April 22, 1930. L. A. SUEKOFF 1,755,715

MATTRESS AND CUSHION

Filed Feb. 10, 1930 2 Sheets-Sheet 1

Fig. 1.

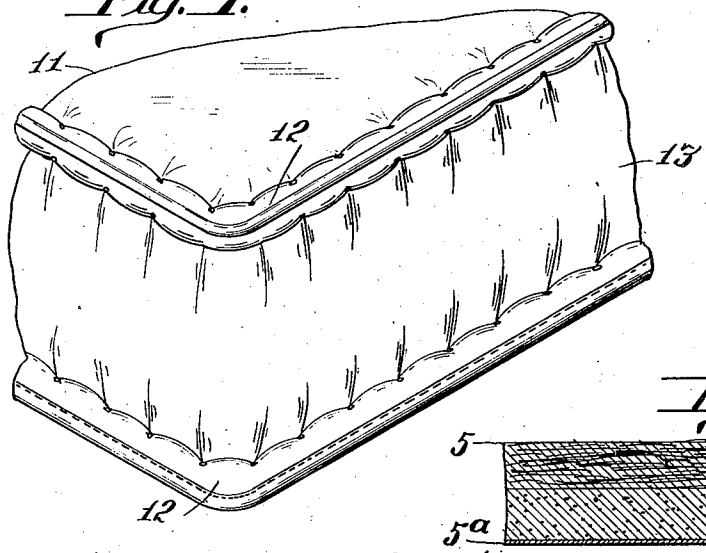


Fig. 2.

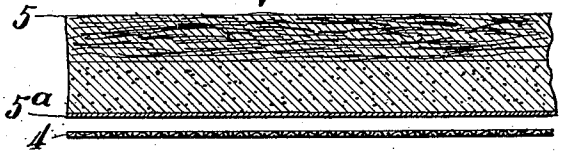
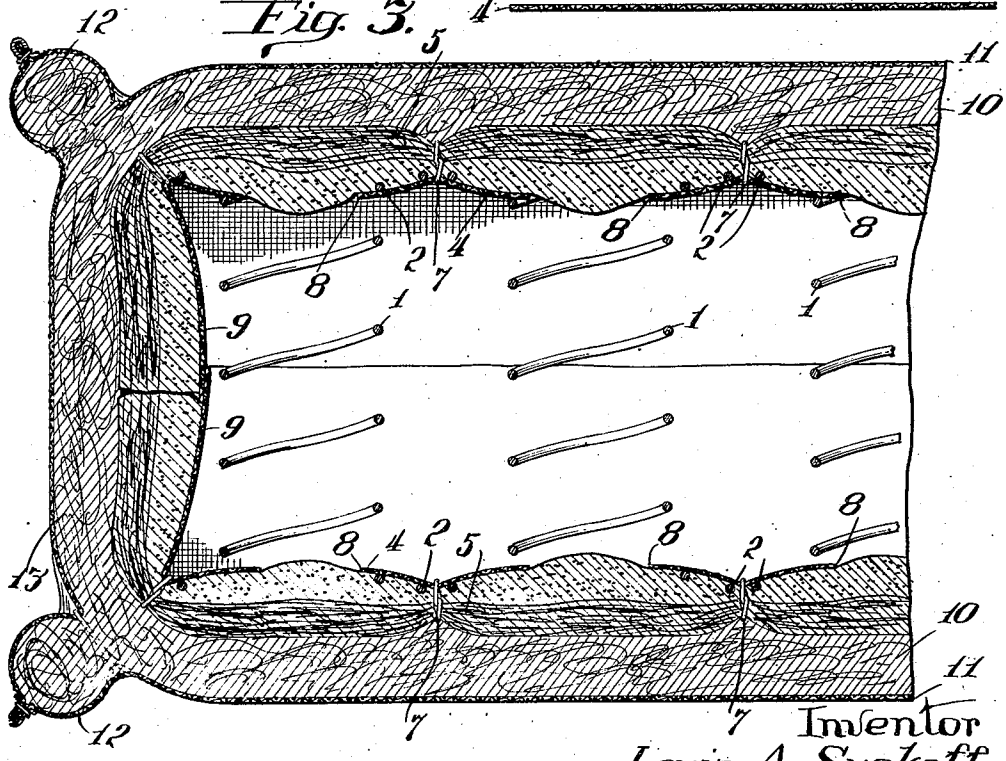


Fig. 3.



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Fig. 4.

