

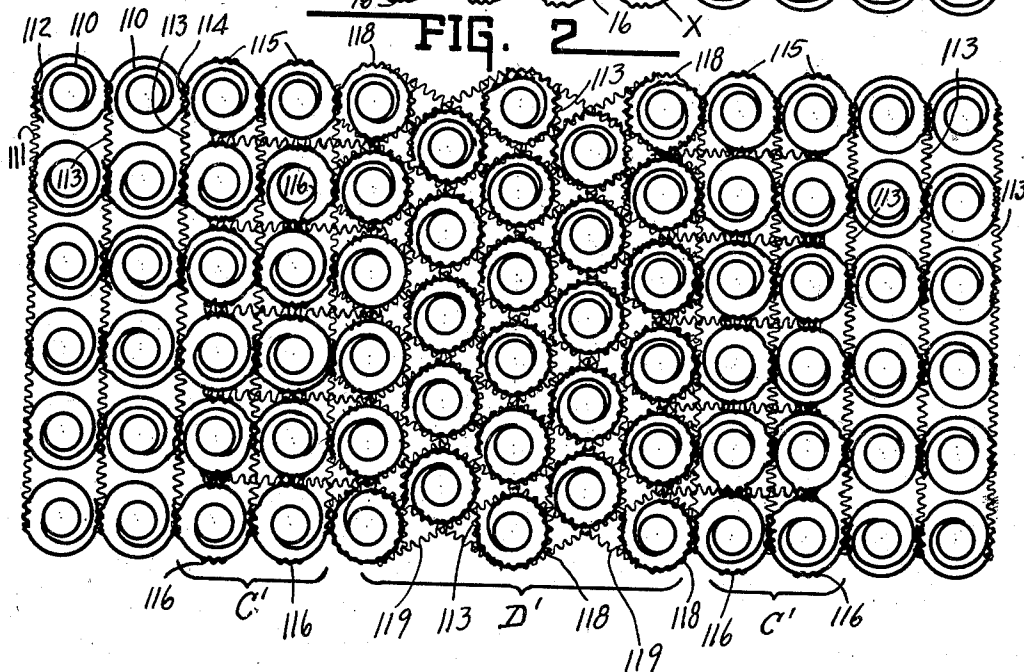
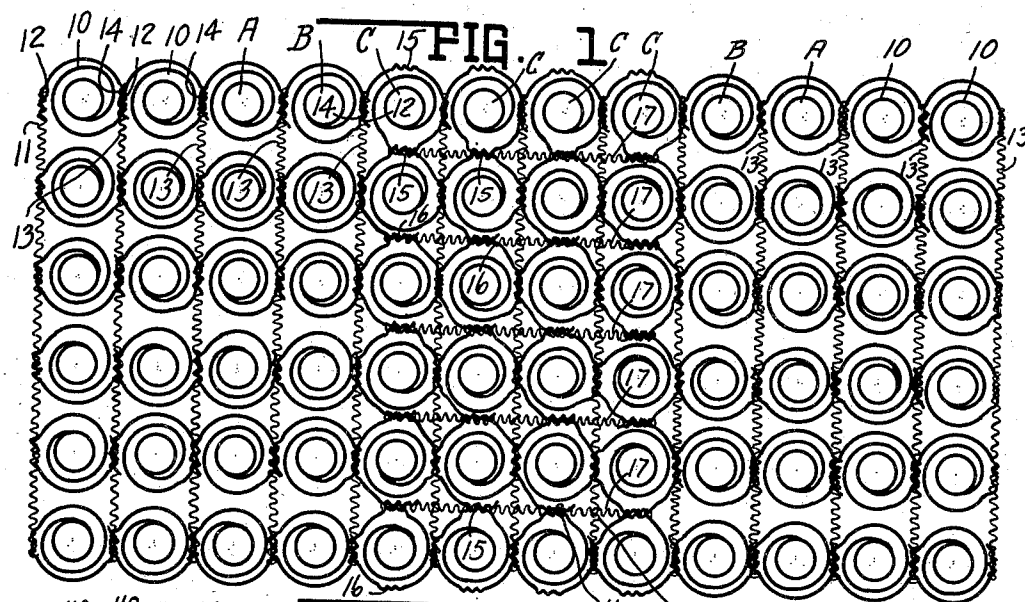
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C. F. McCOY

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PROPORTIONAL RESISTANCE SPRING STRUCTURE

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INVENTOR.
CHARLES F. McCOY.
BY
Lockwood Goldsmith & Salt
ATTORNEYS.

