United States Patent [19]

Ciampa et al.

[11] **3,858,862**

[45] **Jan. 7, 1975**

[54] **SPRING AND SLAT ASSEMBLY**

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[73] Assignee: **Standard Box Spring Company,** East Boston, Mass.

[22] Filed: **Aug. 6, 1973**

[21] Appl. No.: **386,051**

[52] **U.S. Cl.** **267/100,** 5/248, 5/263

[51] **Int. Cl.** **A47c 23/02,** A47c 23/04

[58] **Field of Search** 5/256, 263, 264, 265, 351, 5/210, 247, 248, 269; 297/456, 102; 267/100, 110; 29/453

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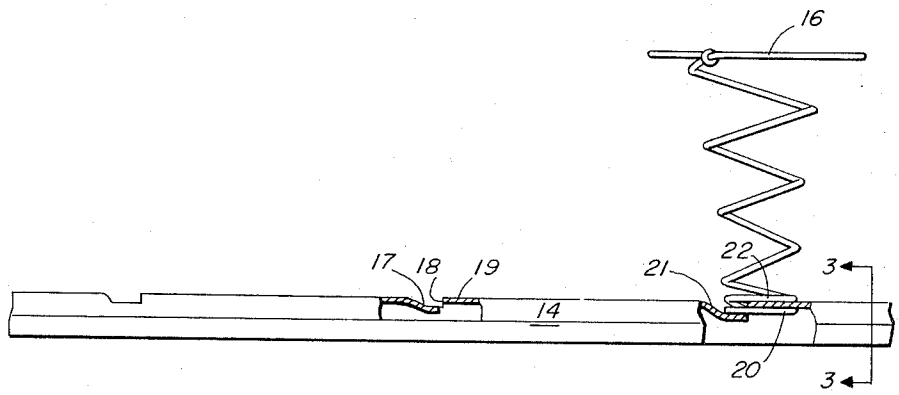
Primary Examiner—Casmir A. Nunberg

Attorney, Agent, or Firm—William L. Ericson

[57] **ABSTRACT**

A metal slat for use in the bottom frame of a box spring has a plurality of slots formed therein. Each slot is defined by a recess having a surface inclined to the upper surface of the slat and a lip. The lowest convolution of a coil spring or the bight of a saddle spring is forced into the slot. The inclined surface of the recess prevents the spring from moving out of the slot once received.

