March 29, 1966 S. TYHANIC 3,242,505

SPRING UNIT

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Fig. 1

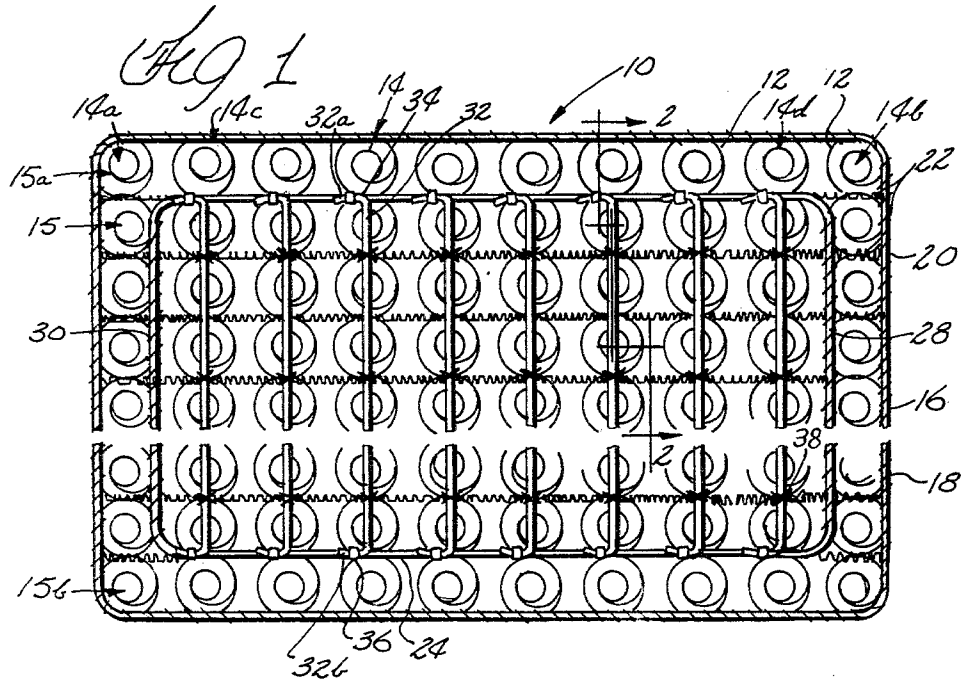
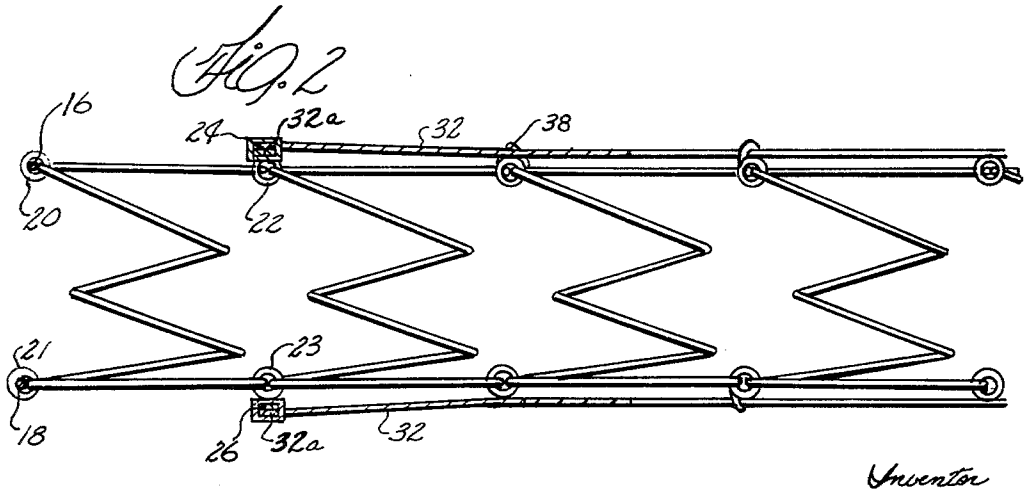


Fig. 2



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SPRING UNIT

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This invention relates to an improved spring unit and, more particularly, an improved spring unit construction for an innerspring mattress or the like.