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PROPORTIONAL RESISTANCE SPRING
STRUCTURECharles F. McCoy, Pennington, N. J., assignor to
Trenton Spring Products Company, Trenton,
N. J., a corporation

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This invention relates to a unitary flexible spring structure suitable for a mattress, and the like.

The chief object of this invention is to provide a proportional resistance spring structure for the purpose desired and by employing therein a plurality of substantially similar coils, each having substantially the same unit strength and formed with a like number of turns and of the same size and of the same wire.

The chief feature of the invention consists in the accomplishment of this object by increasing the number of interlocks between adjacent coils so that adjacent coils, interconnected by a greater number of interlocks, offer greater resistance to lateral sway than coils connected by a lesser number of interlocks.

Other features will be set forth, hereinafter.

The full nature of the invention will be understood from the accompanying drawing and the following description and claims:

Fig. 1 of the drawing is a top plan view of a three section embodiment of the invention.

Fig. 2 is a similar view of a five section embodiment of the invention.

In Figs. 1 and 2 of the drawing the several unit coils are illustrated as of the same direction of winding. Successive rows of coils may be oppositely wound if desired. The coils illustrated are, by reason of only "plan" illustration, intended to illustrate double conical coils, that the diameter at the middle thereof, along the longitudinal central axis, is the smallest and the opposite end turns are of substantially the same and largest diameter. The coils conventionally illustrated herein, are shown of the unknotted type. They may, however, be of the knotted type.

All of the foregoing is conventional in the spring art, and reference thereto is had solely for the purpose of setting forth that the coils illustrated in the preferred embodiments of the invention is not the only form of coil that can be utilized.

In the invention Fig. 1 illustrates a three division as it were, bed or like spring structure while Fig. 2 illustrates a five division structure. In Fig. 1 is illustrated a four-way locking of the coils while Fig. 2 illustrates the same as well as a six-way locking of the coils.

Reference is had to the prior Hager Patents Nos. 1,913,353 and 1,977,476 for a detailed understanding of the specific formation of the end turn portions and the locking helices per se.

In Fig. 1 of the drawing there is illustrated by way of example only, twelve rows of springs, each row including six coils of the character hereinbe-

fore set forth. 10 indicates the coil spring and 11 a closely wound helix which is associated with the crimped portion 12 of each of the coils in the left hand row.

A helix 13 of similar character not only is associated in a similar manner with the crimped portion 12 of the coil but is associated with the crimped portion 14 of the adjacent coil in the left hand row. The connection between the two top turns and the helix 13 is of the character illustrated in the aforesaid patents. A and B, respectively designate additional rows or coils which are similarly connected together.

C designates an intermediate row of coils adjacent the row B and adjacent coils in these adjacent rows are similarly connected together, each coil having the crimped portions 12 and 14. In addition each coil in transverse arrangement relative to the portions 12 and 14 is crimped as at 15 and 16. The top and bottom coils, referring to Fig. 1, respectively, have the crimped portions 15 and 16, respectively, unassociated with a transverse helix unless a border defining helix is employed.

In the event such a border defining helix is employed, it may be extended to engage the end coils of the rows A and B and the end coils of the two left hand end rows of coils, in which event these end coils in transverse relationship to the portions 12 and 14 would be similarly crimped so as to present a better locking connection with the helix. This border arrangement, however, is conventional and may be provided or omitted, as desired. Herein there are four rows of coils designated by the letter C and to the right thereof are the rows B and A, respectively, then the second right hand row of coils 10, and then the last right hand end row of coils 10.

