United States Patent

Ciampa et al.

[15] **3,681,794**

[45] **Aug. 8, 1972**

[54] **BOX SPRING AND METHOD OF ASSEMBLY**

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[22] Filed: **Dec. 14, 1970**

[21] Appl. No.: **97,727**

[52] **U.S. Cl.**.....**5/247**

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

[58] **Field of Search**.....5/247, 351

[56] **References Cited**

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158,413	1/1875	Hatch	5/247
3,414,915	12/1968	Ciampa et al.	5/351
3,546,723	6/1968	Ciampa et al.	5/247

FOREIGN PATENTS OR APPLICATIONS

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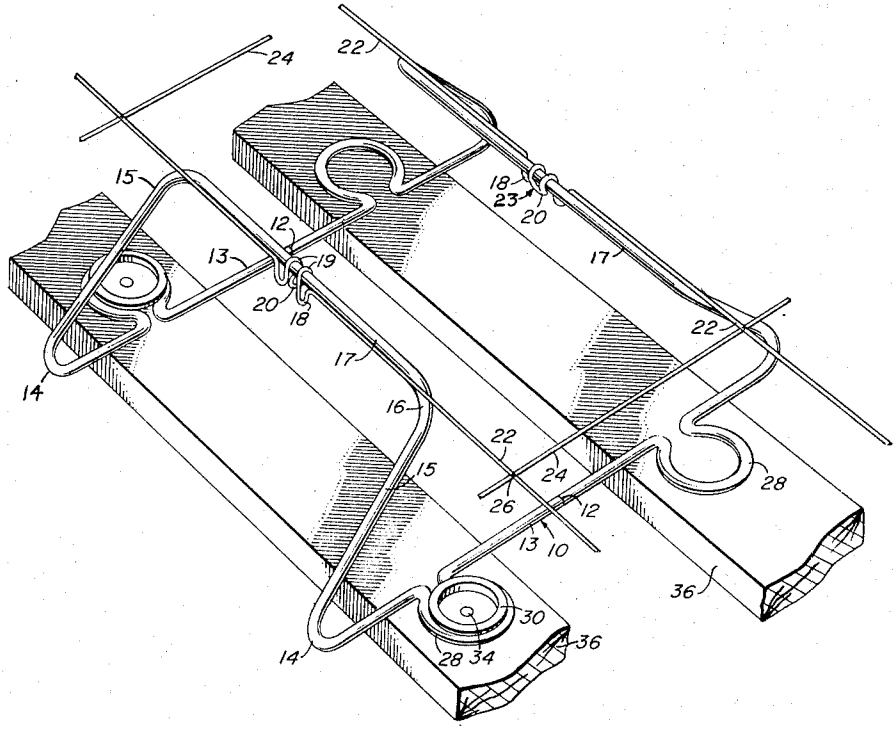
Primary Examiner—Paul R. Gilliam
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[57] **ABSTRACT**

A box spring includes a top mat comprising two groups of wires welded in right-angular relation, and a border frame. The box spring also includes a number of saddle-shaped springs, each of which has parallel bottom legs extending into upwardly sloping legs, and top transverse legs which connect each pair of the upwardly sloping legs together. One of the groups of wires in the top mat is formed with return bends which provide channels originally open toward the lower surface of the mat. The transverse top legs of the springs are received in these channels and secured by upsetting the channels. The channels are spaced apart in the top mat at distances equal to the desired spacing between the top transverse legs of the saddle springs; the top mat thus forms a jig for positioning the saddle springs during assembly of the box spring.

The bottom legs of the saddle springs may be attached to a wood bottom frame by means of disk fasteners which are received in loops formed in these legs.

