METHOD OF BINDING UP COMPRESSED ELASTIC SPRING INSERTIONS AND AN ARRANGEMENT FOR EXECUTION OF SAID METHOD

John G. Jansson, Hemgardsaven 6, Kolsva, Sweden

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8 Claims

ABSTRACT OF THE DISCLOSURE

The method provides for compressing a set of elastic springs, followed by placing two strings respectively on opposite sides of the springs and then stapling the springs together at various points thereon. The apparatus provides means for accomplishing these steps.

The phrase elastic spring insertions in this application means sets of elastic springs, combined within a frame or the like, so that they may be mounted in elastic spring bottoms in beds, chairs, sofas or the like. Such elastic spring insertions are therefore produced from a substantial number of elastic springs, usually but not necessarily of diabolo forming. These springs have, in their un-tensioned state substantial axial length, which causes a corresponding thickness of the elastic spring insertion. During packing and transportation of such ready-made elastic spring insertions, it is necessary from the standpoint of space that the springs compressed and bound up in their compressed state. This compression has hitherto taken place by stacking a number of elastic spring insertions, compressing them between two plates and then binding up each elastic spring insertion. It is extremely difficult to bind up the insertions; experience has shown that the binding up will not be uniform, but rather the thickness of the compressed and bound up elastic spring insertion will vary, which disadvantageously influences the volume of storing and transportation.

The present invention relates to a method for first compressing elastic spring insertions and their binding then up in their compressed state. The invention also refers to machine operated or manually operated means, whereby the above mentioned disadvantages are effectively done away with. Certain purely mechanical arrangements are required according to the invention, independently of how one executes the compression, and whether or not the binding up takes place manually or by machine in a completely automatic procedure.

According to the invention the binding up takes place by means of two strings, which, by means of staples or the like are connected to each other in the inter-spacing between each couple of immediately after adjacent elastic springs and/or within the interior of said elastic springs in the elastic spring insertion. The two strings, bands or the like are thereby arranged to run continuously each on its side of the elastic spring insertion without being interwoven with each other.

The arrangement for the execution of this method, which is also included as part of the present invention, contains a device for compressing the elastic spring inser-
In these prior methods such binding up of the elastic spring insertions was complicated, because it is extremely difficult with hands or with tools to gain access between the tightly compressed springs. Long sticks were used to introduce the strings between adjacent springs. As should be the case, the ends around the periphery were held in their compressed state after pressure plates 20 and 21 were released, but the ability to retain the springs compressed at the interior was not as good upon release of the pressure plates 20 and 21.

The springs for binding up the borders have been tied together outside of the elastic spring insertions, usually at the edge of the elastic spring packet according to FIG. 2. When releasing the plates 20 and 21, to enable the elastic spring insertion to be used, one had only to cut off one of the strings close to one of the knots, whereafter they could without any difficulty be drawn out.

One form of execution of the invention is shown in FIG. 3 in the form of a couple of endless bands 26, 27, each running over a pair of directional rollers 28, 29 and 30, 31, respectively. If needed, one can arrange one or more support rollers 32, 33 for each of the bands. Preferably, at least one roller for each of the two bands, for instance, the rollers 29 and 31, is driven to move the bands 26 and 27.

The elastic spring insertion is fed between the two endless bands 26, 27 in the direction of the arrow 34 from a transportation table 35 and is successively compressed, so that it will have been compressed when it leaves the bands 26 and 27 between the rollers 28 and 30. It is then pressed between a couple of blocks 36, 37 in order to be bound up. The binding takes place by means of a couple of strings 38, 39, which are suitably fed from a couple of storing rollers not shown in the drawing. A stapling apparatus is provided, fed with staples, which will embrace the two strings 38 and 39, as shown in FIG. 4 and 5, where two such staples are shown at 40 and 41.

The stapling apparatus contains two tools 42, 43, the tool 42 containing a feeding device for the staples, whereas the tool 43 forms the cushion for bending the staples, so that they will rigidly embrace the two strings. The strings 38 and 39 are fed for this purpose each over one set of directional rollers, which in the drawing schematically indicated by means of the two directional rollers 44 and 45, from which the strings 38 and 39 run through channels 46 and 47, respectively, in the two tools the free ends being indicated by the numbers 48, 49. The tools 42, 43 are guided in such a way, that they move simultaneously toward each other by substantially equal amounts. The tool 43 is controlled by an eccentric disc 50, and the tool 42 by means of an eccentric disc 51 setting through a lever 52, so that the tool 42 will be displaced downwardly, simultaneously as the tool 43 is displaced upwardly.

