April 24, 1956 G. L. GERBER 2,742,958

SEAT ROLL CONSTRUCTION

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Fig. 1.

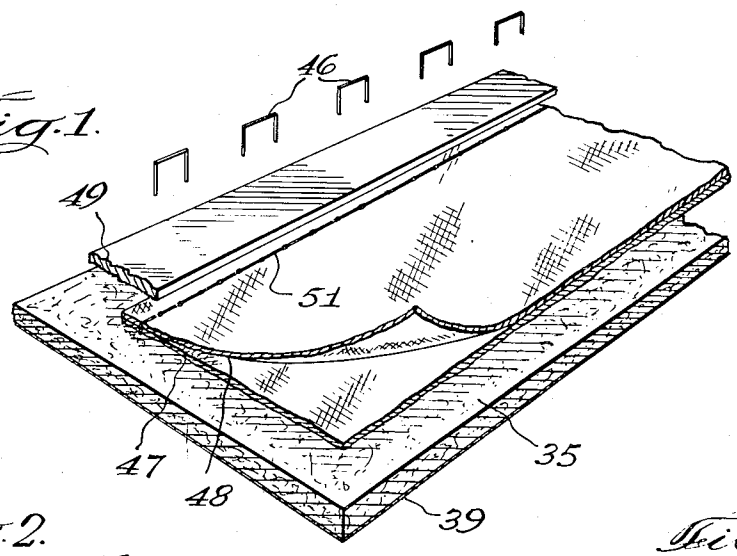


Fig. 2.

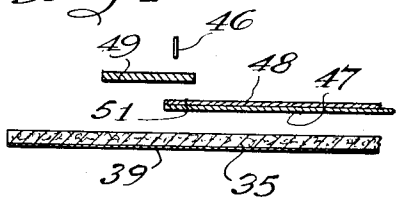


Fig. 3.

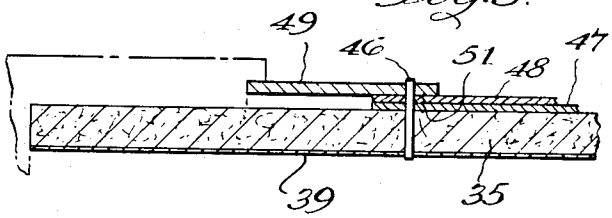


Fig. 5.

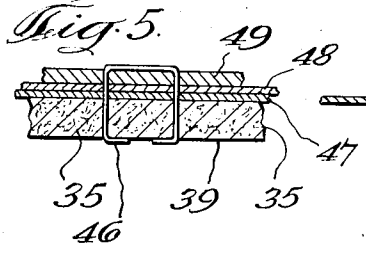


Fig. 4.

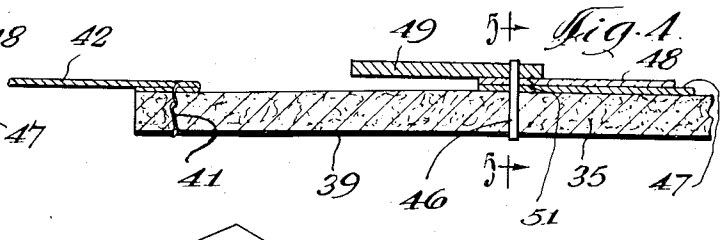
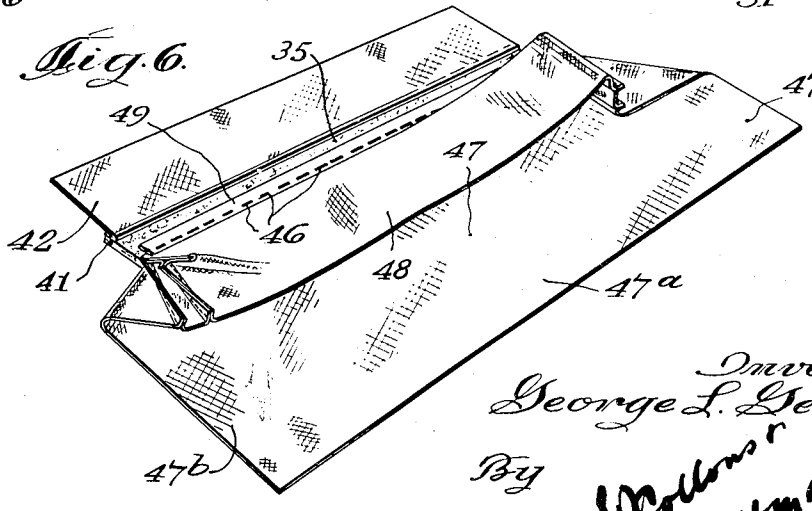


Fig. 6.



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Fig. 7.

