July 17, 1951 G. L. GERBER 2,561,108

SEAT ROLL CONSTRUCTION FIXTURE

Filed June 14, 1950 5 Sheets-Sheet 1

Fig. 1.

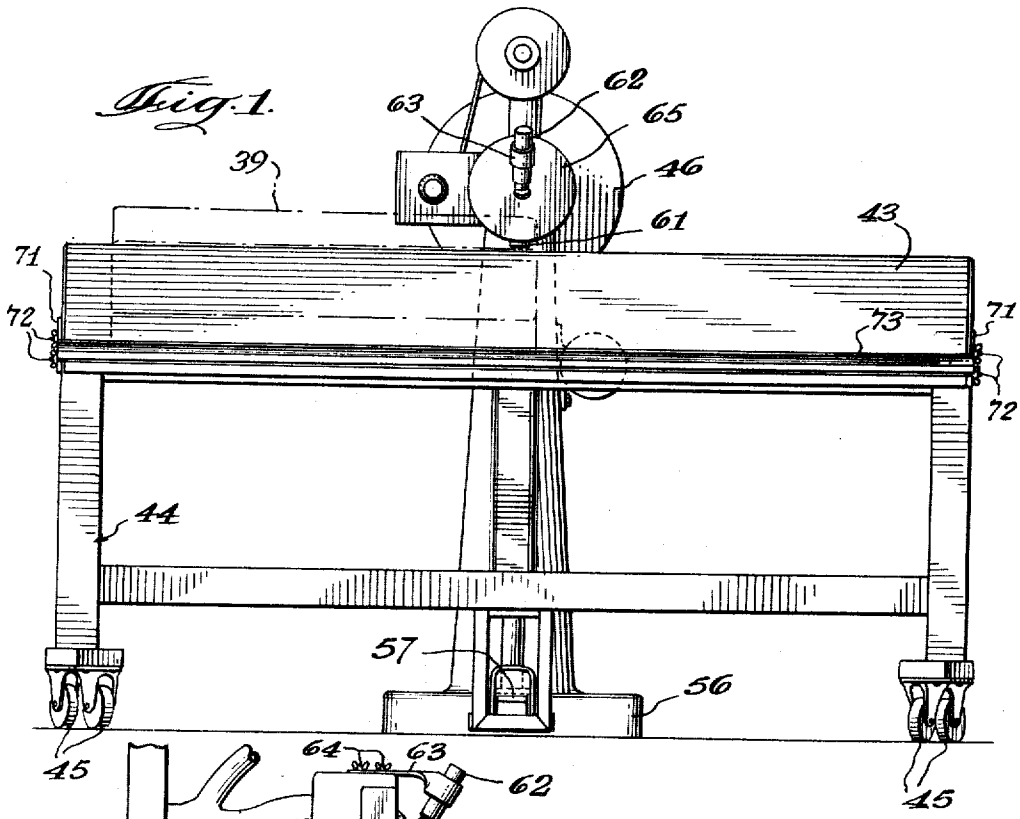
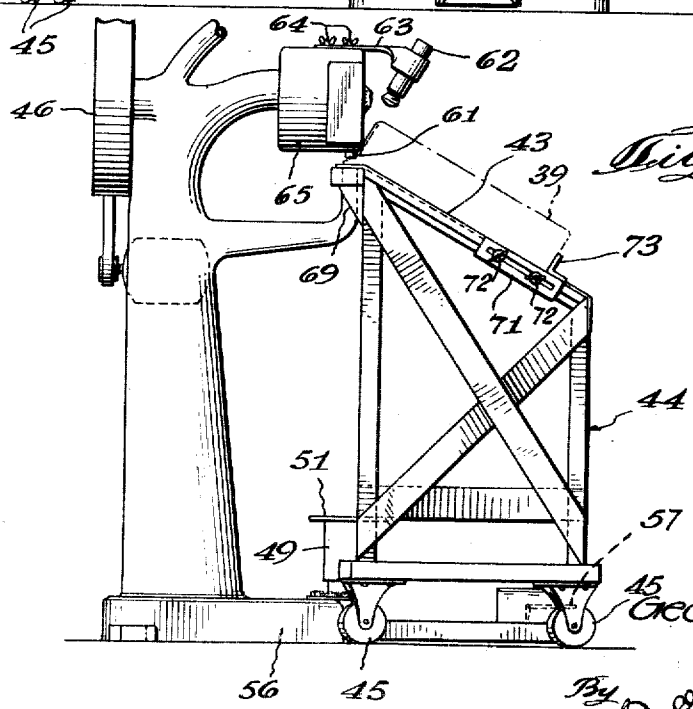


Fig. 2.