8 Claims, 14 Drawing Figures



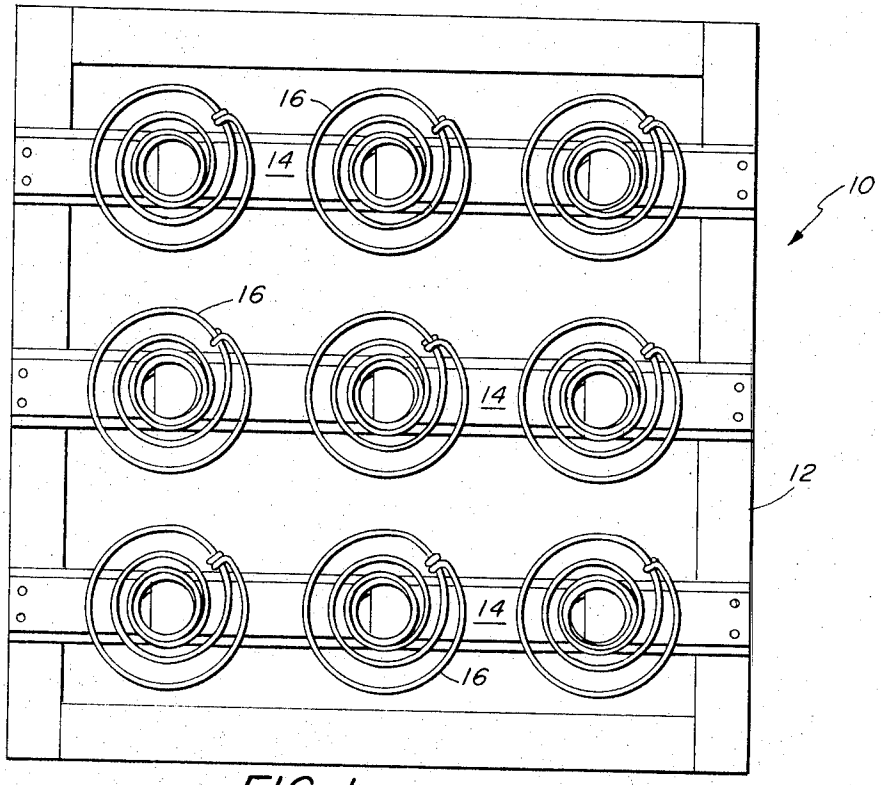


FIG. 1

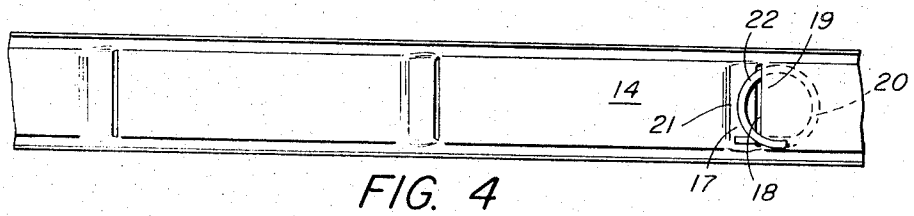


FIG. 4

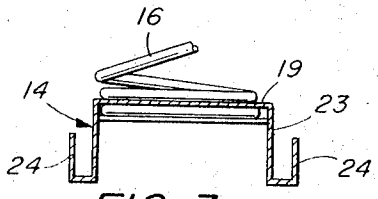


FIG. 3

FIG. 2

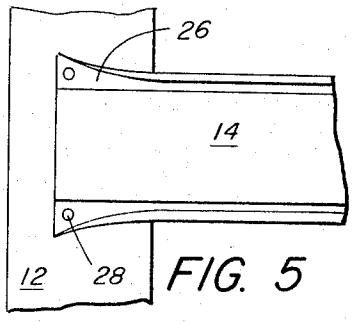


FIG. 5

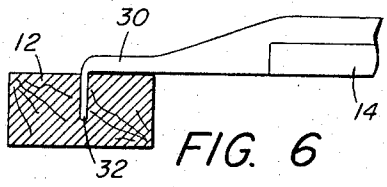


FIG. 6

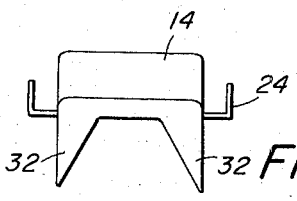


FIG. 7

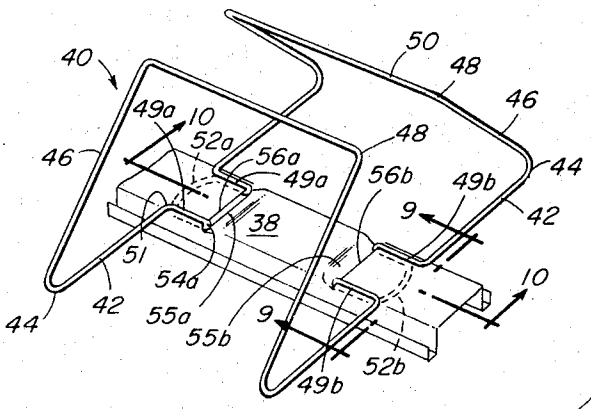


FIG. 8

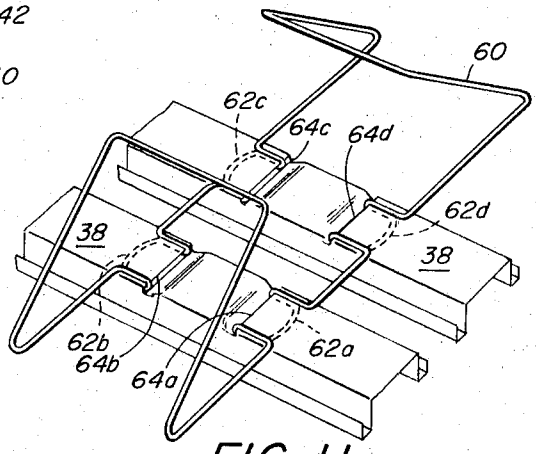


FIG. 11

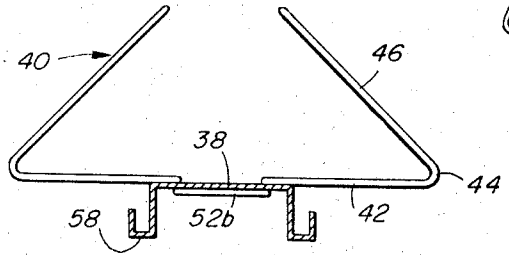


FIG. 9

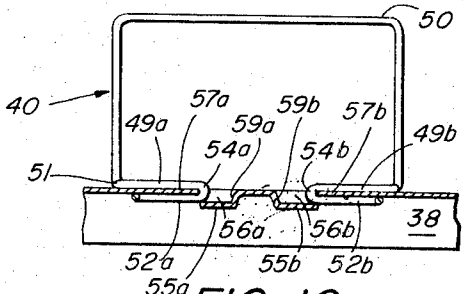