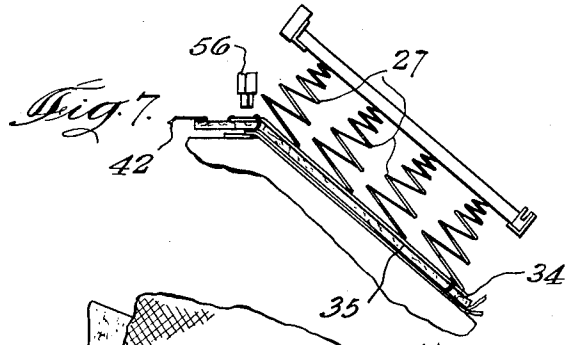
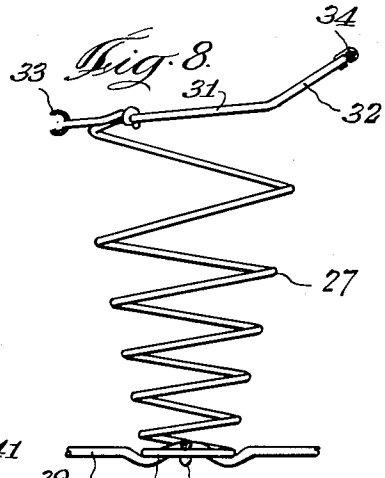


Fig. 8.



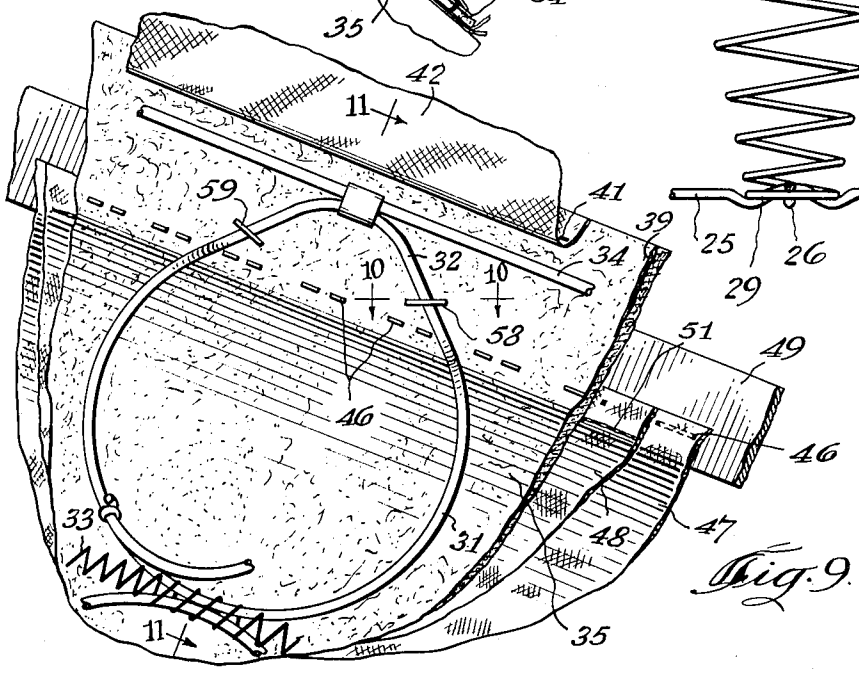


Fig. 9.

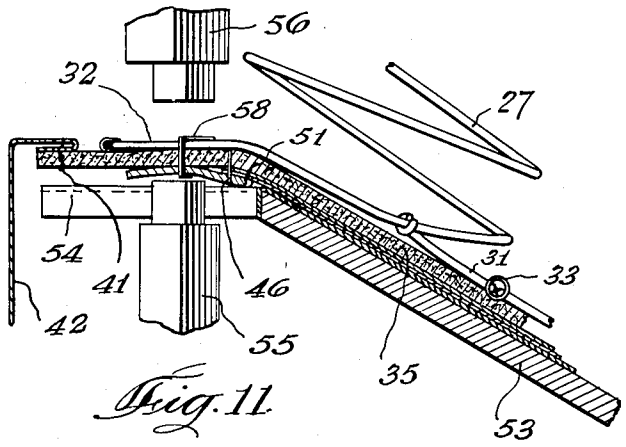
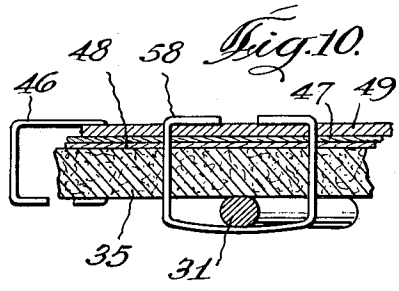


Fig. 11.

Fig. 10.