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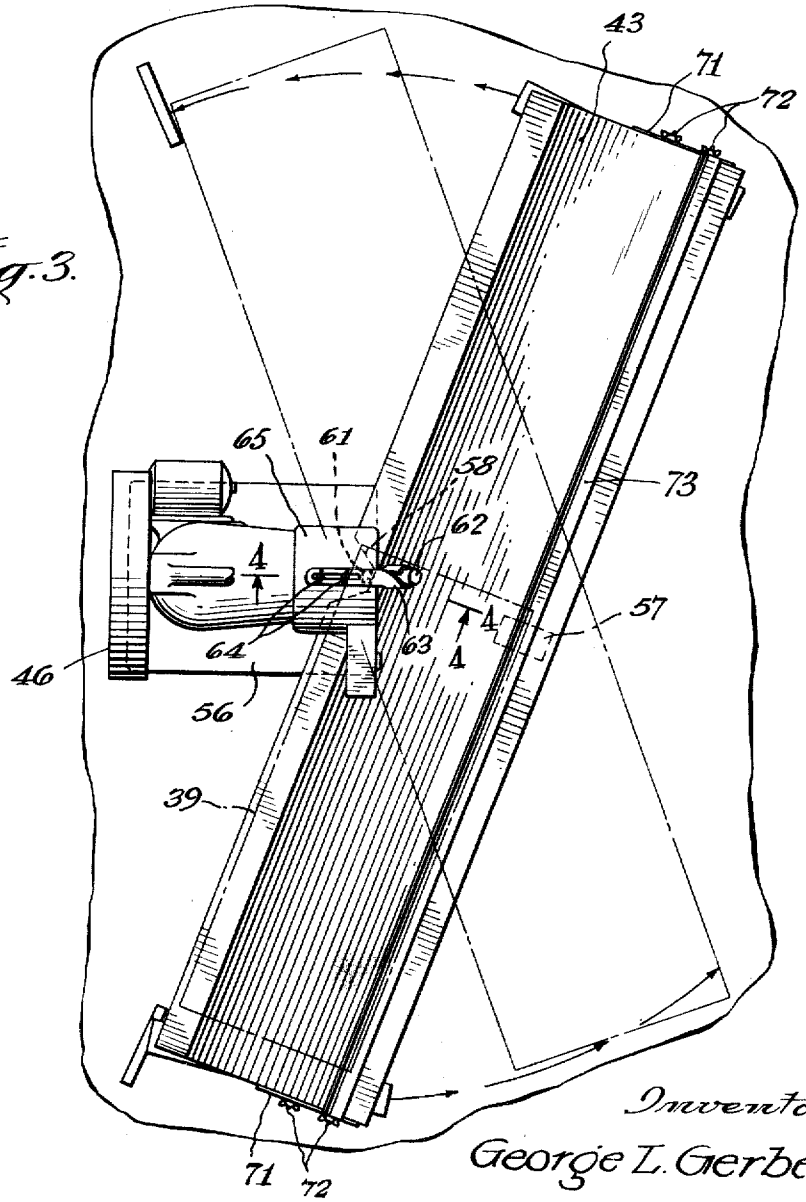
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SEAT ROLL CONSTRUCTION FIXTURE

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Fig. 3.



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SEAT ROLL CONSTRUCTION FIXTURE