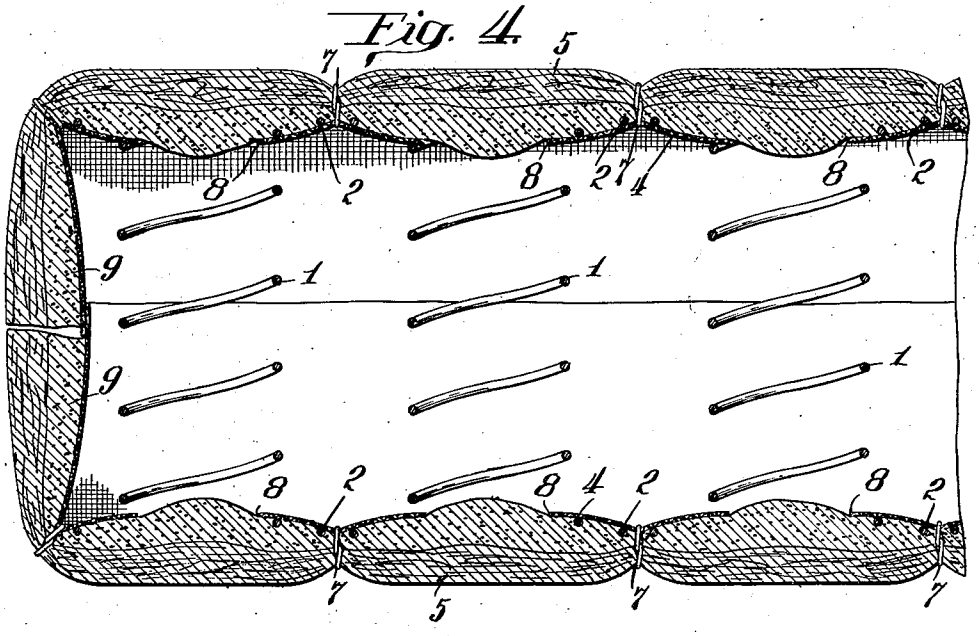


Fig. 5.

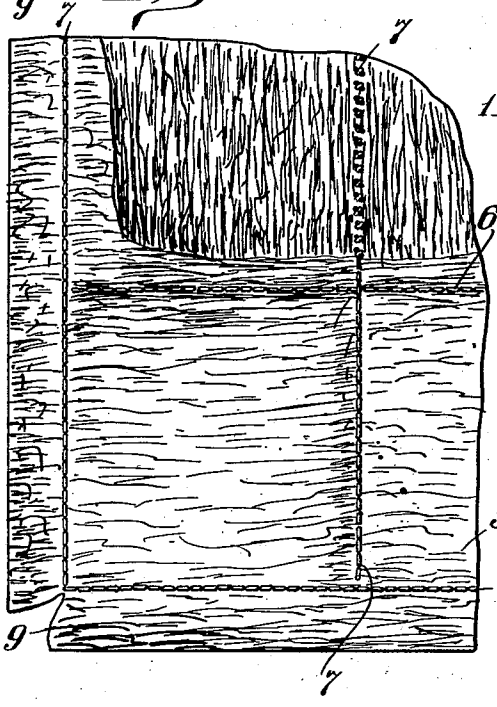
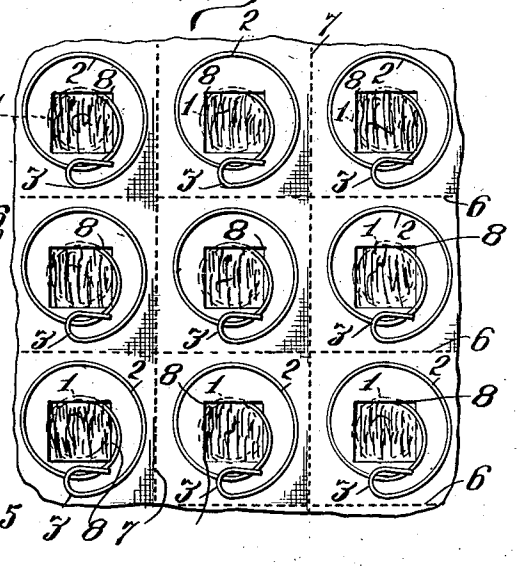


Fig. 6.



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UNITED STATES PATENT OFFICE

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MATTRESS AND CUSHION

Application filed February 10, 1930. Serial No. 427,328.

This invention relates to mattresses and cushions and spring assemblies therefor, and has for its object to provide a structure of this character which, while effecting a very appreciable economy of labor and material, also presents very advantageous structural features.