9 Claims, 9 Drawing Figures



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SHEET 1 OF 3

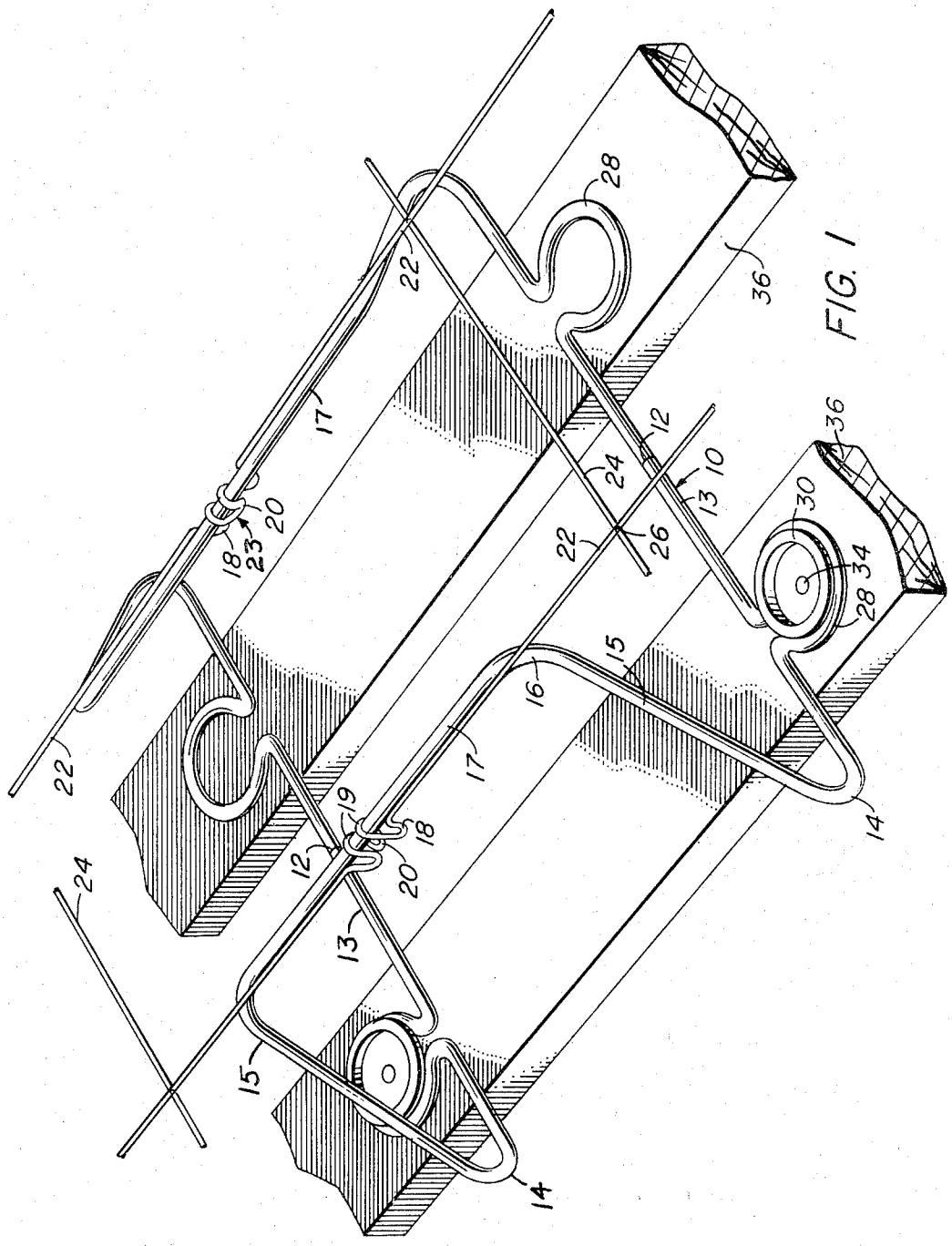


FIG. 1

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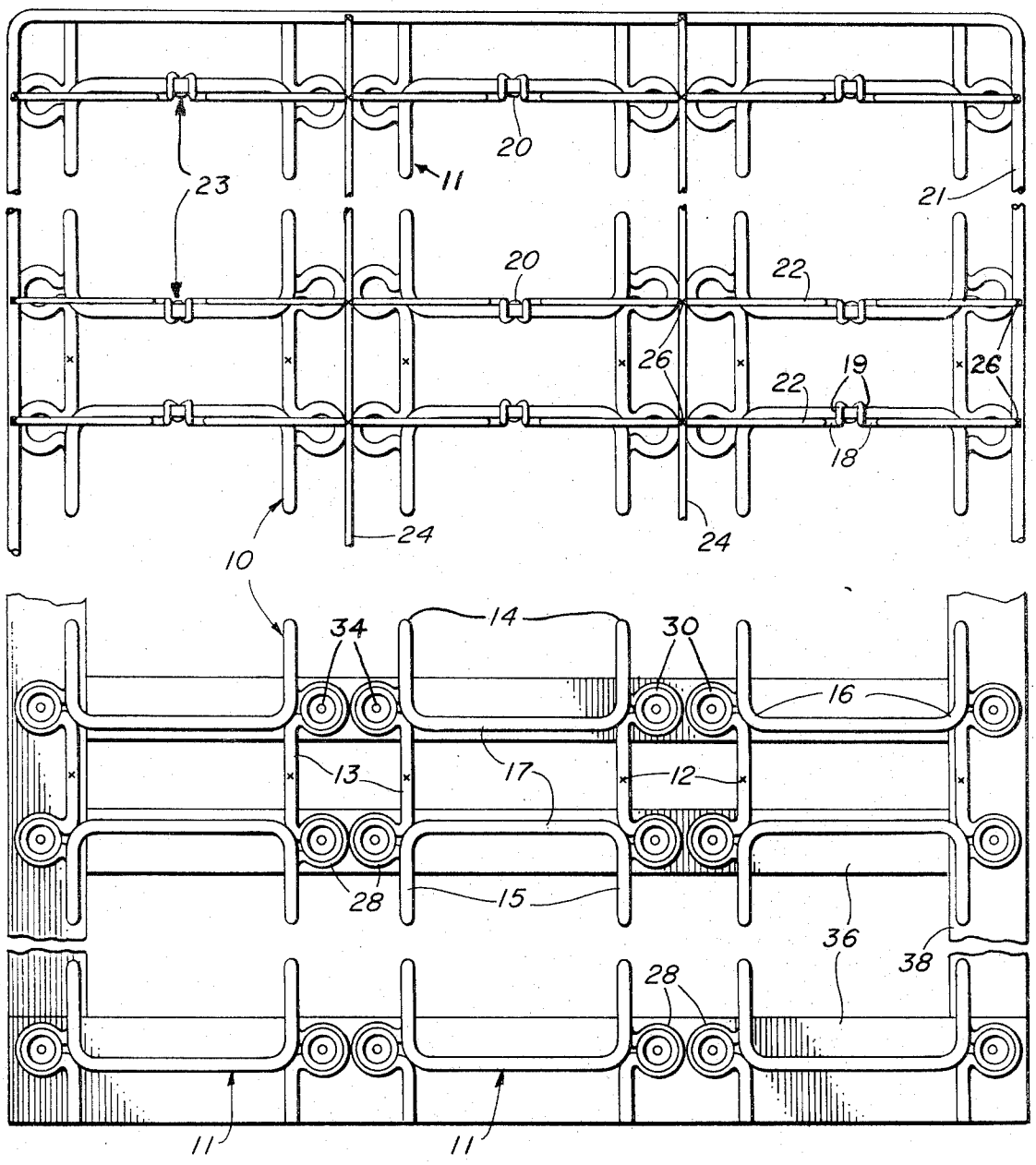


FIG. 2

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FIG. 5

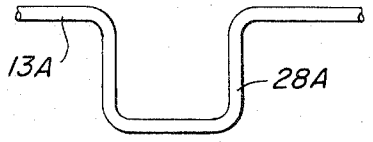


FIG. 6

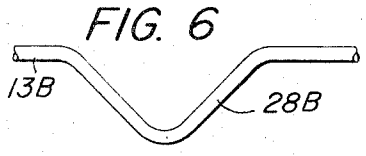


FIG. 4

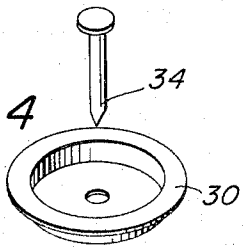
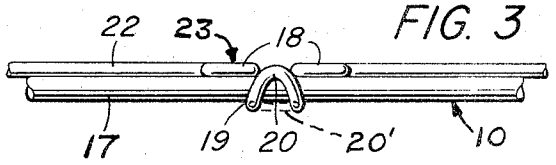