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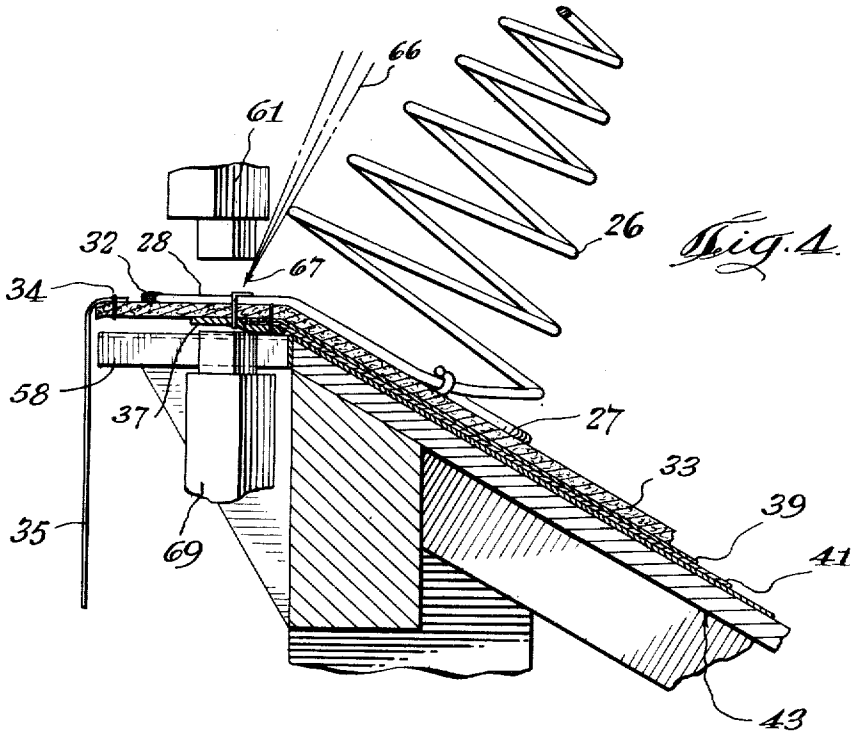
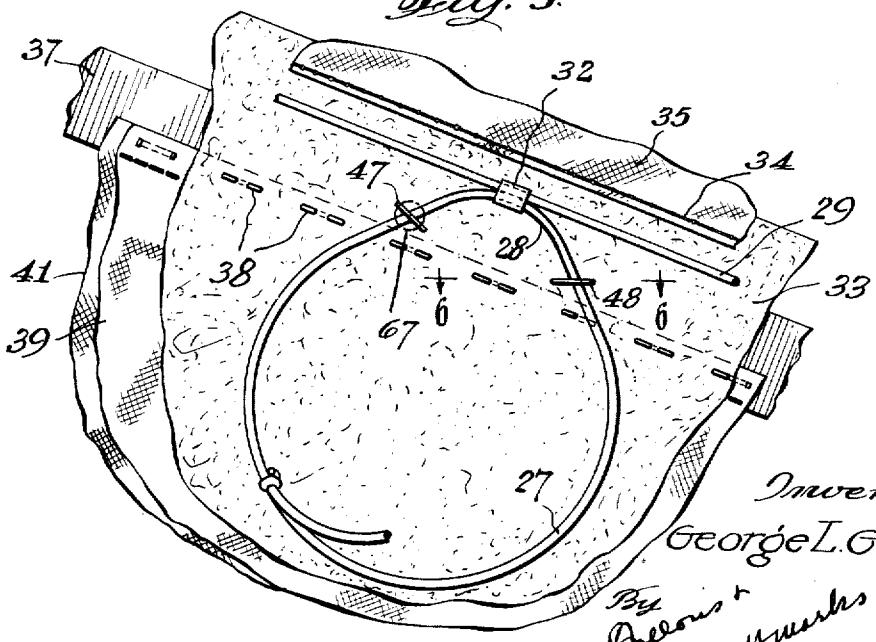


Fig. 4.

Fig. 5.



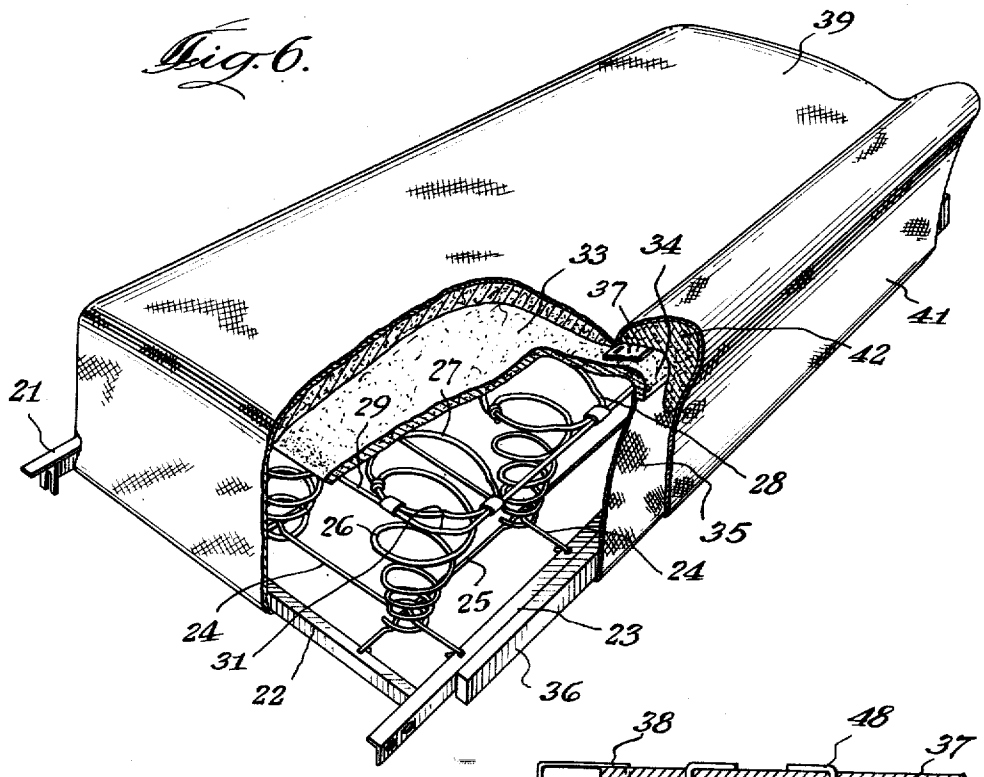
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July 17, 1951 G. L. GERBER 2,561,108