FIG. 10

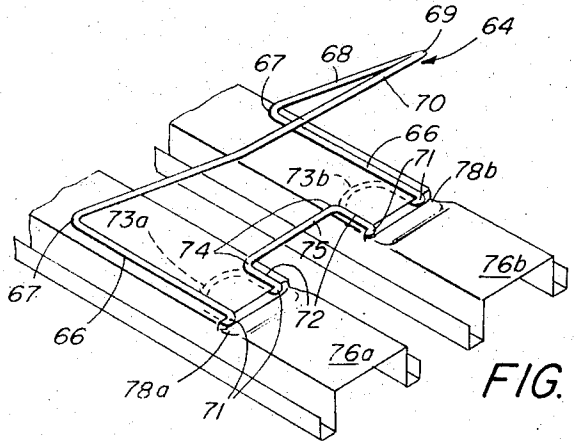


FIG. 12

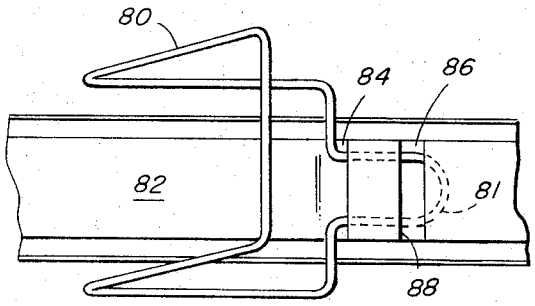


FIG. 13

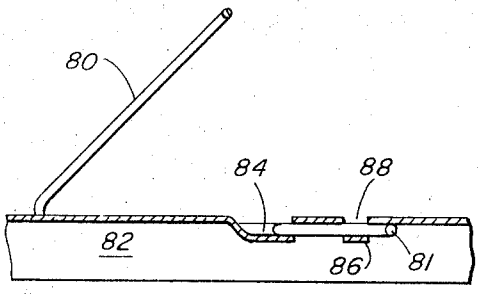


FIG. 14

SPRING AND SLAT ASSEMBLY

BACKGROUND AND BRIEF SUMMARY OF THE INVENTION

Box springs, such as used in the furniture industry, generally comprise a bottom frame having longitudinal beams and transverse slats, a top mat, and compression springs. The compression springs are secured at one end to the traverse slats and at the other end to the mat.