The spring unit assembly in a mattress should provide the most comfortable weight distribution and support for the person resting on the mattress. While the degree of firmness is a matter of choice with the individual user, the resilience should be primarily in the vertical direction and there should be a minimum of perceptible distortion in the horizontal direction. It is particularly desirable that there be a minimum pull or lateral distortion of the edges of the mattress under the normal weight of a person resting on the mattress.

It is an object of this invention to provide an improved mattress construction which will provide a very comfortable weight distribution and support for a person resting on the mattress.

It is another object of this invention to provide an improved spring unit construction for a mattress which will permit a person to rest upon the surface of the mattress with minimum lateral pull and distortion, particularly to the edge portions thereof.

It is an additional object of this invention to provide an improved mattress having improved characteristics of weight distribution and edge stabilization.

Other objects may be seen and a fuller understanding of the invention may be had by referring to the following description and claims taken in conjunction with the accompanying drawings.

In accordance with this invention, the spring unit comprises a plurality of coil springs arranged in parallel longitudinal columns and transversely aligned parallel rows. Top and bottom outer border members extend along and are connected to the outer edges of the coil springs in the terminal columns thereof and to the outer edges of the coil springs at the ends of the intermediate columns thereof. Thus, these outer border members extend peripherally about the coil springs at the top and bottom of the construction. Top and bottom inner border members are also provided, these being disposed inwardly of the outer border members. Each inner border member has side edge portions extending along and connected to coil springs in each of two columns which are laterally separated by a plurality of columns. The end portions of each inner border member, however are not connected to the coil springs; rather these end portions are free to move longitudinally relative to the coil springs. Between the side edge portions of the inner border members there are a plurality of intermediate connecting elements which interconnect the end portions of the inner border members.

One important feature of this invention is the tying of the border members to the coil springs along their longitudinal edges but leaving the end portions of these inner border members free to move longitudinally. Thus, in effect, the inner border members float longitudinally upon the top of the mattress construction.

Another feature of the invention is the construction of both the inner border members and the intermediate connecting elements of flat banding material. This provides a maximum degree of flexibility in the vertical direction, i.e., transverse to the surface of the mattress, but provides a maximum degree of stiffness and strength parallel to the plane of the mattress surface.

Another feature of the invention is the novel means

for attaching the connecting bands to the inner border members.

With reference to the drawing:

FIGURE 1 is a top plan view of the spring unit constructed in accordance with this invention, and

FIG. 2 is an enlarged sectional elevation view of a portion of this spring unit taken substantially along line 2—2 of FIG. 1.

The spring unit **10** illustrated in FIG. 1 comprises a plurality of coil springs 12. These coil springs are arranged in a standard construction in a plurality of longitudinally extending columns **14** which are laterally spaced apart. The coil springs are also aligned in lateral or transverse rows **15**. While it is preferred that the longitudinal columns of coils be laterally spaced as illustrated, it will be appreciated that the invention will also have application to a standard construction wherein the coil springs are not laterally spaced but are laterally juxtaposed.

Top and bottom outer border members **16** and **18**, respectively, extend along and are connected to the outer edges of the coil springs in the terminal or outermost columns **14***a* and **14***b* and to the outer edges of the coil springs in the terminal or outermost rows **15***a* and **15***b*.

The outer border members **16** and **18** are preferably constructed of round wire that is of substantially heavier gauge than the wire of the coil springs **12**. The outer border members are connected to the outer edges of the coil springs in the terminal columns and rows by means of standard helical or pig-tail wire connections **20** and **21** (see FIG. **2**), the wire used in these connections being generally of lighter gauge than the wire of the coil springs **12**. A plurality of helical or pig-tail wire connections **22** and **23** also extend transversely across the unit at the top and bottom thereof, respectively, and connect the adjacent transverse rows **15** of coil springs together as well as tying the longitudinal columns **14** together. These laterally extending helicals **22** and **23** thus tie the unit together both longitudinally and transversely.