This invention relates particularly to that class or type of mattresses and cushions and spring assemblies therefor wherein the springs are associated with textile fabrics, as distinguished from metallic devices, and are held in proper relative positions by said fabrics.

In spring assemblies of the type to which this invention relates and of a size required for a full size mattress, the amount of textile fabric used ranges from a maximum of forty yards to a minimum of thirteen yards. A particular advantage of the spring assembly of the present invention lies in effecting a saving of fifty per cent of the aforesaid minimum of thirteen yards of fabric, besides presenting a structure wherein the crowding together of the springs is effectively resisted without disadvantage to the flexibility or life of the structure.

A further distinct advantage of the spring assembly of the present invention lies in the fact that the latter, per se, includes a very appreciable portion of the padding material required in the completed or finished mattress or cushion structure and lies further, in the fact that this portion of the said padding may be of a far cheaper grade than that ordinarily employed in such structures without the slighest detriment to the characteristics of said finished structure.

A further advantage of the mattress or cushion of the present invention lies in the fact that the additional padding thereof, which commonly consists of cotton or hair, becomes so associated with that portion of the total padding constituting a part of the spring assembly as to be so firmly held in place by the latter that the usual tufting of the finished structure may be obviated, thus effecting a very appreciable saving in cost and producing a more comfortable and better appearing finished article than a tufted structure affords and further, of course, obviating the disadvantages incident to breaking out of tufts.

A suitable embodiment of the invention is illustrated in the accompanying drawings wherein:

Fig. 1 is a fragmentary perspective view of a mattress constructed in accordance with this invention.

Fig. 2 is a fragmentary sectional strip of padding material of the type used in the manufacture of spring assemblies in accordance with this invention.

Fig. 3 is a fragmentary vertical sectional view of a mattress or cushion constructed in accordance with this invention.

Fig. 4 is a similar section of a spring assembly.

Fig. 5 is a fragmentary plan view of the same.

Fig. 6 is a fragmentary plan section showing the outer face of the textile fabric beneath the top layer of padding material and the end coils of springs lying between said fabric and padding material.

The spring assembly of this invention comprises the usual springs 1 having end coils 2 of appreciably greater diameter than the middle or body portion thereof and having looped terminals 3 which are normally free.

The springs 1 which are arranged in rows extending longitudinally and transversely of the completed assembly, are held in proper relative positions by means of the flexible top and bottom walls of said assembly.

Each of said walls comprises a single inner sheet 4 of suitable textile fabric such as burlap or cotton duck and a layer 5 of a suitable fibrous padding material such as sisal, jute, hemp, hair, or other long-fibred substance which is so interlaced or interwined or arranged as to constitute what may be termed loosely felted or laminated material possessing a high degree of resiliency. This padding consists preferably of a plurality of layers of partially carded fibre laid laterally or transversely of each other so that the grain of one layer is disposed in substantially transverse relation to that of the next adjacent layer. This composite layer 5 of above

described material is secured directly to the sheet 4 of textile fabric by means of stitch chains 6 and 7 extending longitudinally and transversely of said sheet to define substantially square areas of diameter substantially equal to that of the end coils 2 of said springs 1.

In substantially the center of each of these square areas of the sheet 4, there is provided an opening 8 through which the end coil of a spring 1 is passed, said end coil being thus confined in what may be termed a flat pocket formed between the sheet 4 and the padding 5, the latter being supported directly upon the end coils of the springs.

The stitch chains 6 and 7 serve to compress the padding 5 at the margins of the substantially square areas thereof bordered or defined by said stitch chains and act to produce formations therein known in the upholstery art as "biscuits" or "biscuit formations." The latter serve to belly the said square areas of the sheet 4 so that the latter and the contained portion of the padding project appreciably inwardly from the planes of the end coils of the springs toward the smaller diameter coils of the latter.

The loop-ends or terminals 3 of the end coils of the springs are adapted to prevent crawling or rotation of the springs under the influence of load vibrations and are less liable to penetrate the padding 5 than raw ends of said springs. The loops 3 are open and the raw ends thereof therefore engage the fabric 4 to prevent rotation of the springs 1 on their own axes so that they remain permanently in proper relative positions.

The marginal portions of the sheet 5 and the textile fabric 4 are preferably of such width as to permit those of the upper wall to meet or even overlap those of the bottom wall to thus provide what may be termed peripheral walls or peripheral closure flaps for the assembly.

The latter may be inserted into a suitable cover fabric, it being optional with the user to add further loose padding to be interposed between the padding 5 and the cover fabric. Under the influence of use, the padding flattens appreciably so that for the cheaper grade of cushions and mattresses, additional padding may be omitted.