In this way a binding up of the strings will take place by means of each of the flattened staples. Before the elastic spring insertion arrives at the place of binding, the ends of the two strings should be tied together. Then, according to FIG. 4, the strings are tied between adjacent elastic springs or, according to FIG. 5, tied in the interior of each elastic spring, as these springs pass through the stapling apparatus. The elastic spring insertion is thereafter transported in its compressed and tied state between a couple of support rails 53, 54, wherewith it can be packed, stored or disposed of in any other way for future use.

It is important that the tieing should be easy to resolve, which is effected by gripping one of the two free ends 48 and 49 and drawing them apart. For this reason the ends should be sufficiently long in order that they may be mounted into some suitable tool or some suitable machine. Further, it is necessary that the strings not be wound around each other.

Finally, the staples should have a rigidity and tension to maintain the elastic spring insertion in its compressed state against the tendency of the elastic springs to return to their uncompressed state, but that they will be flattened so as to release the strings, when an additional power is applied, caused by drawing in the two free ends 48, 49.

The strings must further have a rigidity which is sufficient, in order that they endure not only the tension from the compressed elastic springs in the insertion but also, in addition thereto, the power which is required when releasing in order to flatten out the staples by means of the strings.

It is evident from the above, that all of the elastic spring insertions when passing through the stapling apparatus will have a constant thickness after compression. The staples embrace the two strings so firmly that they cannot slide within the staples, whereby it is ensured that the elastic spring insertion after tieing will have a constant thickness over its entire extent. The tendency, earlier observed in elastic spring insertions, to bend out in the middle, will not take place when using the method according to the present invention.

The method according to the invention can be effected manually, using an equipment of the general kind, shown in FIG. 3, whereby one drives the elastic spring insertion step by step through the compression apparatus, and while the electric spring insertion is stationary, the stapling apparatus applies a staple. The method, however, can also be effected completely automatically by using a machine driving in synchronism the compression apparatus and the stapling apparatus 42, 43.

Usually an elastic spring insertion contains a greater number of elastic springs, arranged in rows, perpendicular to each other. It is usual to combine the elastic springs included in each row in the one direction by metallic spirals, meshing into the closed outer turns of the elastic springs. These spirals thereby keep the elastic springs contained in rows, perpendicular to the level of the paper in FIGS. 4 or 5, such as indicated at 55. The spirals, thus, may bind together, for instance the left edge of all outer turns in one row of elastic springs, parallel to the axis of the spiral, with the right edge of the row adjacent thereto, as shown in FIG. 5, or possibly they may run with their axes diametrically over the outer turns of the elastic springs in one single row, such as indicated in FIG. 4. In the last mentioned case, the springs interface between the turns of the spirals.

In order simultaneously to compress and bind up all of the elastic springs in one single elastic spring insertion, one may provide a plurality of machine tieing arrangements of the general type shown in FIG. 3, side by side, and in distances from each other, corresponding to the distances between the elastic springs, bound together by one single spiral 55. However, it should be observed, that the spirals 55 are intended permanently to remain associated with the elastic springs, when they are mounted in a piece of furniture, whereas the tieing strings 38, 39 are intended to be removed, before the elastic spring insertion is mounted into the piece of furniture.

What is claimed is:

1. A method for binding elastic spring insertions having a row of elastic springs in a compressed state, comprising placing a string over the springs on one side thereof and placing a string over the springs on the other side thereof, and stapling the strings together at various points thereon to maintain said springs in their compressed states.

2. The method according to claim 1, wherein the staples are applied to the strings between adjacent springs.

3. The method according to claim 1, wherein the staples are applied to the strings in the interiors of the springs.

4. Apparatus for compressing and binding elastic spring insertions including a row of elastic springs, comprising means for compressing the elastic springs, means for placing a string over the springs on one side thereof and
5. Apparatus according to claim 4, wherein said stapling means includes a first portion for feeding staples and a second portion for bending the staples around the strings, said portions respectively having feeder elements to feed the strings in place on the springs.

6. Apparatus according to claim 5, wherein the staples are applied to the strings between adjacent springs.

7. Apparatus according to claim 5, wherein said portions are operated by eccentric discs.

8. Apparatus according to claim 4, wherein the staples are capable of holding the strings with substantially no sliding therebetween.

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