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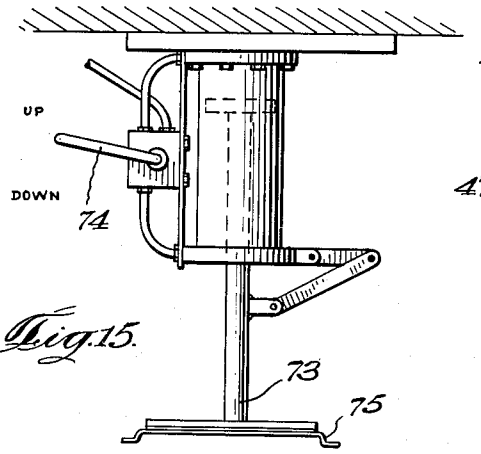


Fig. 15.

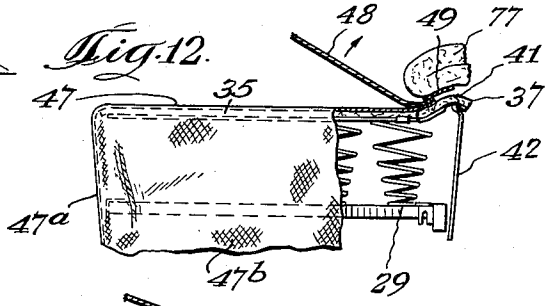


Fig. 12.

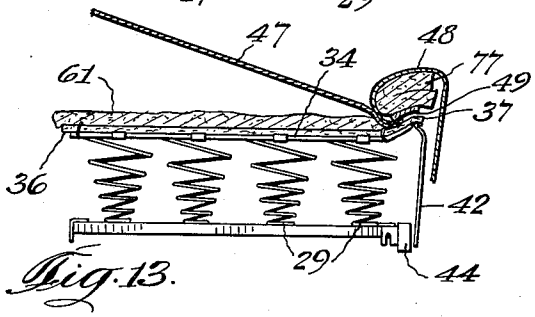
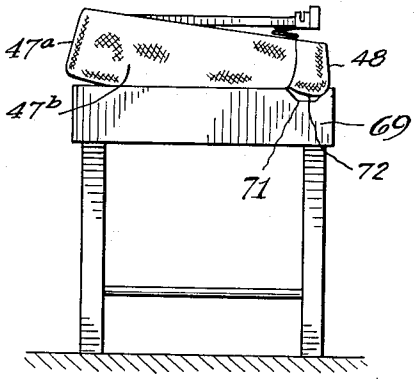


Fig. 13.



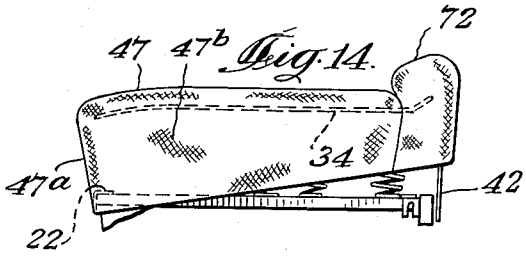


Fig. 14.

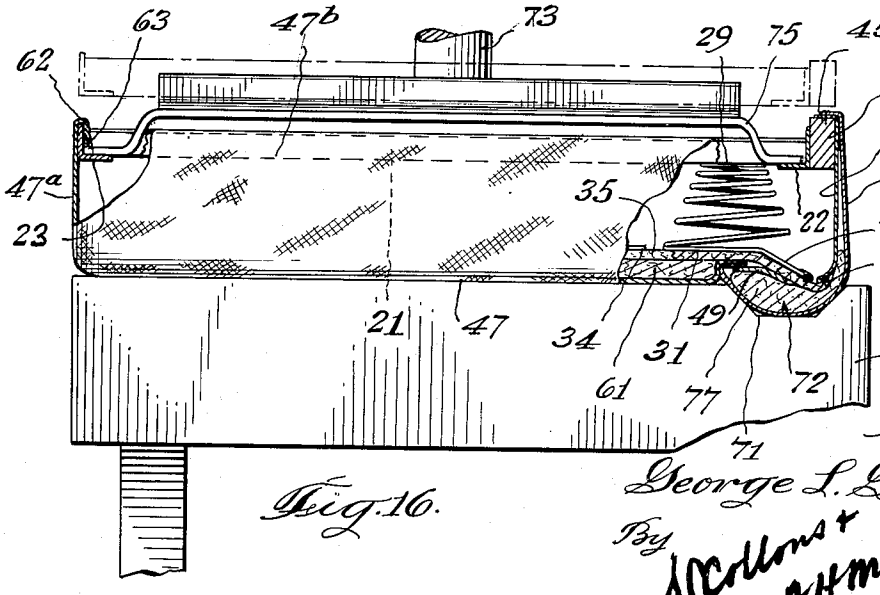


Fig. 16.