SEAT ROLL CONSTRUCTION FIXTURE

Filed June 14, 1950 5 Sheets-Sheet 4

Fig. 6.



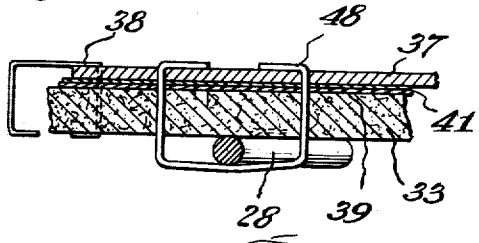


Fig. 7.

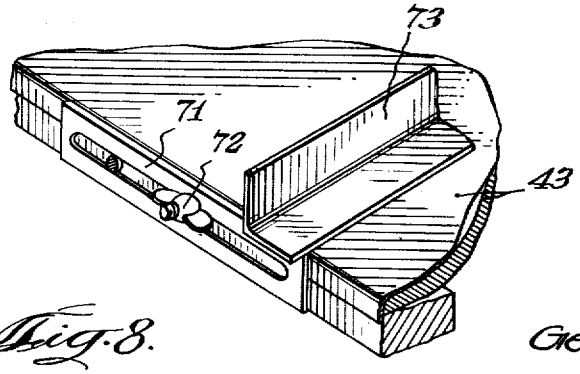


Fig. 8.

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SEAT ROLL CONSTRUCTION FIXTURE

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Fig. 9.

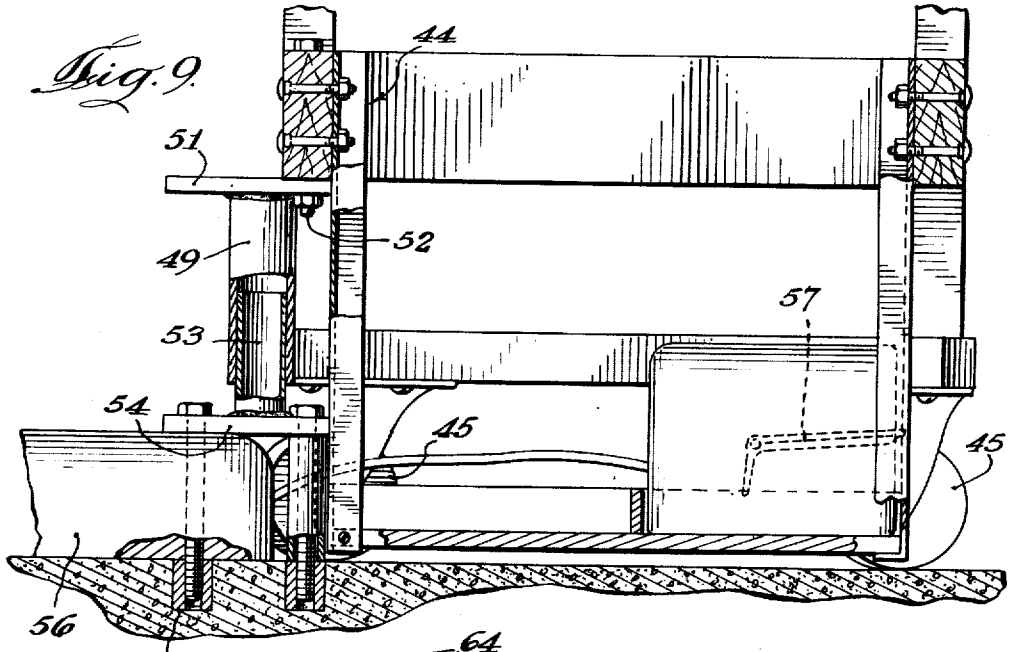
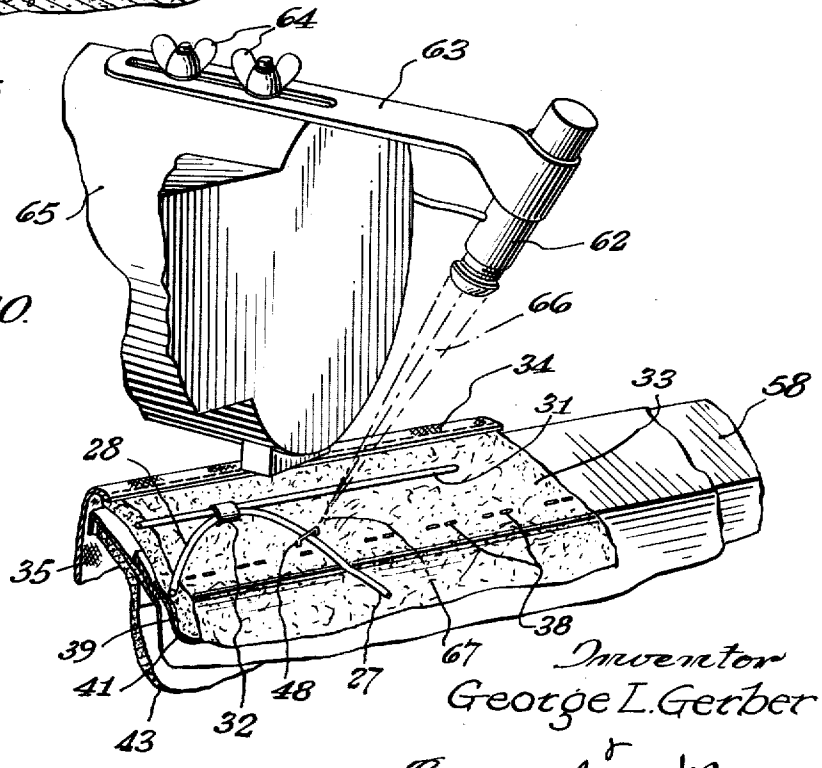


