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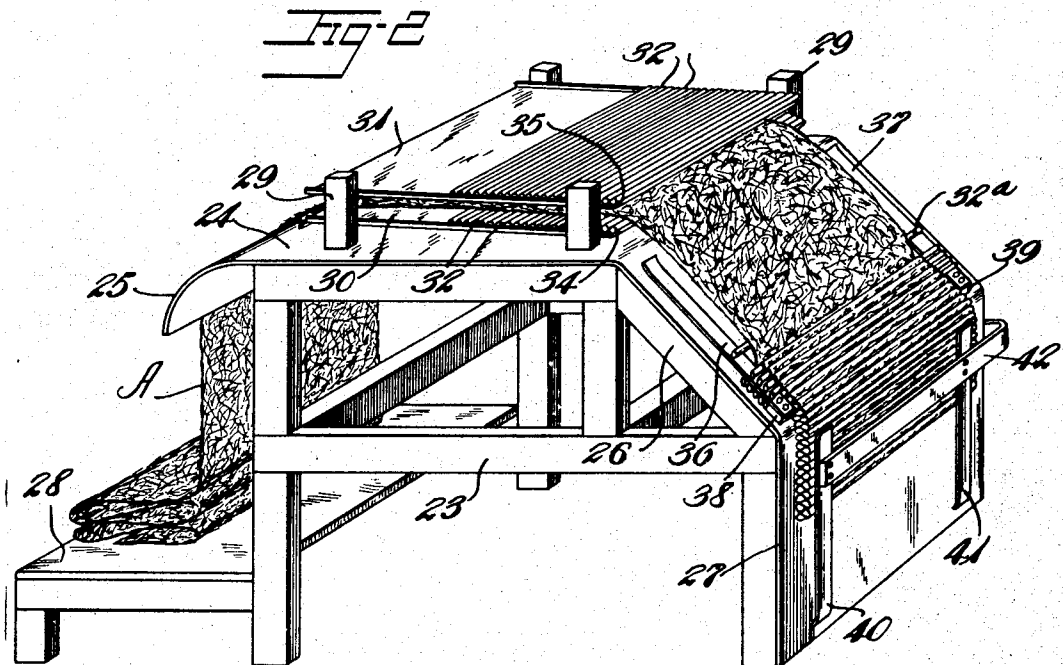
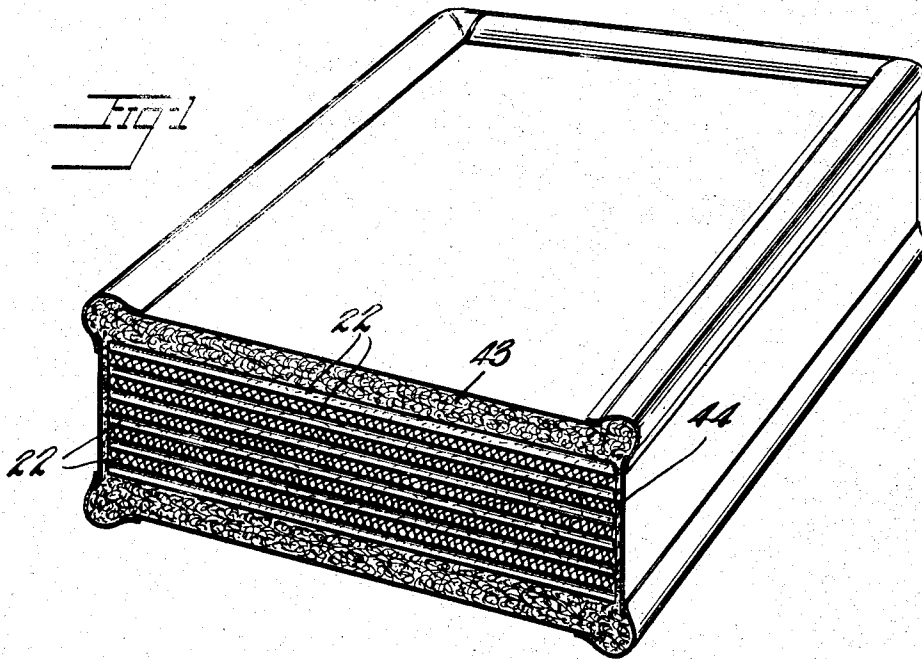
C. H. HELDENBRAND

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CUSHIONING BODY AND METHOD OF PRODUCING THE SAME

Filed Aug. 18, 1931

4 Sheets-Sheet 1



Inventor
Carl H. Heldenbrand
By *Eskin & Avery*
Attys.