Top and bottom inner border members **24** and **26** are preferably at least about two coil spring diameters shorter in length and two coil spring diameters narrower in width than the outer border members **16** and **18**. The side edges of each inner border member extend along and are connected preferably to the inner edges of the coil springs in the terminal longitudinal columns **14***a* and **14***b*, the connection being by standard helicals **28** and **30**. If desired, however, these inner border member side edges may be connected to the coil springs in the penultimate columns **14***c* and **14***d*. The end portions of these inner border members preferably extend along the inner edges of the coil springs in the terminal rows **15***a* and **15***b* thereof, but it will be particularly noted that there is no connection between the ends of the inner border members and the coil springs. Thus, in effect, the inner border members are permitted to float longitudinally on the coil springs. This is an important feature of the invention and it permits proper distribution of the load or weight over the surface of the mattress without, in any way, pulling in or tending to distort the outer border frames **16** and **18**.

In order to provide resilient stiffness and strength in the plane parallel to the surface of the mattress it is preferred that the inner border members be in the form of relatively flat bands.

The ends of the inner border members **24** and **26** are connected together, not only at their edges, but also intermediate their edges. This intermediate connection is effected by a plurality of flat connecting bands **32**. It will be noted that the connecting bands **32** extend across the coil springs in the longitudinal columns **14**, thus tending to distribute any applied force (weight) over the top

of the coil springs and longitudinally along the column or columns of coil springs.

The ends 32*a* and 32*b* of the connecting bands are transversely bent and are connected to the inner border member end portions by means of wrap-around or encircling connectors 34 and 36. Actually, the ends 32*a* and 32*b* of each connecting band are over bent, that is they are bent more than 90° from their original extension, so that the angle between the transverse ends 32*a* and 32*b* and the elongate central portion or body of the connecting band 32 is oblique, i.e., less than 90°. This feature of the invention permits the ends 32*a* and 32*b* of the bands to be retained within the connectors 34 and 36, respectively, even though the connectors may become loosened to a slight extent.

The connecting bands 32 are attached at intervals to the coils which they traverse, and this may be done as in the illustrated embodiment by means of wire rings 38. Alternatively, the transverse helical or pig-tail connections 22 and 23 may be used for connecting the bands 32 to the coil springs, although it is preferred that the helicals 22 and 23 be in place to connect the coil springs 12 before the inner border sub-assemblies, each of which consists of one of the inner border bands and the connecting bands, are positioned.

In the preferred embodiment of the invention, the edges of the inner border members extend laterally and are connected by helicals 28 and 30 to the inner edges of the terminal row of coils 14*a* and 14*b*. Thus the edges of the inner border members are connected to the edges of the outer border members through the terminal row of coils. As previously stated, it may be desirable to have these inner border member edges only extend and be connected to, for example, the outer edges of the penultimate or next adjacent column of coils 14*c* and 14*d*.

The ends of the inner border members, however, must not in any way be fixed to the ends of the outer border members, but rather these inner border member ends must be free to move in the longitudinal direction relative to both the ends of the outer border members and the coils 12. This free longitudinal floating action of the ends of the inner border members permits the distribution of weight to be effected over the surface of the mattress without tending to pull the outer border members inwardly to distort the mattress.

Although the invention has been described with a certain degree of particularity, it is understood that the present disclosure has been made only by way of example and various modifications may be made by those skilled in the art without departing from the spirit and scope of the invention as hereinafter claimed.