Fig. 10.



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UNITED STATES PATENT OFFICE

2,561,108

SEAT ROLL CONSTRUCTION FIXTURE

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Application June 14, 1950, Serial No. 168,059

7 Claims. (Cl. 1—2)

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The present invention relates to production line manufacturing apparatus for assembling various kinds of cushion for upholstered furniture. It is more particularly concerned with staple-securement of covering fabrics to spring assembly units such as are employed in sofas, parlor chairs and other living room pieces.

This application is companion to co-pending application Serial No. 163,587 filed May 23, 1950, in which there are revealed certain novel improvements in the manufacture of parlor furniture seat cushions characterized by their teaching of a novel edge roll or lip formation which serves the purpose of retaining one or more loose or removable cushions such as are customarily placed over cushion spring bases whereby to prevent such cushions from creeping or otherwise becoming dislodged. As revealed in said co-pending application the improved edge roll structures consist of an especially formed foundation lip achieved by eccentric deformation of the uppermost convolutions of a front row of seat cushion springs so as to produce a skeleton or foundation and over which a padded ledge is thereafter made secure.

The instant invention concerns itself with special service apparatus which is adapted to handle such deformed convolution spring assemblies and which fastens by staple-stitching the eccentric deformations of such springs to an overlay padding assembly including a matted sisal pad having substantial thickness to protect users from the discomfort of the coil wire irregularities.

The problem presented in the practice of this invention is one of appropriately accommodating a unitary assembly of such springs in which the corresponding convolutions are parallelly deformed so as to facilitate the staple-stitching operation in a facile and expeditious manner with the object in view of performing the securement operation under high productivity methods of factory assembly. In this manner the cost element, with particular concern to economy and infallibility, may be maintained low by relatively unskilled or at best moderately skilled labor technicians. Because it is also a purpose of this invention to perform the aforedescribed stapling operation after certain subassembly components have been separately integrated into, it is of significance that the apparatus of the instant invention is especially suited to the handling of spring cushion subassemblies and cover unit subassemblies, each of which has been brought up to complete integration without encountering conflict in respect to accessibility and variation dimensionwise.

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Accordingly, the principal object of the present invention is one which may be expressed as achieving a work table and stapling machine combination suited to the purpose of staple-stitching multiple coil spring convolutions having comparatively rigid physical dimensions to a subassembly of covering fabrics under conditions of rapid handling and execution.

Another object of the present invention is one of accommodating a cushion spring assembly and covering unit through mutual integration operations where the springs of said assembly are deformed for the purpose of producing a foundation for a padded lip or edge roll effect.

Further and additional important objects of this invention are such as will become evident from a reading of the hereunto appended claims.