FIG. 3



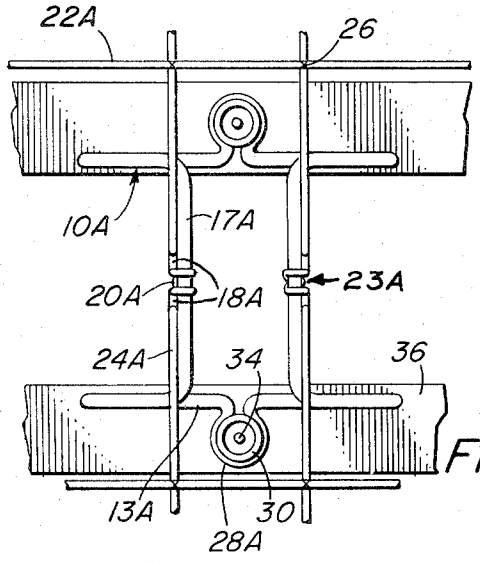
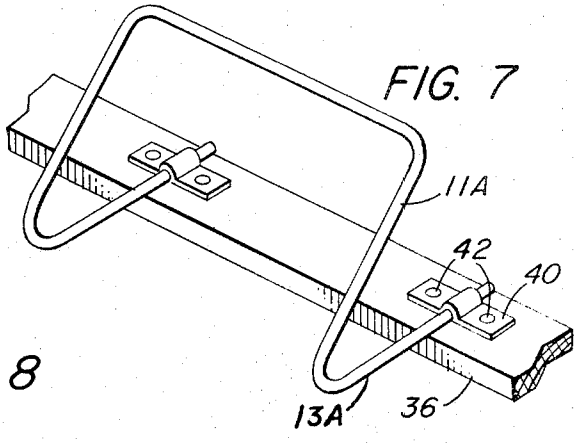


FIG. 8

FIG. 7



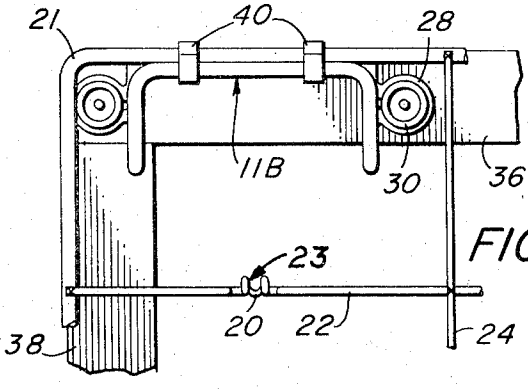


FIG. 9

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BOX SPRING AND METHOD OF ASSEMBLY

BACKGROUND AND BRIEF DESCRIPTION OF THE INVENTION

The present invention concerns an improvement on the invention of our co-pending U . S. Pat. application Ser. No. 735,453, filed June 7, 1968, entitled "Box Spring" which will issue as U. S. Pat. No. 3,546,723 on Dec. 15, 1970. That application relates to a box spring incorporating saddle-shaped springs which have parallel bottom legs extending into upwardly sloping legs, and transverse top legs interconnecting parallel pairs of the upwardly sloping legs. The bottom legs lie in a common plane and are attached to a wood bottom frame, while to top legs lie in a common plane parallel to the bottom legs, but extend transversely to the bottom legs. The application shows a top mat composed of crossed groups of transverse and longitudinal wires which are welded to one another at their intersections, and also to a border wire. The saddle springs are attached to the wires of the top mat by individually-attached wire clips, which must be fastened manually. The springs are secured to the wood bottom frame by staples which must also be manually and individually attached. This requires a considerable amount of time and dexterity.

It is the general object of the present invention to provide an improved box spring of a kind which incorporates saddle-shaped springs, and an improved method of assembling such a box spring which reduces the labor required, yet affords a firm structure in which the saddle springs are securely held in place. Further objects and advantages will appear as the following description proceeds.