The most important function of the padding 5 is to resist relative lateral movement of the springs toward each other. This is usually termed "crowding" and occurs when the assembly is forced into a cover fabric and sometimes in the operations of tufting and forming roll-edges. The padding 5 is very appreciably stiffened along the stitch chains 6 and 7 to form the equivalent of ribs and beads in sheet metal without, however, defeating the flexibility of the top and bottom wall structures under the influence of load, these stiffened portions cooperating with the "biscuit formations" to resist distortion of the top and bottom walls by lateral pressures on the assembly.

This power of resistance results from the direct attachment of the padding 5 with the fabric 4 at an infinitesimal number of very closely associated points or along very numerous lines to thereby prevent all relative movement between the fabric 4 and the padding 5, a relation which has not, to my knowledge, heretofore been presented in the upholstery art in which the padding has always heretofore been loosely disposed upon and about the spring assembly prior to application of the cover fabric, the tufting subsequently effected being the only attachment of the padding to the spring assembly ever resorted to.

Thus the single sheet of fabric 4 functions conjointly with the stitch chains 6 and 7 to hold the padding 5 uniformly distributed and prevent the separation or tearing apart thereof under the various stresses to which mattresses are subjected, including rolling and folding of the same, and also serves to maintain the end coils of the springs permanently properly positioned relatively to the "biscuit formations" of the padding and particularly with respect to the most dense or compressed portions of the latter.

Obviously the padding material is far cheaper than textile fabric of the type required to withstand the stresses to which the sheet 4 is subjected, so that by eliminating a sheet of the latter for each of the two walls of the assembly, a very appreciable cost economy is effected without the slightest detriment to the structure.

It is very essential that the fibres of the pad shall be long and shall be carded to the extent necessary to produce the aforesaid laminated or felted effect. I have found sisal fibre to be particularly well adapted to the purpose because the length of said fibres, in the main, is in excess of the length of a diagonal of a square pocket of the structure. This fibre is normally curly and wavy and is preferably not carded to the extent necessary to eliminate these formations because the latter effect a more intimate overlapping of fibre upon fibre in the several layers of the pad to thus more or less intertwine said fibres and produce a more resilient and wear-resistant structure than would result from straightened fibres.

In Fig. 2 I have illustrated diagrammatically a fragment of a pad consisting of only two layers of the partially carded fibre, said pads consisting usually of a larger number of layers of less depth than shown in Fig. 2. Such pads are sometimes covered on one face with paper, cheese-cloth or other very cheap material stitched or cemented thereto, such sheet of material being indicated by numeral 5a and being intended merely to hold the pad

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together and permit rolling and unrolling of same. This sheet 5a is not of a wear resisting nature and is preferably omitted from the structure of my invention as devoid of any useful function, though its presence in the structure is not disadvantageous except from the standpoint of additional cost. When retained, it is regarded as constituting a part of the pad, per se, and not as a separate element equivalent to a wear-resistant fabric.

In said Fig. 2, the sheet of fabric 4 is also shown spaced from the pad which, of course, rests upon said sheet 4, or vice versa, during stitching.

The openings 8 are cut into the sheet 4 before the latter and the pad 5 are stitched together.

The fibrous pad of the assembly above described presents not only the biscuit surface formations but also a rough surface which includes projecting loose ends of fibres which are particularly well adapted to become intertwined with additional padding 10 such as cotton and lint, hair and the like, interposed between the spring assembly and the cover fabric 11 of the contemplated completed mattress or cushion. In practice it is found that the said loose ends of fibre of the pad 5 intertwine with the material of the pad 10 and loose ends of fibres of the latter project into the spaces between fibres of the pad 5 to such an extent that the two pads 5 and 10 become substantially inseparable and, since the pad 5 cannot become displaced in handling a mattress or cushion, it follows that the pad 10 cannot be displaced relatively to the pad 5 so that after the entire structure, including the padding 10, has been inserted into the cover fabric 11 and the roll-edges 12 have been formed, the usual tufting of the structure may be obviated with considerable advantage from both cost economy and comfort of the finished article with special reference to mattresses. The cover fabric of the latter includes the usual boxing strip 13 which is suitably stitched to the peripheral edges of the top and bottom fabrics 12.

A further advantage of the structure lies in the fact that the free edge portions or flaps of the fabric piece 4 and pad 5 do not need to be stitched together to form the peripheral wall of the assembly because the peripheral wall portion of the padding 10 serves to hold said free flaps in proper relative position without such stitching.