In the accompanying drawings—

Fig. 1 is a front elevational view of a work table and stapling machine apparatus having embodied therein certain features of the present invention,

Fig. 2 is a side elevational view of the same apparatus with portions broken away,

Fig. 3 is a plan view of the apparatus featured in Figs. 1 and 2 showing the work table in solid and dotted outline to denote alternative angles of relationship thereof with the stapling machine,

Fig. 4 is an enlarged detailed sectional view taken approximately on line 4—4 of Fig. 3,

Fig. 5 is an enlarged fragmentary elevational view showing the work table sans the apparatus structure featured in Fig. 4,

Fig. 6 is a perspective view of an upholstered base cushion and its applied covering produced in accordance with the teachings of the co-pending application referred to above,

Fig. 7 is a further enlarged fragmentary detailed view of a principal stitch-staple construction such as is used with deformed convolutions by the apparatus featured in Figs. 1–3,

Fig. 8 is an enlarged fragmentary perspective view of one of the work retaining brackets carried at each end of the supporting table structure,

Fig. 9 is an enlarged side elevational view, partially in section, showing the floor mounting and treadle apparatus which relate to the principal structures featured in Figs. 1 and 3, and

Fig. 10 is an enlarged fragmentary perspective view of a portion of the work table and stapling machine mechanism showing how a locating spot light is employed for accurately determining the precise staple area in advance of each staple forming and securing operation.

Articles of parlor furniture such as divans, overstuffed chairs and dual purpose davenports

are customarily provided with a spring filled seat base, Fig. 6, that may vary dimensionally in length and width, according to style and preference. Under improved methods of construction these units are ofttimes assembled on a rectangular frame work of angle iron components designated 21, 22 and 23 secured together at their junction by riveting or welding so as to provide horizontally extending flanges. Through regularly spaced apertures in these webs or flanges there are made fast coordinate rows of joist springs 24 and 25. At the intersection of these joist springs or rods 24 and 25 there are secured in any of several well known manners of practice upstanding helical compression springs 26 of conical or hypoid outline, so shaped as to present uppermost their largest-in-diameter convolutions 27. These springs are preformed so that the aforesaid outermost convolutions 27 are eccentrically bent or deformed, see Figs. 4 and 5, producing angling lip formations 28 that possess a common angular relationship with the planes in which the major portion of their convolutions 27 lie.

The aforedescribed spring deformations are characteristic of the front row only of the multiple rows of springs which constitute the basic spring assembly best portrayed in Fig. 6. Various methods are employed for stabilizing these springs to yieldably maintain their upright position such as by interlashing with cross connector elements or as by interweaving with continuously traversing so-called pigtail coils. In addition, the entire assembly is made more secure by being perimetrically bounded with a form wire 29 adapted to lie in the principal plane which is common to all of the convolutions 27. Form wire 29 is made to conform further with the assembly by being bent as at 31, Fig. 6, angularly in correspondence with the lip deformations 28. At each point of tangency where the form wire 29 circumscribes the outermost convolutions 27 it is lashed thereto by an enveloping clamp 32 and in this way the metallic assembly of spring is rendered integral and relatively rigid while at the same time there is afforded the desired degree of yield or compressibility for making the base cushion unit comfortably compressive to accommodate the general purpose and objects of upholstered parlor furniture.

After the metallic spring assembly has been integrated in the manner generally outlined above, it is necessary to cover the entire structure with a subassembly of several fabrics whose purposes are to conceal, supply smoothness, and form padding, as well as to provide adornment or ornamentation which characterizes in color and style each particular article of furniture. For example, there will be observed that the assembled coil springs are covered by a thickness or pad of matted sisal 33 which consists of an intertwined and evenly distributed fibrous pad well known under other methods of furniture manufacture and preferably having one or the other of its surfaces dipped into a plastic binder such as rubber. The length and width of pad 33 is usually such as to overlie and extend beyond the perimetric outlining wire 29. The outermost edge of pad 33, see Figs. 4, 5 and 10, is stitched as on a stitch line 34 to a burlap strain relieving fabric 35 which in the ultimate product remains concealed from view, having its free end anchored to a nailing strip 36 or otherwise made fast as suits particular manufacturing preferences.

Paralleling the row of stitching 34, Fig. 5, the several fabrics generally referred to above are in

advance secured to one another and to a narrow cardboard form strip 37 by a row of metal stitching staples 38. Included in this integration of fabrics and form strip 37, in addition to the already described sisal pad 33 are a pair of fabrics designated 39 and 41. The latter two, as may be discerned from Figs. 4 and 6, include the utility covering 39 which encases completely the spring assembly structure in respect to its top and three of its peripheral sides, while the ornamentation fabric is doubled over to retain the edge roll padding strip 42 and thereafter parallels and conceals the already discussed strain relieving fabric 35, being also nailed to the bottom structure as at the nailing strip 36 or alternatively to impaling prongs as disclosed in the co-pending application.