Our copending U. S. Pat. No. 3,577,574, which issued May 4, 1971 for "Spring Assembly for Furniture and Method of Assembly," discloses and claims a method for assembling coil springs into a box spring. A top mat is first formed by welding two crossed groups of parallel wire to one another, and to a border wire. The wires of at least one group are spaced apart a distance equal to the diameter of the top turns of the coil springs, and are formed with return bends that provide channels initially open toward the bottom surface of the mat. The top mat constitutes an assembly jig; it is inverted, and the coils are simply placed in the prepositioned channels, after which the coils are locked in place by bending the channels. Assembly of the box spring is completed by attaching the free ends of the coils to a wood bottom frame. The method avoids the need for individual attachment of clips to secure the coils; indeed, the assembly can be carried out by automatic machinery.

According to the present invention, a top mat of welded construction is formed with channels arranged to provide a jig for positioning and assembly of saddle-shaped springs. The individual springs include parallel bottom legs each extending into an upwardly sloping leg, and parallel pairs of the upwardly sloping legs are interconnected by transverse legs. The saddle springs may initially be formed in halves, each including only one pair of bottom legs and one pair of upwardly sloping legs, joined by a single transverse leg. These half-saddle springs may be used in their original form at one or both borders of the box spring, but are joined in pairs to form full-saddle springs for use in the remainder of the box spring. Two halves are assembled

by welding the free ends of their bottom legs together to form a pair of parallel elongated bottom legs. The full saddle spring then has two pairs of oppositely-inclined sloping legs, and two parallel transverse top legs. By spacing one group of wires of the top mat apart a distance substantially equal to the gap between these top legs, the channels in these wires are automatically spaced the correct amount to receive both top legs.

To assemble the spring, the top mat is inverted and the required number of the full saddle springs and half saddle springs are placed in the appropriate channels of the top mat, which thus serves as a jig for correctly positioning the springs automatically. The channels are then bent to lock the springs firmly in place.

While the bottom legs of the saddle springs may be attached by staples or other individually-attached fasteners to the wood bottom frame, another feature of the invention concerns an improved means of completing this part of the assembly. According to this feature, we bend the bottom legs of the saddle springs to form partial loops which extend transversely from the bottom legs. We insert in each of these loops a recessed disk such as is described and claimed in our prior U. S. Pat. No. 3,414,915, issued Dec. 10, 1968, entitled "-Bottom Construction for Box Springs." Each of these disks has a preformed opening in the center for receiving a nail, and the nails can readily be driven into the wood bottom frame by automatic machinery such as is described and claimed in our U. S. Pat. No. 3,538,573, issued Nov. 10, 1970, entitled "Device For Automatic Assembly of Box Springs."

DESCRIPTION OF THE DRAWINGS

FIG. **1** is a fragmentary view in perspective of a first embodiment of our improved box spring;

FIG. **2** is a fragmentary plan view of the complete box spring, in which the upper portion shows only the top parts of the box spring, and the lower portion shows only the bottom parts, for the sake of increased clarity;

FIG. **3** is a fragmentary plan view showing the details of channel means which lock the top mat to the saddle springs;

FIG. **4** is a view in perspective of a disk fastener used with the bottom frame;

FIGS. **5** and **6** show two alternative form of loops which may be formed in the bottom legs of the saddle springs for purposes of attachment to the bottom frame;

FIG. **7** is a fragmentary perspective view showing a modified form of half-saddle spring, with alternative means of attachment to the bottom frame;

FIG. **8** is a fragmentary plan view showing a modified form of full saddle spring and means for attachment to the bottom frame, and

FIG. **9** is a fragmentary plan view showing a modified assembly in which half-saddle springs are attached directly to the border wire of the top mat.