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SEAT ROLL CONSTRUCTION

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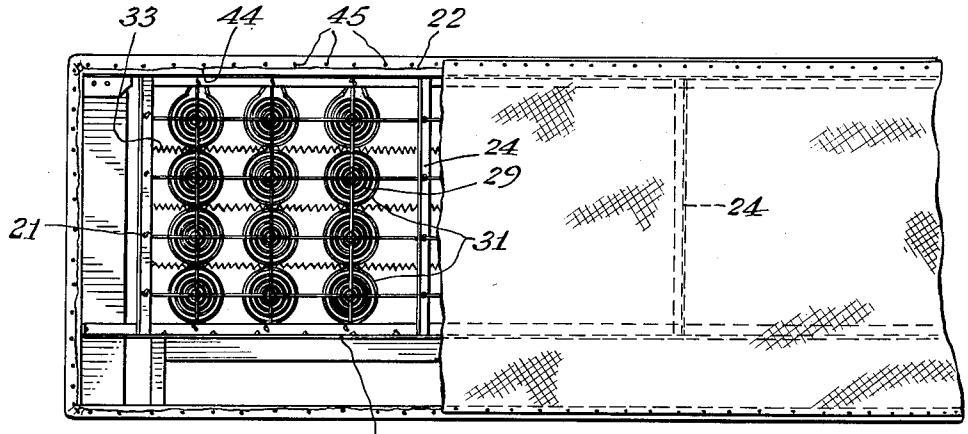


Fig. 17.

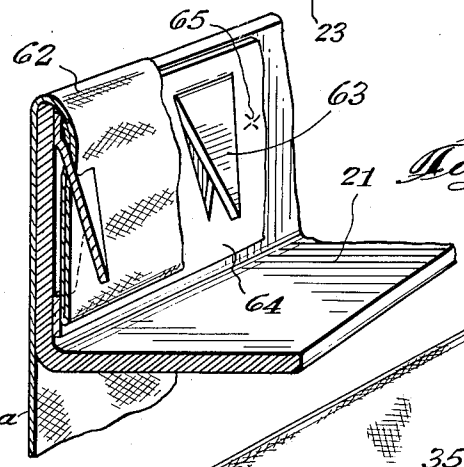


Fig. 18.

Fig. 19.

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SEAT ROLL CONSTRUCTION

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Application May 23, 1950, Serial No. 163,587

8 Claims. (Cl. 155—181)

The present invention relates to upholstered furniture and is concerned particularly with structural details of seat spring assemblies and production line methods of processing and assembling seat edging and other seat spring details.

Various articles of parlor furniture having particular reference to sofas, arm chairs, and the like, are provided with fabric covered upholstered sections in back and side arm portions of the principal furniture pieces and in addition the same ornamental fabric which constitutes the predominant covering is frequently also employed for encasing a removable seat cushion or cushions. The latter members are predeterminedly designed to nest between the side arms of parlor furniture articles and to extend forward of a rear wall component under suitably retentive conditions so as to assure that the cushions are maintained substantially in vertical alignment with the forward edge. Conventionally the base of such parlor furniture articles are made up of fabric encased framework and are filled with coordinately aligned compression springs. These, in addition to the springs which are contained in the removable seat cushions provide abundant resiliency and compressive action to give to these furniture articles the quality of adequate body conformation and comforting rest support.

In order to prevent the removable seat cushions from creeping or otherwise working out of their nested position, as aforedescribed, between the furniture article side arms and back member, the base spring assemblies are provided with an angling protrusion or defining lip at the forward corner edge, which in itself is required to possess ample resiliency and yet sufficient rigidity to serve as a retaining barrier. This practice is deemed necessary to retard creeping effects which may otherwise impair the stability of removable seat cushions. It is the formation of this lip or edging which constitutes a principal subject of the present invention since it concerns itself with various fundamental departures from prior practices in these regards.

Seat rolls or edging of this class generally speaking, has been known and widely used in all forms of parlor and vehicle seat constructions particularly where removable cushions are utilized which are to be superimposed over a primary compressible base for affording deep action resiliency. The problem presented is one of producing a padded edge roll which is able to withstand the rigors of severe and continuous usage as is its requirement under usual household utility conditions. Endurance qualities of such structures are tested under laboratory conditions by thrusting concentrated weights ranging from between 200 and 600 pounds under a variety of action such as downward thrusts, kneading and overroll movements.

The principal spring assembly in this type of device is customarily made up of a rectangular cluster of multiple convolution cylindrical or hyperbolic coil springs or of inverted conical coil springs whose uppermost and usually greatest diameter terminating convolutions are

brought into lateral alignment with each other by edge to edge placement and coupling. Lateral uniformity is further stabilized by providing these spring assemblies with perimetrically secured defining edge wires which encompass all of the abutting outermost and uppermost convolutions tangentially and which are frequently secured at their multiple points of tangency by appropriate forms of clamps or binding devices.