The present invention concerns itself with certain procedural steps in the assembly as a result of which the springs 26, and more particularly the uppermost convolutions of them 27, are made fast to the sisal pad 33. To accomplish this association and securement under production live methods of treatment, the subassembly of fabrics featured in Figs. 4 and 5 is turned inside out and laid with the sisal pad 33 topmost on an inclined-plane work table 43. Referring now more particularly to Figs. 1–4, the table 43 is mounted on a suitable base support or frame generally designated 44, that is supported on four roller wheels 45 directionally disposed in a manner to describe an arcuate travel course on which they may be expected to roll, see particularly Fig. 3. In this way the work table 43 may be made to assume the solid outlined position or dotted outlined position alternatively, as the stapling machine 46 maintains permanently the position shown thereat and also in Fig. 2. The purpose of affording the arcuate path adjustable alignment table 43 is one of accommodating for the particular angular placement of the securing staples 47 or 48, Fig. 5, since the two straightsided sections of the spring deflection 28 angle in symmetrical opposition with respect to each other as well as to the principal convolution 27.

In operation, therefore, when the table 43 is placed into either of its alternative positions, the operator will slide the spring assembly and the fabric subassembly, one placed upon the other, longitudinally across the table at the same time completing the placing and securement of all of the staples 48 and thereafter by reversing the position of the table 43 repeat the same procedure in placing all of the staples 47. It has been found that by performing these operations in this manner the accomplishment of full staple securement involving the integration of the convolutions 27 to the sisal pad 33 is attainable most expeditiously and within the shortest operating time.

The swinging of the table 43 on its roller wheels 45 while maintaining firm anchorage of the center portion in respect to the stapling machine 46 may be made a more infallible and easier to manipulate function by providing a pivot sleeve 49, Fig. 9, which extends downwardly from a mounting fixture 51, bolted as at 52 to the principal structure 44 of the frame work. The pivot sleeve 49 rests over and receives an upstanding pintle 53 which is made fast to the stapling machine by rigidifying brackets 54 shown in Fig. 9 to be bedded as at 55 in a concrete floor. The brackets 54 may also pass through the footing 56 or base portion of the stapling machine 46.

At the front of the stapling machine 46 and near the center of the table 43 there is provided for easy access by the operator's foot a treadle 51, preferably spring loaded, and adapted to control an electric contact element in the manner well known in stapling machine control whereby for each treadle operation a single stapling forming and applying performance is accomplished. The manner in which the electrical circuit for performing supervision over the stapling machine is operated forms no part of the present invention but instead may be any one of several well known control systems practiced in the art of staple operation.

As the work is slid across the inclined table 43 a narrow horizontal table ledge 58, Figs. 4 and 10, which forms the same angle with respect to the principal table surface 43 as is characteristic of the flare of the deflected spring portions 28 in respect to their convolutions 27 is provided for the purpose of affording adequate ledge support to the assembly as it is slid longitudinally and progressively from spring to spring to align the respective spring portions with the stapling machine hammer and anvil 61. Proper alignment is in this way made known to the operator before he steps upon foot treadle 51, by means of a bullseye lighting apparatus 62 carried on an adjustable bracket 63 which is mounted as at 64 to the stapling head 65. The beam of light 66 which emanates from the lighting fixture 62 is convergent so as to produce a small arear locating circle 67, Fig. 5, at the proper place in the wire of deflected spring portion 28 whereafter the depression and actuation of the stapling head and its encounter with the stapling anvil 69 may be predetermined with finite reliability and accuracy.

Since the width of spring cushions may vary within limited ranges it has been found expedient to provide an adjustment as shown in Fig. 8 which includes a pair of slideable side brackets 71, wing-nut secured as at 72, to the table 43 and carrying an angle bracket 73. This bracket extending across the full length of the table, Figs. 2 and 3, prevents the spring cushion assembly from becoming misaligned as it is slid along the table 43. In this way the securing staples 47 and 48 may be applied to integrate the fabric and steel spring subassemblies to one another with maximum efficiency and under high production speed methods.

While the present invention has been explained and described with reference to a particular embodiment, it will be understood nevertheless that numerous variations and modifications are susceptible of incorporation without departing from its essential spirit or scope. It is accordingly not intended to be limited, for an understanding of the invention to the particular illustrations shown in the accompanying drawings, nor to the arbitrary language chosen in the foregoing description but instead to be afforded a latitude of interpretation as is inherent in the hereunto appended claims.

The invention claimed is:

1. An apparatus for stitching together a spring filled steel subassembly and a multiple fabric and padding subassembly which comprises, a work table carried upon a mobile support structure, caster wheels under said support structure disposed to direct said structure to be rolled to and fro about an arcuate path, an automatic staple forming and clinching machine associated with said structure and work table, a pivotal articulation connecting said structure with a base portion of said staple-forming and clinching machine and constituting the pivotal center of said arcuate path, and a control treadle for operating said stapling machine mounted upon said structure.