The several coils in the C rows are interconnected or locked together at their adjacent crimped portions 15 and 16 by the transversely positioned helices 17. Thus, except for the end coils in the C rows, each of the coils in the C rows is connected at four portions to the four adjacent coil portions. Also the two helices 13 and 17 where they cross each other more or less interfit as at X so as to form two transverse supporting linear portions, as it were.

It may be stated that roughly it requires twice as much force to compress a portion of the spring defined by the C rows as it does to compress an end portion of the spring the same amount. In other words, there is incorporated in the spring structure proportional resistance. It is well known that the body when reclining has more

weight in the trunk portion and more especially at the hips than elsewhere so that with the present spring structure the central portion defined by the C rows, as it were, will offer greater resistance to the body and the two end sections will offer less resistance to the body. Therefore, relative light springs may be utilized throughout the entire spring unit and the resistance of the unit thus proportional for the load to be accommodated thereby, so that for normal spring deflection, the central portion of the unit which carries the greatest weight will not be unduly compressed.

In Fig. 2 there is illustrated an extension of the aforesaid invention and herein similar numerals increased by one hundred and letters of the prime series indicate like elements, parts and sections, respectively. However, this form of the invention, as previously stated, contains five divisions of which in the present instance, the two end rows at each end, each constitute one division, the immediate adjacent two rows constitute two other divisions, and then the intermediate section of five rows constitutes the mid section. This latter section is herein designated by the letter D'. The two sections at each side thereof are designated by the letter C', and thus there is formed a five section unit. Each of the coils in the D' rows has an end turn which is crimped substantially throughout its length as indicated at 118.

Helices 119 in this instance, interlock with the coils of the D' row at an angle less than 90° so that with helices 113, all D' coils, except the end coils in the long rows D', have a six-sided interlock with adjacent coils, as distinguished from the four sided interlock between coils in rows C' or two-sided interlocks between adjacent coils in the two end rows.

Thus, the spring shown in Fig. 2 has a central portion with the greatest supporting strength for accommodation of the hip portion of the torso, two sections C' adjacent thereto for shoulder and thigh portion accommodation and two end sections for head and foot portion accommodation.

In each instance, the coils are formed of the same size wire, are of the same diameter, and are of the same unit strength. They may or may not be identical in their end turn formation so far as the crimping thereof is concerned, although it is to be understood that in mass pro-

duction it might be preferred to crimp the entire length of the end turn.

The length of the crimp which is of sinuous character, in each interlock or lacing with an adjacent helix, as stated, is of the character shown in the before mentioned patents, and preferably three alternations of sinuosities per helix interlock or lacing is sufficient to secure the desired interlocking relationship.

While the invention has been illustrated and described in considerable detail in the drawing and foregoing specification, the same is to be considered as illustrated only and not restrictive in character. The several modifications herein disclosed and suggested, as well as others which readily suggest themselves to persons skilled in this art, are all considered to be within the scope of this invention as defined by the appended claims.

The invention claimed is:—

1. A unitary spring structure including a plurality of similar coils arranged in successive rows with a plurality of coils in each row, a plurality of helices parallel with one another and disposed between the coils of each row, said helices connecting the end coils of each adjacent row, and a second plurality of helices disposed parallel with one another and all at an angle to the first plurality of helices, said second plurality of helices disposed between and connected with the end coils of a group of adjacent coil rows as well as with the helices of the first plurality, whereby the coils in the zone of said spring structure included in said second plurality of helices are stabilized in more than one direction.

2. A unitary spring structure including a plurality of similar coils arranged in successive rows with a plurality of coils in each row, a plurality of helices parallel with each other disposed between said rows and connected to the end coils of adjacent rows, a second plurality of helices disposed at angles substantially 60° to each other and connecting adjacent end coils of a medial zone of said structure upon opposite sides of said coils and at angles less than 90° to the helices of the first plurality, and a third plurality of helices disposed at right angles to the first plurality and connecting adjacent end coils of said rows immediately adjacent to the coils of said medial zone and on both sides thereof.

CHARLES F. MCCOY.