Because unification of the spring assembly necessitates that the perimetric binder of metal to be rather firm and of but slight flexibility it is necessary that the edge roll construction superimposed upon or encompassing this wire, possess adequate padding to prevent material interference with comfort. On account of the physical characteristics of this wire, as well as to prevent any undue abrasive wear upon the fabric to develop a padding is provided which encompasses the front edge of the perimetric wire. It is further important that the edge roll be produced within established cost limits as indicated by prior art practices. Accordingly, the economics which dominate redesigning of this furniture detail require that the labor and material costs which enter into the construction total little more or preferably less than the costs essential to prior art practices of comparable utility.

A principal object of the present invention therefore is one of providing a seat roll construction for upholstered furniture which lends itself to production line methods of assembly under manufacturing conditions of comparable ease and facility, which require low cost composition elements that may be procured in unlimited markets at costs favorable to competitive practices, and which may be assembled with expenditures of time and labor less than the costs so required under other methods of treatment.

Another object of the present invention is to devise a seat roll construction the building up and sub-assembling of which may be performed as a complete preliminary or bench operations under specialized shop conditions of assembly line continuity as distinguished from other treating operations requiring non-homogeneous and mutually interfering manufacturing operations to be performed contemporaneously.

Further objects of the present invention are such as will become evident during the course of the following detailed explanation and such as will be understood from a reading of the hereunto appended claims.

For a better understanding reference will now be had to the particularized description following and by reference to the accompanying drawings, in both of which, like reference characters designate corresponding parts throughout, and in which:

Fig. 1 is a perspective view of a fragmentary seat roll construction with component parts spaced from each other in exploded displacement.

Fig. 2 is a transverse sectional view through the elements shown in Fig. 1.

Fig. 3 is an enlarged sectional detail view showing the same arrangement of elements in an advanced condition of assembly.

Fig. 4 is a transverse sectional view similar to Fig. 3 showing a further advanced condition of assembly.

Fig. 5 is a fragmentary sectional view taken approximately on line 5—5 of Fig. 4.

Fig. 6 is a perspective view of the seat fabric subassembly for a parlor chair or similar article of furniture in readiness for application to the seat frame and spring members.

Fig. 7 is a transverse sectional view of a stapling machine bench showing the fabric assembly thereon in a

preliminary stage of securement to the coil spring framework.

Fig. 8 is an enlarged side elevational view of one of the conical spring coils of which the uppermost convolution is modified in accordance with certain features of the present invention.

Fig. 9 is an inverted elevational detail view of a modified seat coil featuring its manner of staple securement to the fabric and securing strip assembly.

Fig. 10 is an enlarged detail sectional view taken approximately on line **10—10** of Fig. 9.

Fig. 11 is an enlarged detail sectional view taken approximately on line **11—11** of Fig. 9.

Fig. 12 is a side elevational view with portions illustrated in section revealing a furniture seat frame assembly in readines for final finishing operations including placement of the seat roll batt strip.

Fig. 13 is a view similar to Fig. 12 revealing additional cross section and indicating advanced stages of final assembly.

Fig. 14 is a side elevational view similar to Figs. 12 and 13 without sectional breakouts illustrating a completed application and tuck-in of the perimetric covering fabric.

Fig. 15 is a side elevational view of a final operation compression fixture for depressing the upholstery springs prior to securing the perimetric tuck-ins.

Fig. 16 is an enlarged elevational view of the compression fixture anvil member or nesting support shaped to accommodate a particularly shaped seat cushion product.

Fig. 17 is an inverted plan view of an article of parlor furniture with a portion of the mask fabric removed to reveal certain details in regards to cushion construction embodying the features of the present invention.

Fig. 18 is an enlarged fragmentary perspective view of a seat frame angle iron frame member provided with a welded anchor strip in which are formed impaling hooks for securement of the perimetric fabric tuck-ins, and

Fig. 19 is a general perspective view of an angle iron framework base cushion construction with portions broken away to illustrate the various interior details.

Spring cushioned seat assemblies for automobile or furniture articles are conventionally built in the general manner of disposing on a firm support a plurality of steel spring helixes in coordinate rows as shown in Fig. 17 and 19. The principal supporting body of these structures is comprised of a rectangular frame assembly which includes side members **21**, front and rear members **22** and **23** and, in the case of long span articles, intervening transverse intermediate beam members **24**. These various framing components are constructed under prevailing practices of angle metal, usually steel secured together at their junctures by riveting or welding. The horizontal flanges of the angle members are apertured at regularly spaced intervals and in transverse alignment whereby there may be installed through such arrangement intersecting steel joist wires or rods **25** longitudinally and **26** transversely.

The intersections and spacings of the joist wires are planned in accordance with the density of cushion spring distribution to be accommodated. At the intersection of the longitudinally and transverse wires as best shown in Fig. 8, there is afforded by suitable forming of the wires, anchorage for conical types of cushion springs **27**, which may be secured to the intersecting wires **25** and **26** in any of various manners of practice which include flexible clamping or lashing such as will afford ample freedom to permit flexing of the convolutions but such as will prevent the minor convolution from drifting away from placement positions coaxial with the support wire intersecting points.