2. A production line stitch-stapling apparatus for securing to furniture base spring assemblies their fabric and pad coverings which comprises, a work table having an inclined surface portion merging with a horizontal surface portion, said work table being mounted upon a rigid support base and being provided at its approximate center beneath said horizontal surface portion with a pivot coupling element, a staple forming and clinching machine electrically operated and having a base extremity on which is carried a cooperating coupling element for affording a vertical pivot with said first mentioned pivot coupling element, a work support guide transversely adjustable on said work table inclined surface portion for maintaining superimposed spring and fabric assemblies in longitudinal parallelism as they are advanced during line stitching by said machine, and a light beam projecting apparatus adjustably supported on said machine for precisely locating staple application areas on said assemblies.

3. A special purpose assembly line apparatus for staple stitching onto a spring filled subassembly a multiple fabric and overlay padding subassembly which comprises, a work supporting table carried upon a pivoting base structure, wheels under said pivoting structure placed to roll about an arcuate path, guide fixtures adjustably securable to said table for confining work advanced thereon to parallel linear movement, an automatic staple forming and clinching machine associated with said work table, and a pivotal articulation connecting said structure with a base portion of said staple forming and clinching machine and constituting the pivotal center of said arcuate path.

4. An assembly line stitch stapling apparatus for securing to metallic base spring subassemblies their covering subassemblies which comprises a work table having an inclined surface portion merging with a horizontal surface portion at an angle which corresponds to that at which an edge row of the metallic springs of said subassemblies have their uppermost convolutions angularly and in parallel alignment bent, said work table being mounted upon a support base provided at its approximate center beneath said horizontal surface portion with a pivot element, a staple forming and clinching machine having a base extremity on which is carried a cooperating pivot element for forming a vertical axis pivot with said first mentioned pivot element, guide means transversely adjustable on said work table inclined surface portion for directing said subassemblies parallelly, and a light beam projecting apparatus carried by said stapling machine for indicating the striking area of staples applied and clinched by said machine.

5. A machine for securing fabric covering subassemblies to seat cushion spring coil subassemblies in which the forward row of spring coils have their uppermost convolutions parallelly and similarly deformed to provide a seat roll lip foundation comprising, a principal work table having an inclined portion to support the major area of the spring coil subassemblies and a horizontal surface portion to support the deformed parallel spring convolution portions, a machine for automatically forming wire staples from a coil of supply wire and for applying and clinching said

staples to integrate said forward row of spring coils along a stitch row to the fabric subassemblies, vertical pivot means coupling said work table with said stapling machine, said vertical pivot means having its pivot axis in vertical alignment with the staple applying and clinching area of said machine, a roller system for permitting said work table to be rotated within a limited arc radius about said vertical pivot, and means adjustably carried by said work table for confining work supported thereupon for travel in longitudinal parallelism with said work table whilst maintaining constant spaced alignment with respect to said stapling area.

6. A production line apparatus for applying stitching staples to upholstery fabrics comprising an electrically operated stitching staple forming and clinching machine having a target anvil at a horizontal level and a stapling hammer disposed for operation over said anvil, a base portion to said machine having a vertically upstanding pintle, a work supporting table carrying arcuate path aligned caster rollers and having a pivot element for receiving said pintle, said supporting table including a horizontal surface portion at a level corresponding with said stapling machine anvil and an inclined surface portion angling downwardly from said horizontal surface portion, and an adjustable means securable to said inclined surface portion of said table to constitute a guide for directing the movement of work to

be slid longitudinally along the surface of said table parallelly whereby to expose successive areas in a linear path to the staple applying elements of said stapling machine.

7. An assembly line apparatus for stapling fabric covering subassemblies to seat cushion spring coil subassemblies in which the forward row of spring coils have their uppermost convolutions similarly deformed to provide a seat row lip foundation comprising, a principal table having one surface inclined to support the major area of the spring coil subassembly and another surface for supporting the alignment of deformed spring convolution portions, a machine for automatically forming wire staples from a coil of supply wire and for applying and clinching said staples to encompass said spring coil convolutions and their adjacent fabric coverings, vertical pivot means for articulating said table and said stapling machine, said vertical pivot means being in vertical alignment with the staple applying and clinching apparatus of said machine, a roller support structure for permitting said work table to be rotatably adjusted within an arc about said vertical pivot, and means carried by said work table for guiding work supported thereupon to travel in longitudinal parallelism with said work table.

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No references cited.