One method employed to secure compression springs, either coil springs or saddle springs, to a slat is to nail the spring to the slat at spaced intervals. The slat may be marked where the spring is to be nailed and the spring manually held in place and nailed to the slat.

Saddle springs may be secured to the slats of a frame by forming bights in the transverse bottom leg of the saddle spring. A disc is received in and engages the bight. The disc is nailed to the slat. This method of securing saddle springs to the slats is described in U.S. Pat. No. 3,681,794, issued Aug. 8, 1972.

Another method employed to secure the coil springs to the slats is to pass the lowest convolution of a coil spring through apertures in the slats (see for example U.S. Pat. No. 2,841,209, issued July 1, 1958; U.S. Pat. No. 2,054,868, issued Sept. 22, 1936; and U.S. Pat. No. 2,096,435, issued Oct. 19, 1937). In some embodiments a traverse wire is woven through the engaged convolution and the slat to provide stability to the spring coil. This general method of assembly is time-consuming, and does not satisfactorily lend itself to automation.

This invention concerns an improved slat to receive and securely hold compression springs and the method of assembling the same. The invention, in its preferred embodiment, includes a channel-like slat having a plurality of slots formed in the upper surface. Each slat is defined by a lip and a recess. The recess extends downwardly from and terminates below the upper surface of the slat; and further, at least a portion of the recess lies in a plane which is inclined to the plane of the upper surface of the slat. This inclination may form any angle with the upper surface, whether acute, right, or obtuse.

To secure a coil spring to the slat, the lowest convolutions are deflected to avoid interfering contact with the inclined surface, and are inserted in the slot. After insertion, the coil is restored to its normal undeflected form and will remain secured in the slot. The inclined surface of the recess will interfere with or prevent its movement out of the slot. No additional structure is required to hold the coil securely to the slat.

To secure a saddle spring to the slat, a bight formed with reverse U-bends is inserted into the slot while the bight is deflected. After the bight has been inserted, it is released to its undeflected form. The inclined surface of the recess interferes with or prevents the movement of the bight ou of the slot.

For saddle springs which have forward bights, such as shown in U.S. Pat. No. 3,681,794, a second slot spaced apart from the first slot is formed in the slat. The bight is inserted into both the first and second slots.

Another aspect of the invention provides a tubular slat having at least two apertures on either side. The end of the lowest convolution of a coil spring is threaded through all four apertures, such as by a twisting motion.

The slats of the present invention with the preformed slots eliminate the necessity of separately marking the slat to locate the position where the spring is to be secured. The slots function as a jig to locate the springs at the proper locations along the slat. Further, the slat allows the securing of the springs to the slat to be automated.

Whether a tubular slat or channel-like slat is used, the ends of the slat may be flattened and formed into claws, which claws may be driven into the longitudinal beams of the bottom frame.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a plan view of one embodiment of the invention, showing coil springs secured to slats in a bottom frame;

FIG. **2** is a side partially sectional view of a coil spring and a slat of FIG. **1**;

FIG. **3** is an end view of the slat of FIG. **2**, taken along lines **3—3** of FIG. **2**;

FIG. **4** is a plan view of FIG. **2**;

FIG. **5** is a partial plan view of the end of a slat secured to the bottom frame;

FIG. **6** is a front partially sectional view of a claw-like end of a slat received in the bottom frame;

FIG. **7** is an end view of FIG. **6**, less the bottom frame;

FIG. **8** is an isometric view of a saddle spring secured to a slat;

FIG. **9** is an end, partially sectional view of FIG. **8**, taken along line **9—9** of FIG. **8**;

FIG. **10** is a side, partially sectional view of FIG. **8**, taken along line **10—10** of FIG. **8**;

FIG. **11** is an isometric view of a multiple-slat saddle spring secured to two slats;

FIG. **12** is an isometric view of a half saddle spring secured to a slat;

FIG. **13** is an isometric view of a half saddle spring secured to a multi-slotted slat;

FIG. **14** is a side, partially sectional view of the saddle spring and slat of FIG. **13**;

FIG. **15** is a side partially sectional view of a coil spring secured to a tubular slat having claw-like ends; and

FIG. **16** is a top plan view of the slat and end of FIG. **16**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to FIG. **1**, a plurality of channel-like transverse slats **14** embodying the preferred embodiment of the invention are fastened to longitudinal beams **12**. Spring coils **16** are secured to the slats **14** in spaced relationship.