Jan. 22, 1935.

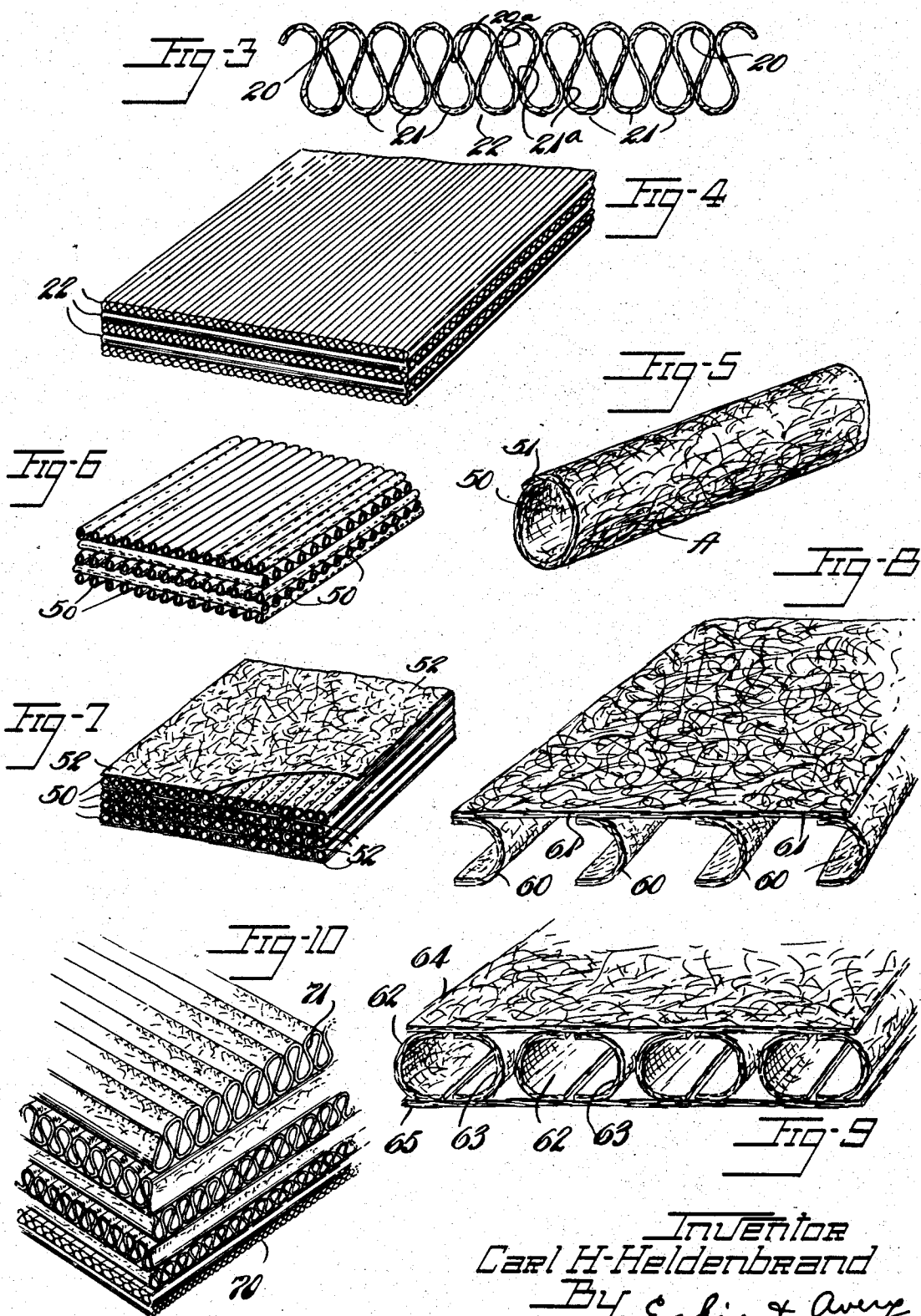
C. H. HELDENBRAND

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4 Sheets-Sheet 2



Inventor
Carl H. Heldenbrand
By Edwin F. Avery
Attys.