Referring to FIGS. **1–4**, a first form of the improved box spring includes a top mat comprising a first group of parallel wires **22** extending laterally, a second group of parallel wires **24** extending longitudinally, and a rectangular wire border frame **21**. Each of the wires **22** is first formed with a series of channels generally designated **23**, which are spaced longitudinally of the wire. These channels preferably consist each of bights

18 which lie in a common plane, (best seen in FIG. 3), transverse bends 19 which project laterally from the common plane, and a central bight 20 which initially extends parallel to the common plane of the bights, as shown in dotted lines at 20' in FIG. 3. The bights provide channels 23 which, in the assembled top mat, are all initially open in a common direction normal to the plane of the top mat, i.e. downwardly from the plane of the paper in FIG. 2.

The wires 24 are fed lengthwise onto a plane surface in parallel relation, and the wires 22, having the preformed channels 21, are laid across them in parallel rows with all the channels open upwardly. The border frame 21 is laid over the array of wires, intersecting the ends of each wire as shown in FIG. 2. The complete mat is formed by welding all of the intersections 26 between the wires 22 and 24 and the frame 21. The mat so formed rests on the assembly surface in an inverted position, reversed from the upright position of the box spring shown in FIG. 2.

The next step in the assembly is the formation of a number of saddle springs 10 and a half-saddle springs 11. Each half-saddle spring 11 is bent from a single length of wire, to form a pair of parallel bottom legs 13, a pair of parallel upwardly sloping legs 15 connected to the bottom legs by curved portions 14, and a transverse top leg 17 connected to the sloping legs by curved portions 16. The top leg 17 is parallel to the common plane of the bottom legs 13, but is transverse to these legs. It is convenient to form the full saddle springs 10 by welding together the free ends of the bottom legs of two half-saddle springs, as shown at 12, although the full saddle springs may also be formed from single lengths of wire.

In the full saddle springs 10, the two top legs 17 are parallel to one another. They are spaced apart at a distance substantially equal to the spacing between adjacent wires 22 of the top mat. Each of the full saddle springs 10 is set in an inverted position into a pair of adjacent channels 23 in the top mat, being automatically positioned and correctly aligned thereby.

The half-saddle springs 11 are preferably used at the ends or sides, or both, of the box spring, adjacent to the border frame 21, so that the side walls of the completed box spring will be firmly supported but will have no protrusions. FIG. 2 shows a simplified arrangement for the sake of clarity, in which the border wire is not directly connected to any of the saddle springs. The upper portion of FIG. 2 shows only the top parts of the assembled box spring, including the border frame, top mat, and saddle springs. After appropriate numbers of full saddle springs 10 and half-saddle springs 11 are placed in the channels 23, the central bights 20 are bent over or upset as best shown in FIG. 3, securely locking the springs to the wires 22 of the top mat. The bending can be done manually or by automatic machinery.

The final stage of assembly is concerned with the attachment of the bottom legs 13 of the saddle springs to a wood bottom frame comprising longitudinal beams 38 and transverse slats 36. According to a feature of the invention, each bottom leg 13 of saddle springs is formed with a partial loop 28, so positioned as to rest on one of the slats 36 or beams 38. These loops receive recessed disks 30, as shown in FIG. 4 and more fully described in our aforementioned U. S. Pat. No. 3,414,915. Each disk has a central hole for receiving a nail 34. The box spring is completed by inverting the assembly of the top mat and the saddle springs to rest on the bottom frame, inserting a disk 30 in each loop 28, and driving a nail 34 through each disk into the slats 36 or beams 38. This step may also be carried out either manually or automatically, and completes the assembly of the box spring.

As shown in FIGS. 1 and 2, the loops 28 are circular in form; however, they may have other shapes to simplify bending. For example, a right-angular partial loop 28A is shown in a bottom leg 13A in FIG. 5, and a V-shaped partial loop 28B is shown in a bottom leg 13B in FIG. 6. These forms are also adapted to be gripped firmly by the disks 30.

The bottom legs of the saddle springs may alternatively be attached to the bottom frame by other means, such as staples, or the straps 40 and nails 42 shown in FIG. 7. In this case, the bottom legs of the springs 11A are straight and do not require the loops 28: the bottom legs of full saddle springs are also straight.