As shown in FIGS. **2**, **3** and **4**, the slat **14** includes recesses **17** extending downwardly and terminating below and spaced apart from the upper surface; and lips **19**, lying in the plane of the upper surface of the slat. Each recess includes a surface **21** inclined to the plane of the upper surface. The recesses **17** and the lips **19** define the slots **18**. To insert the coil **16** into the slot, the lowest convolutions **20** and **22** of the coil are deflected and the lowest convolution **20** inserted into the slot. This deflection is achieved by forcing the spring to enter the slot until it reaches the illustrated position. After insertion the coil is elastically restored to its undeflected form. The inclined surface **21** prevents the coil, when the lower convolutions are in normal undeflected form, from moving out of the slot **18**. If it becomes necessary

to remove the coil spring **16** because of some discovered defect, the lower convolutions **20** and **22** must be deflected with a screwdriver or other tool to avoid interfering contact with the inclined surface **21**, before the coil can be removed from the slot.

As shown most clearly in FIG. **3**, the slat **14** includes side walls **23** and stiffening flanges **24**.

The ends of the slats **14** may be formed in various ways in order to secure them to the traverse beams **12**. In FIG. **5**, the end of the slat **14** is flattened at **26** and is secured to the beam **12** by nails **28**. In FIG. **6**, the slat **14** has been flattened at **30** and shaped into claws **32**, which are driven into the beam **12**. FIG. **7** is an end view of FIG. **6** without the beam **12**, illustrating a preferred shape of the claws **32**.

In FIGS. **8**, **9**, and **10**, a saddle spring **40** is secured to a channel-like slat **38**. The saddle spring **40** includes parallel bottom legs **42**, and upwardly and inwardly sloping side legs **46** connected to the bottom legs by curved portions **44**. Transverse top legs **50** are connected to the side legs **46** by curved portions **48**. Legs **49** *a* and *b*, parallel to the top legs **50**, are secured to the bottom legs **42** by curved portions **51**. Reverse bights or convolutions **52** *a* and *b* are secured to the legs **49***a* and *b* by reverse U-shaped bends **54***a* and *b*. As shown most clearly in FIG. **10**, the slat **38** includes two recesses **55***a* and *b* which extend downwardly from the upper surface of the slat in opposite directions and terminate below the plane of the upper surface and spaced apart therefrom. The recesses **55***a* and *b* include surfaces **59***a* and *b* which are inclined to the plane of the upper surface of the slat **38**. Lips **57***a* and *b* lying in the plane of the upper surface define, with the recesses **55***a* and *b*, slots **56***a* and *b*. To secure the spring **40** to the slat **38**, the bights **52***a* and *b* are deflected to avoid interfering contact with the inclined surfaces **59***a* and *b* and inserted in the slots **56***a* and *b*. After insertion into the slots **56***a* and *b*, the bights **52***a* and *b* are released to undeflected form. The inclined surfaces **59***a* and *b* prevent the movement of the bights **52***a* and *b* out of the slots **56***a* and *b*.

In FIG. **11**, a multiple-slat saddle spring **60** is secured to two adjacent slats **38**. Bights **62***a*, *b*, *c*, and *d* are received in slots **64***a*, *b*, *c*, and *d* in the manner as described for the slat and saddle spring combination of FIGS. **8**, **9**, and **10**.