Upholstery springs such as are suitable for this use vary in shape and also in resiliency. Usually, however, there is provided a lowermost or securing convolution **29**, in the particular illustration of smallest diameter, and an uppermost convolution **31** in the particular case of largest diameter. The foremost row of upholstery springs, Figs. 17 and 19 is further modified in respect to their uppermost convolutions **31** by being eccentrically deformed as best illustrated at **32** in Figs. 8, 9, and 11. This deformation **32** is characterized by its eccentric bulge effect as well as by its angular deflection which gives to the row or alignment of springs the basic slope or foundation flare of a lip formation around which the other features which constitutes the improved seat roll construction are built up.

The uppermost convolutions **31** of the several springs, while permitted as between themselves a limited range of floating movement consistent with ideal cushion upholstery behavior, are preferably lashed together in one manner or another such as by the provision of the transverse pigtail springs **33** whereafter the entire assembly is framed in by a perimetric encircling wire **34**. Consistent with the lip formation which is thus incorporated into the front row of cushion springs, the encircling wire **34** is correspondingly shaped so that it too partakes of the deformation outline when viewed in horizontal alignment with the deformations **32** as best seen in Figs. 12 and 13. In this way, the assembly of springs is flexibly integrated and made to perform as a self-sufficient compression unit in readiness to receive overlays of padding and other cushioning materials which will now be described.

One of the principal advantages which flows from the present improved teachings is its facile susceptibility of specialized sub-assembling. The overlay padding and the cushion roll elements may be prepared ready for insertion and the upholstery fabric may be fully stitched and cut in advance of application over the spring assembly. In Fig. 6 there is shown how these several fabrics and padding layers may be attached to each other so that when they are in readiness for application over the assembled springs it is not required that these members be further worked upon as by sewing or stitching other than to lash the free ends into the impaling prongs which will be later described. The manner in which the overlay fabrics are applied onto the spring assembly is best illustrated in Figs. 12 and 14 from which it will be observed that the entire sub-assembly is made up of a relatively thick padding of rubber impregnated sisal mat **35** amply dimensioned to encompass and overlap beyond the perimetric wire frame as at **36** and **37**, Fig. 13, at the front and rear edges and as at **38** at the sides, Fig. 19.

The rubberized impregnation of the sisal pad is a shallow surface treatment indicated by the thickness **39** which serves the purpose of anchoring the loose ends of the pad fibers so that they become relatively secured together and therefore less inclined to disintegrate as a result of wear or abrasion effects from repeated pounding and from strenuous contact with the coil convolutions **31**. In the afore described preassembly of the fabric and sisal layers, there are performed two significant stitching and stapling operations which will now be discussed. The foremost edge **37** of the sisal pad is transversely stitched as at **41** near one edge of a strip of burlap **42** which later serves as a frontal panel to relieve the stretchment strains from the ornate covering **48**, Fig. 16, being nailed to the nailing strip **44** as at **45** under moderate tension conditions at the same time that the ornamental fabric **48** is thereat secured.

Paralleling the stitching **41** at a predetermined distance therefrom is installed an alignment of metal stitching staples **46**, see also Figs. 1, 9, 11, and 19. As will be observed from Figs. 1 to 5 the application of this row of stitching staples **46** secures together the sisal pad **35** with the two fabrics **47** and **48** as well as with the strip of relatively hard fiberboard edging **49**. Since the fabrics **47** and **48**, more about which will be discussed later, are elements which under severe conditions of wear may be subjected to rupture producing strains it is considered good practice that the two be first setup and stitched to-

gether as at 51 to give to these two members an additional mutual bond.

It will be understood, of course that the length and width dimensions of the various sisal and fabric components which enter into the formation and construction of this assembly will vary in accordance with the furniture articles which they are particularly suited or adapted to serve. Consequently, when the several fabric elements are integrated by the aforedescribed stitching and stapling operations they will present the unitary assembly seen in Fig. 6. Since the aforedescribed manufacturing operations are characteristically and fundamentally different from the general plan of furniture producing and assembly operations to be performed later, it is of paramount significance to note at this time that an important economy results from these teachings and practices namely that of affording material production conveniences of appropriate labor segregation. The stride of this achievement looms of major significance when considered in terms of production line efficiency. As a consequence several time study operations are performed in shorter periods because the parts are more accessible to power tool treatment and also they are performed better because the operator is enabled to obtain more complete dominion over the subassembly.