I claim:

1. A spring unit comprising a plurality of spaced parallel columns of coil springs, top and bottom outer border members each extending along and connected to the outer edges of the coil springs in the terminal columns thereof and to the outer edges of the coil springs at the ends of the intermediate colums thereof, top and bottom inner border members each having side edge portions extending along and connected to the coil springs in each of two columns which are separated by a plurality of columns, each inner border member having end portions free to move longitudinally relative to said coil springs, and a plurality of connecting elements extending between said inner border member end portions and connecting said inner border member end portions together intermediate said side edge portions.

2. A spring unit comprising a plurality of spaced parallel columns of coil springs, top and bottom outer border members each extending along and connected to the outer edges of the coil springs in the terminal columns thereof and to the outer edges of the coil springs at the ends of the intermediate columns thereof, top and bottom inner border members each having side edge portions extending along and connected to the coil springs in each of two columns which are separated by a plurality of columns, each said inner border member having end portions free to move longitudinally relative to said coil springs, and a plurality of connecting elements extending across the coils intermediate the end portions of said inner border member and connecting said inner border member end portions together intermediate the side edge portions thereof.

3. A spring unit comprising a plurality of spaced parallel columns of coil springs, top and bottom outer border wires each extending along and connected to the outer edges of the coil springs in the terminal columns thereof and to the outer edges of the coil springs at the ends of the intermediate columns thereof, top and bottom inner border bands each having side edge portions extending along and connected to the coil springs in each of two columns which are separated by a plurality of columns, each inner border band having end portions free to move longitudinally relative to said coil springs, and a plurality of connecting bands extending across the coils intermediate the end portions of said inner border band, each of said connecting bands having obliquely disposed transverse ends, and means encircling said ends for connecting said ends to the end portions of said inner border band intermediate said inner border band edge portions.

4. A spring unit comprising a plurality of spaced parallel columns of coil springs, top and bottom outer border wires each extending along and connected to the outer edges of the coil springs in the terminal columns thereof and to the outer edges of the coil springs at the ends of the intermediate columns thereof, top and bottom inner border bands each having side edge portions extending along and connected to the coil springs in each of two columns which are separated by a plurality of columns, each inner border band having end portions free to move longitudinally relative to said coil springs, and a plurality of connecting bands extending across the coils intermediate the end portions of each said inner border band, each of said connecting bands having obliquely disposed transverse ends, a plurality of encircling connectors connecting said ends to said inner border band end portions intermediate said inner border band edge portions, and a plurality of elements attaching said connecting bands to at least some of said coil springs intermediate the end portions of said inner border bands.

5. A spring unit comprising a plurality of coil springs arranged in longitudinal columns and transversely aligned rows, means tying adjacent transverse rows of coil springs and adjacent coil springs in each longitudinal column together, top and bottom outer border members each extending along and connected to the outer edges of the coil springs in the terminal transverse rows and terminal longitudinal columns thereof, top and bottom inner border bands each having side edge portions extending along and connected to a column of coil springs inwardly of said outer border member, and having end portions free to move longitudinally with respect to the coil springs in the terminal transverse rows thereof, a plurality of connecting elements extending across the coil springs intermediate the end portions of said inner border bands, and means connecting the ends of said connecting elements to the end portions of said border bands.

6. A spring unit comprising a plurality of coil springs arranged in spaced longitudinal columns and juxtaposed transverse rows, a plurality of transversely extending helical spring wires tying adjacent transverse rows of coil springs and adjacent coil springs in each longitudinal column together, top and bottom outer border members each extending along and connected to the outer edges of the coil springs in terminal transverse rows and terminal longitudinal columns thereof, substantially flat top and bottom inner border bands, each having side edge portions extending along and connected to the inner edges of the coil springs in the terminal longitudinal columns thereof, and having end portions extending along but free to move

longitudinally with respect to the inner edges of the coil springs in the terminal transverse rows thereof, a plurality of flat connecting bands extending across the coil springs intermediate the end portions of said border bands, said connecting bands having oblique transverse ends, and means binding the ends of said connecting bands to the end portions of the said border bands.

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