A half saddle spring **64** is shown in FIG. **12** and includes two parallel bottom legs **66**, two upwardly and forwardly directed parallel side legs **68** secured to the bottom legs **66** by curved portions. A top leg **70** transverse to the bottom legs **66** is secured to the side legs **68** by curved portions **69**. The outer sides of reverse bights **73***a* and *b* are secured to the bottom legs **66** by reverse U-shaped portions **71**. The inner sides of the bights **73***a* and *b* are secured to parallel legs **72**, which legs are parallel to the bottom legs **66**, by reverse U-shaped portions **71**. Transverse leg **75** is secured to the legs **72** by the curved portions **74**. Slats **76***a* and *b* include slots **78***a* and *b* dimensioned as described for the prior embodiments. The bights **73***a* and *b* are received in slots **78***a* and *b*.

A slat **82**, FIGS. **13** and **14**, includes a first slot **84**, dimensioned as described for the prior embodiments. A recess **86** is formed in the slat **82** and lies in a plane substantially below the plane of the upper surface of the slat **82**. The recess **86** in combination with the slat **82** defines a slot **88**, most clearly shown in FIG. **14**. A half saddle spring **80**, which includes a forward bight **81**, is received in both the slots **84** and **88**.

The inclined surface of the recess which prevents the movement of the compression spring out of the slot once inserted has been shown and described in FIGS. **1–14** as lying in a plane which is at an acute angle to the plane of the upper surface of the slat. The inclined surface may be at any angle, acute, right or obtuse, to insure that once a spring is inserted into the slot and is in normal undeflected form, the indexed surface will interfere with its removal from the slot. Any structure which will accomplish this junction may be employed. For example, rather than form the inclined surface from the upper surface of the slat, a separate piece could be secured to the lower surface of the slat to provide the inclined surface.

Having described the invention, what is now claimed is:

1. A slat-spring assembly which comprises:

at least one compression spring having a lower convolution of predetermined height and width;

a slat having an upper surface and a parallel lower surface, said slat being formed with a recess portion and a lip portion defining a slot therebetween, said recess portion extending downwardly from said upper surface and terminating below said lower surface and being spaced apart therefrom, at least a portion of the surface of said recess portion which adjoins said upper surface being inclined thereto;

said slot having a cross-sectional height and width sufficient to receive said lower convolution of said spring by a translatory movement thereof accompanied by elastic deformation of said lower convolution, said inclined surface portion interfering with removal of said lower convolution in a relaxed, undistorted condition from said slot.

2. The assembly of claim **1**, wherein said compression spring is a coil spring having a plurality of convolutions, and the lowest convolution of said coil spring is inserted into said slot into contact with said lower surface of said slat and said recess portion, and the next lowest convolution of said coil spring contacts said upper surface of said slat.

3. The assembly fo claim **1**, wherein said compression spring comprises a saddle spring having a lower convolution comprising a bight formed on a bottom transverse leg thereof, and said bight is received in said slot.

4. The assembly of claim **3**, said slat including a second recess portion and a second lip portion formed in said slat and defining a second slot therebetween, said second recess portion extending downwardly from said upper surface and terminating below said lower surface in spaced-apart relation thereto, at least a portion of the surface of said recess portion which adjoins said upper surface being inclined thereto;

said saddle spring including lower convolutions comprising first and second bights of predetermined height and width, said slots having crosssectional heights and widths sufficient to receive said bights of said spring by translatory movements thereof accompanied by elastic deformation thereof, said inclined surface portions of said first and second recess portions interfering with removal of said bights in a relaxed, undistorted condition from said slots.

5. The assembly of claim 4, said second recess extending in a direction opposite the direction in which said recess of said first slot extends.

6. The assembly of claim 3, said slat including a second recess portion spaced apart from said first recess portion, said second recess portion extending below said lower surface and defining a second slot therewith, said bight of said saddle spring being received in both said slots.

7. The assembly of claim 1, wherein the ends of said slat are flattened.

8. The assembly of claim 7, wherein said flattened ends are formed with claw portions extending at an angle to the length of said slat.

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