The several fabric and sisal elements 35, 47, 48, and 49 are conveniently integrated by a single line of metal stitch staples 46. The elements are placed into the relationship shown in Fig. 1 but in an inverted manner over a suitable worktable. Thereafter, when the subassembly is ready to be installed over the coil spring frame it is inverted and laid upon an inclined surface 53 of another table which may also have a horizontal section 54 cut-out or notched at intervals to afford access by a stapling machine. The notches or cut out portions in the horizontal table strip 54 afford access to the stapling machine anvil 55 which may on this account be assured alignment with the stapling hammer 56. The particular type of stapling machine which is employed for this purpose forms no part of the present invention and may be any of several well known wire staple forming and clinching mechanisms such as are commercially available.

The spring assembly is placed over the sisal padding strip 35, so that the front row of spring 27 all become disposed after the manner illustrated in Fig. 11 with their deflected portions 32 resting upon the horizontal table strip 54. The table 53—54 or the stapling machine 55—56 are then moved with respect to each other longitudinally, either member being the movable one as may be desired, so that the securing staples 58 and 59 may be driven into the fabric assembly straddling the deflected spring portions as best indicated in Fig. 9. The staples are clinched, Fig. 10, against the surface which ultimately becomes topside. By locating the staples 58 and 59 in the proximity of the regions indicated in Figs. 9 and 11 relatively close to the bend of the deflected portions 32 the sisal pad 35 is compelled to reside securely in the basin effect which is produced by the cumulative profile of the deflections 32 in combination with their perimetric defining rod 34.

When all of the front row springs have been thus secured to the fabric the two are removed from the stapling table and the various fabric panels are doubled back to assume to the dispositions shown in Figs. 12 through 14 progressively. The fabric 47 which is preferably a heavy matching color denim and is sewn to form back and side panels 47*a* and 47*b* thereupon encompasses the spring assembly as best indicated in Fig. 19. Tension on the fabric 47 conforms the sisal edges 38 to give them roundness as shown in Figs. 12 and 13 and in addition this fabric is made to cover the filler layer 61 of cotton batting or other similarly compressible material.

The free ends of the denim fabric 47 which include the ends of the panels 47*a* and 47*b* are then brought around the angle iron frame elements 21 and 22 after the manner shown at 62 Fig. 18 and while the several springs of the assembly are subjected to a compression, see Figs. 15 and 16, these ends are impaled upon the triangular prongs 63 which are struck from a superimposed securing strip 64 integrated as by welding 65 or otherwise to one of the flanges of the angle members 21 or 22. Thereafter when the pressure is relieved the denim panels 47*a* and 47*b* are drawn taut giving to the covering a smooth pleasing tailored appearance which takes out any fabric gathering or wrinkle effects as the tension is distributed with equalizing consequence throughout the entire covering 47.

For the purpose of performing the aforedescribed tuck-in and impaling operations expeditiously and with minimum labor attendance there is utilized a compression fixture which includes the work bench 69 grooved as at 71 to afford a bedding trough to receive the built-up edge roll 72. The partially assembled upholstery unit with its covered fabric applied are placed on the bench 69 in an inverted position whereupon the hydraulic ram 73 which is controlled by a valve lever 74 is actuated downward. The ram is fitted for each different kind of operation with an appropriate nesting head 75 proportioned to seat within the rectangular recess formed by the several angle-iron members 21 and 22. When the springs 27 have been compressed sufficiently to permit the panel tails to be gathered in and impaled as aforedescribed the compression movement of the ram 73 is arrested and the tools remain in this position until the impaling operation has been completed around the three sides where the panels 47*a* and 47*b* are disposed.

In order to give the seat roll adequate padding and in some instances accentuated protrusion there may be laid in over the fiber strip 49, Fig. 12, a doubled over strip-wadding 77 which is then covered by the ornate facing panel fabric 48 which, as has been explained, is thereafter tacked down at 45 along the nailing strip 44.

While the present invention has been explained and described with reference to a particular embodiment and practice it will be understood, nevertheless, that numerous variations are susceptible of incorporation without departure from the essential spirit or scope thereof. It is accordingly not intended to be limited in an understanding of the invention to the particular language used in the foregoing description nor to the forms illustrated in the accompanying drawing except as indicated in the hereunto appended claims.

I claim:

1. An upholstered spring cushion construction embodying a rectilinear angle iron supporting frame, a plurality of rows of compressible upholstery springs carried upon said frame in upright parallelism, each of said springs having uppermost its maximum diameter convolution, a foremost row of said springs having their uppermost convolution edges deformed to present eccentrically extending and upwardly angling lip deflections to constitute together a foundation upon which an upholstered ridge is supported, a cover fabric subassembly comprising a layer of compressible fibers to be superimposed upon and overly said upholstery springs, a burlap forepanel stitched on a line to the forward edge of said layer, a denim fabric and a coextensive ornate covering fabric stitched together with a fibrous strip at a predetermined stitch row spaced from said first mentioned burlap stitch line, and a seat roll padding comprising a double-over fiber strip disposed beneath said ornate fabric and over said fibrous strip foundation so as to form a retainer edging.

