** a border stabilizer comprising a single strip of resilient foam.

4. In a combination according to claim **3** a border stabilizer wherein said strip of foam extends between the two middle convolutions of each of said coil springs.

5. In a combination according to claim **3** a border stabilizer wherein said strip of foam extends between the top or bottom convolution of each of said coil springs and the convolution immediately adjacent thereto.

6. In a combination according to claim **1** a border stabilizer comprising two parallel strips of resilient foam.

7. In a combination according to claim **6** a border stabilizer wherein said two strips of foam extend respectively into the two spaces between the middle convolution of each of said coil springs and each of the convolutions immediately adjacent thereto.

8. In a mattress or like device containing a plurality of coil springs, in combination therewith an improved border stabilizer comprising at least one strip of resilient foam positioned along at least a portion of the outer side of a peripheral row of said coil springs and extending between two adjacent convolutions of each of the coil springs in said portion of said peripheral row in which the border stabilizer comprises two parallel strips of resilient foam, wherein said two strips of resilient foam extend respectively into the two spraces between the top convolution of each of said coil springs and the convolution immediately adjacent thereto and the bottom convolution of each of said coil springs and the convolution immediately adjacent thereto.

9. In a matteress of like device containing a plurality of coil springs, in combination therewith an improved border stabilizer comprising at least one strip of resilient foam positioned along at least a portion of the outer side of a peripheral row of said coil springs and extending between two adjacent convolutions of each of the coil

springs in said portion of said peripheral row, the border stabilizer comprising three parallel strips of resilient foam.

10. In a mattress or like device containing a plurality of coil springs, in combination therewith an improved border stabilizer comprising at least one strip of resilient foam positioned along at least a portion of the outer side of a peripheral row of said coil springs, said foam strip having a longitudinal slit along one side cut into but not completely through said strip, a convolution of each of said coil springs extending into said slit and the foam portion on either side of said slit extending between said convolution and the convolution immediately adjacent thereto at least as far as the center lines of said coils.

11. In a combination according to claim **9** a border stabilizer wherein said foam portions on either side of said slit extend between said convolutions beyond the center lines of said coils.

12. In a combination according to claim **10** a border stabilizer wherein the coil convolution extending into said slit is the middle convolution of each coil.

13. In a combination according to claim **10** a border stabilizer wherein the coil convolution extending into said slit is the convolution of each coil adjacent to an end convolution.

14. In a combination according to claim **10** a border stabilizer wherein said foam strip has two longitudinal slits along one side cut into but not completely through

said strip, two adjacent convolutions of each of said coil spring extending into said two slits, the portion of foam between said slits extending to the space between said two adjacent convolutions and the portions of foam on the other sides of said slits extending into the spaces between said two adjacent convolutions and the two convolutions immediately adjacent thereto.

15. In a combination according to claim **10** a border stabilizer comprising two parallel strips of foam each containing said slit, the convolution adjacent to the top convolution of each coil extending into the slit of one strip and the convolution adjacent to the bottom convolution of each coil extending into the slit of the other strip.

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U.S. Cl. X.R.

5—260, 309