It may be noted that each bottom leg 13 of the saddle springs extends across a pair of the slats 36 in the constructions so far described, so that the transverse top legs 17 are parallel with the wires 22. As shown in FIG. 8, saddle springs 10A may alternatively be turned through 90°, so that each bottom leg 13A lies along a single slat 36, and the top legs 17A lie parallel to the wires 24A of the top mat. The saddle spring then requires only two loops 28A, which may be centrally located as shown. The channels 23A are, correspondingly, formed in the longitudinal wires 24A rather than the transverse wires 22A.

In many applications, it is preferable to attach the border wire 21 directly to half-saddle springs for increased firmness of the edges of the box spring. FIG. 9 illustrates the attachment of a half-saddle spring 11B to the border wire 21 by means of individually-attached rings or clips 40. It is not usually desirable to form channels 23 in the border wire 21 for attaching the saddle springs, because of the heavy gauge wire needed in the border frame. A more complete description of an arrangement of half-saddle springs attached around the complete periphery of the border wire is given by our aforementioned U. S. Pat. application Ser. No. 735,453.

While we have illustrated the improved box spring as having only one channel 23 for locking each top leg of the saddle springs in place, we may provide two or more channels in the wires of the top mat for receiving and locking each such top leg.

What I claim is:

1. A box spring comprising:

a bottom frame; a number of saddle-shaped springs each having a pair of bottom legs extending at the opposite ends thereof into two pairs of upwardly sloping legs, and a pair of top legs each connecting one pair of said upwardly sloping legs together, said top legs of each spring being spaced apart a predetermined distance, said bottom legs being attached to said bottom frame;

a top mat formed of a border frame and two groups of wires lying parallel to a common plane and intersecting one another, said wires being welded to

one another and to said border frame at the intersections therebetween;

the wires of one of said groups being formed with a plurality of channels originally open to the lower surface of said top mat, said wires of said one group being spaced apart substantially said predetermined distance, said top legs of each said spring being freely received in channels of different wires of said one group, said channels being bent to overlie said top legs to lock said springs to said top mat.

2. A box spring as recited in claim 1, said bottom legs being formed with partial loops, together with a plurality of disks each received in one of said loops, and means securing said disks to said bottom frame to lock said springs thereto.

3. A box spring as recited in claim 2, in which each of said disks has a recessed circular body portion fitting snugly within one of said partial loops, and a flange overlying said one partial loop.

4. A box spring as recited in claim 1, each of said top legs extending parallel and adjacent to the wire of said one group which has a channel receiving that top leg.

5. A box spring as recited in claim 1, said bottom legs being formed with partial loops, together with a plurality of disks each received in one of said partial loops, and fastening means securing said disks to said bottom frame.

6. A box spring as recited in claim 5, said bottom frame including a plurality of slats extending transversely to said bottom legs, said saddle springs having their bottom legs bridging adjacent pairs of said slats, each bottom leg being formed with a pair of said partial loops each overlying one of an adjacent pair of slats.

7. A box spring as recited in claim 1, in which said bottom frame includes a plurality of spaced slats, the bottom legs of said saddle springs extending lengthwise of said slats, each bottom leg being formed with one of said partial loops in a position to overlie one of said slats.

8. The method of making a box spring assembly which comprises the steps of:

forming a plurality of channels in longitudinally-spaced relation in each of a first group of wires;

forming a top mat by arranging a second group of wires in parallel spaced relation, arranging said first group of wires in parallel spaced relation to overlie and intersect said second group of wires, with the channels of said first group open toward one surface of the top mat, and the wires of said one group being spaced apart a predetermined distance; arranging a wire border frame to intersect ends of both said first and second groups of wires; and welding said wires and said border frame together at points of mutual intersection;

forming a plurality of saddle-shaped springs each with a pair of bottom legs extending at the opposite ends thereof into two pairs of upwardly sloping legs, and a pair of top legs each connecting one pair of said upwardly sloping legs together and being spaced apart substantially said predetermined distance;

inserting the top legs of said springs each into more than one of said channels in different ones of said first group of wires, and upsetting said channels to lock said springs to said top mat;

and attaching a bottom frame to said bottom legs of said springs.

9. A box spring as recited in claim 1, said two pairs of upwardly sloping legs being oppositely inclined relative to one another.

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