A decided advantage of the lack of need of tufting the mattress resides in the fact that in a full size mattress, a saving of an appreciable amount of the cover fabric is effected.

I claim as my invention:

1. A mattress comprising a spring assembly presenting an outer wall having rough surfaced fibrous biscuit formations, a layer of fibrous padding covering said outer wall of said assembly and held firmly in place thereon by interengagement of the fibres of said wall and padding, and a cover fabric housing said assembly and said padding.

2. A mattress comprising a spring assembly presenting top and bottom walls having rough surfaced fibrous biscuit formations, said walls including free peripheral edge portions constituting closure flaps for the normal open peripheral portion of said assembly, a layer of fibrous padding covering said outer wall of said assembly and held firmly in place thereon by interengagement of the fibres of said wall and padding, said padding including a peripheral wall portion engaged with the outer surfaces of said closure flap portions of said assembly, and a cover fabric housing said assembly and said padding.

3. As a subcombination in a mattress, a core spring assembly including a top wall structure consisting of an appreciably thick layer of substantially felted fibrous padding material presenting superficial loose ends of component fibres, springs having their end coils disposed in direct contact with the bare lower face of said layer, fabric means secured to said layer by sets of stitch-chains extending entirely through said layer substantially transversely of each other and in alternate relation to the end coils of the springs, said stitch-chains compacting said padding along the lines thereof to thereby provide biscuit formations therein and coacting with said fabric means to retain the springs in spaced relation to each other and engaged with said layer and effecting a stiffening of said padding for preventing crowding of the springs into overlapping position relatively to each other under the influence of pressures exerted against the peripheral edges of said layer.

4. As a subcombination in a mattress, a core spring assembly including a top wall structure consisting of an appreciably thick layer of substantially felted fibrous padding material presenting superficial loose ends of component fibres, springs having end coils terminating in free loop ends disposed in direct contact with the bare lower face of said layer, fabric means secured to said layer by sets of stitch-chains extending substantially transversely of each other and in alternate relation to the end coils of the springs, said stitch-chains extending entirely through and compacting and stiffening said padding along the lines thereof to thereby provide biscuit formations therein and coacting with said fabric means to retain the springs in spaced relation to each other and engaged with said padding, the said stiffening of said padding preventing crowding of the springs into overlapping position relatively to each other under the influence of pressures exerted against the peripheral edges of said padding.

5. As a subcombination in a mattress or

cushion, a spring assembly including a wall structure consisting of a single sheet of textile fabric, a layer of substantially felted fibrous padding having an uncovered outer surface and devoid of wear resistant covering on its inner face, a series of relatively transversely disposed stitch-chains passing through and securing said layer to said fabric and providing pockets of geometric form between said padding and said fabric, and springs having end coils engaged and confined in said pockets in direct contact with the bare surface of said padding, said stitch-chains extending entirely through and compacting said padding along the lines thereof to thereby stiffen the same and render it resistant to pressure exerted against the peripheral edges thereof and thus prevent crowding of the springs into overlapping relation to each other.

6. As a subcombination in a mattress, a core spring assembly comprising two layers of fibrous, substantially felted padding material spaced from each other, springs interposed between and having their end coils bearing directly against the bare opposed faces of said layers of padding, textile fabric means secured to the inner opposed faces of said layers of padding material by stitch-chains extending through said layers longitudinally and transversely of the same in alternation with the end coils of said springs and cooperating with said fabric means to maintain said springs engaged with said layers and against lateral movement relatively to each other, said layers of padding being compacted by said stitch-chains along lines extending laterally and longitudinally of said layers to thereby render the latter resistant to contraction and distortion by pressures exerted against the peripheral edges thereof.

7. A spring-filled mattress including a top wall structure consisting of a substantially felted appreciably thick layer of fibrous padding material presenting superficial loose ends of component fibres and an appreciably rough bare outer face, a series of rows of supporting springs having their end coils disposed in direct contact with the lower face of said layer of padding material, fabric means and sets of relatively transversely disposed stitch-chains cooperating with said layer of padding material to retain said springs in proper position relatively to each other, said stitch-chains passing entirely through and compacting said layer along the lines thereof to thereby convert the normally substantially plane upper face thereof into a substantially corrugated surface, a second layer of fibrous padding material supported upon and filling the hollows of said top face and engaged and held in place upon the top surface of said first-named layer by interlacing of the fibres of said layers with each other, and a cover fabric disposed over said second layer of padding material.

In testimony whereof, I have set my hand this 29th day of January, 1930.

LOUIS A. SUEKOFF.