2. An upholstered spring-cushion construction for parlor furniture embodying a rectangular supporting frame of steel angle members, a plurality of rows of compressible upholstery springs carried upon said frame, each of said springs having uppermost a maximum diameter convolution, the front row of said springs having their said uppermost convolutions deformed to present eccentrically extending and upwardly angling lip portions combinedly

arranged in longitudinal alignment, a cover fabric subassembly comprising a layer of compressible fibers to be superimposed on said upholstery springs, a burlap forepanel stitched on a line to the forward edge of said layer, a denim fabric and an ornate covering fabric stitched to a stiff fiber strip on a stitch row spaced from said first mentioned burlap stitch line, and a seat roll padding comprising a doubled-over narrow piece disposed beneath said ornate fabric and lying over said fiber strip so as to cover said lip alignment to form a retainer edging.

3. An upholstered spring cushion construction embodying a supporting frame, a plurality of rows of compressible upholstery springs carried upon said frame in upright parallellism, each of said springs having uppermost its maximum diameter convolution, a foremost row of said springs having their uppermost convolution edges deformed to present eccentrically extending and upwardly angling lip deflections to constitute together a foundation upon which an upholstered ridge is supported, a cover subassembly comprising a layer of compressible fibers to be superimposed upon and overlie said upholstery springs, a flexible forepanel stitched on a line to the forward edge of said layer, a second flexible panel and a co-extensive covering stitched together with a stiffening strip at a predetermined stitch row spaced from said first mentioned stitch line, and a seat roll padding comprising a wadding strip disposed beneath said covering and over said stiffening strip foundation so as to form a retainer edging.

4. An upholstered spring cushion construction for parlor furniture embodying a supporting frame, a plurality of rows of compressible upholstery springs carried upon said frame, each of said springs having uppermost a maximum diameter convolution, the front row of said springs having their said uppermost convolutions deformed to present eccentrically extending and upwardly angling lip portions combinedly arranged in longitudinal alinement, a cover subassembly comprising a layer of compressible fibers to be superimposed upon said upholstery springs, a flexible forepanel stitched on a line to the forward edge of said layer, a second flexible panel and a covering stitched to a stiffening strip on a spaced row spaced from said first mentioned stitch line, and a seat roll padding comprising a wadding strip disposed beneath said covering and lying over said stiffening strip so as to cover said lip alinement to form a retainer edging.

5. The combination with an upholstery frame spring assembly including a forward row of springs each having a maximum diameter convolution uppermost, the forward portion of each uppermost convolution being deformed to extend laterally beyond the body of the spring and angularly upwardly intermediate the plane of said convolution and a plane at a right angle thereto, said forward portions being connected and in longitudinal alinement and constituting a foundation for a seat roll construction, a strip of relatively firm material laid over the several forward portions of said springs, an encircling fabric stitched to one edge of said firm material, an edge roll padding overlaid on said material, and means for securing said fabric after encircling said edge roll at the front of said spring assembly.

6. The combination with an upholstery frame spring assembly including a forward row of springs each having a maximum diameter convolution uppermost, the forward portion of each uppermost convolution being deformed to extend laterally beyond the body of the spring and angularly upwardly intermediate the plane of said convolution and a plane at a right angle thereto, said forward portions being connected and in longitudinal alinement and constituting a foundation for a seat roll construction, a strip of relatively firm material laid across and secured to the several deformed forward portions of said spring coils, and a jacket fabric stitched to one edge of said firm material strip in said assembly and before said strip is secured to the spring convolutions, an edge roll padding overlaid on said strip, and anchoring means for securing said fabric after encircling the edge roll padding.

7. The combination with an upholstery frame spring assembly including a forward row of springs each having a maximum diameter convolution uppermost, the forward portions of the uppermost convolutions being connected and in longitudinal alignment and constituting a foundation for a seat roll construction, a strip of relatively firm material laid over the several forward portions of said springs, an encircling sheet of material stitched to one edge of said firm material, an edge roll padding overlaid on said firm material, and means for securing said encircling material after encircling said edge roll at the front of said spring assembly.

8. An upholstered spring cushion construction embodying a supporting frame, a plurality of rows of compressible upholstery springs carried upon said frame in upright parallelism, each of said springs having uppermost its maximum diameter convolution, the forward portions of said uppermost convolutions of the foremost row of said springs being connected and in longitudinal alignment and constituting a foundation for a seat roll construction, a cover sub-assembly comprising a layer of compressible fibers to be superimposed upon and overlie said upholstery springs, a flexible forepanel stitched on a line to the forward edges of said layer, a second flexible panel and a coextensive covering stitched together with a stiffening strip at a predetermined stitch row spaced from said first-mentioned stitch line, and a seat roll padding comprising a wadding strip disposed beneath said covering and over said stiffening strip foundation so as to form a retainer edging.

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