Jan. 22, 1935.

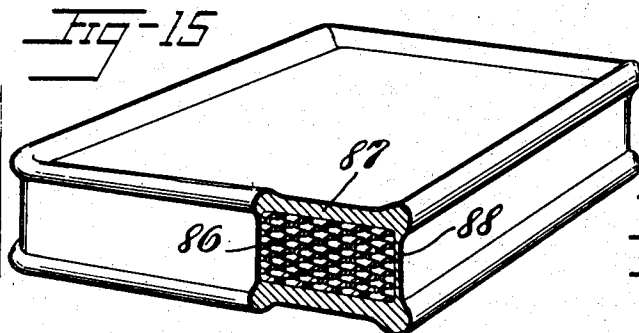
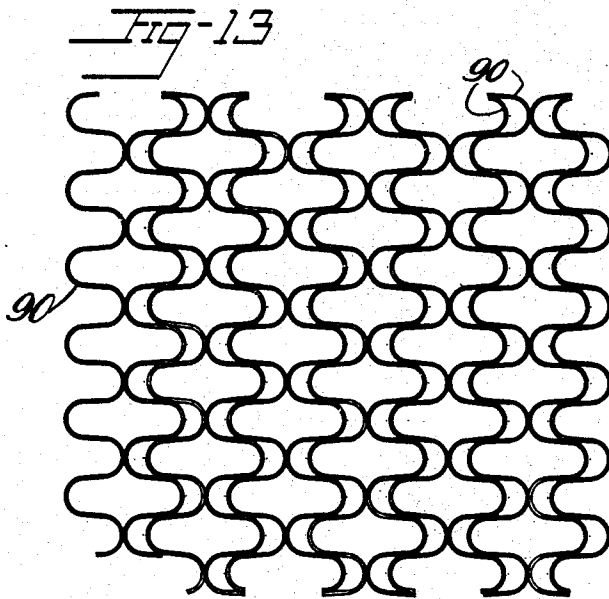
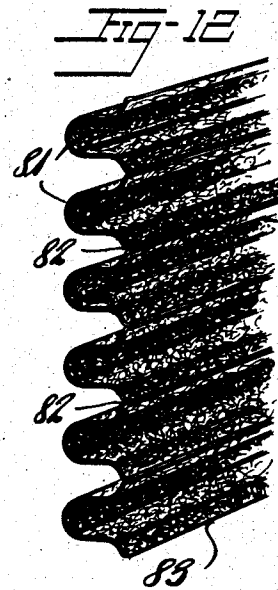
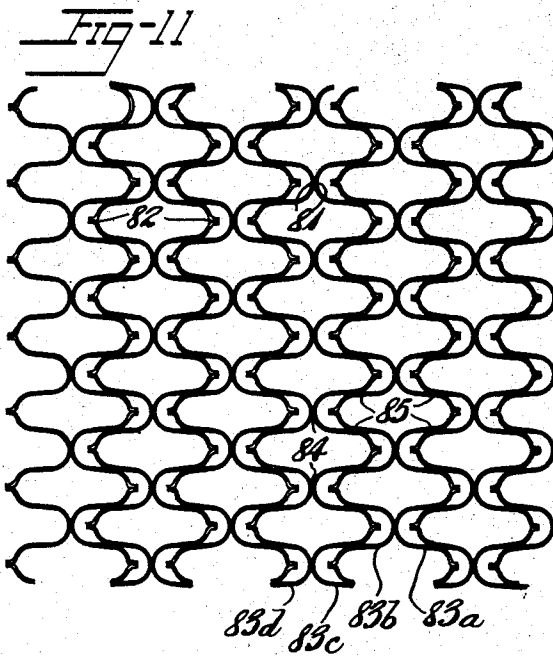
C. H. HELDENBRAND

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4 Sheets-Sheet 3



Inventor
Carl H. Heldenbrand
By Eakin & Avery
Attys.

Jan. 22, 1935.

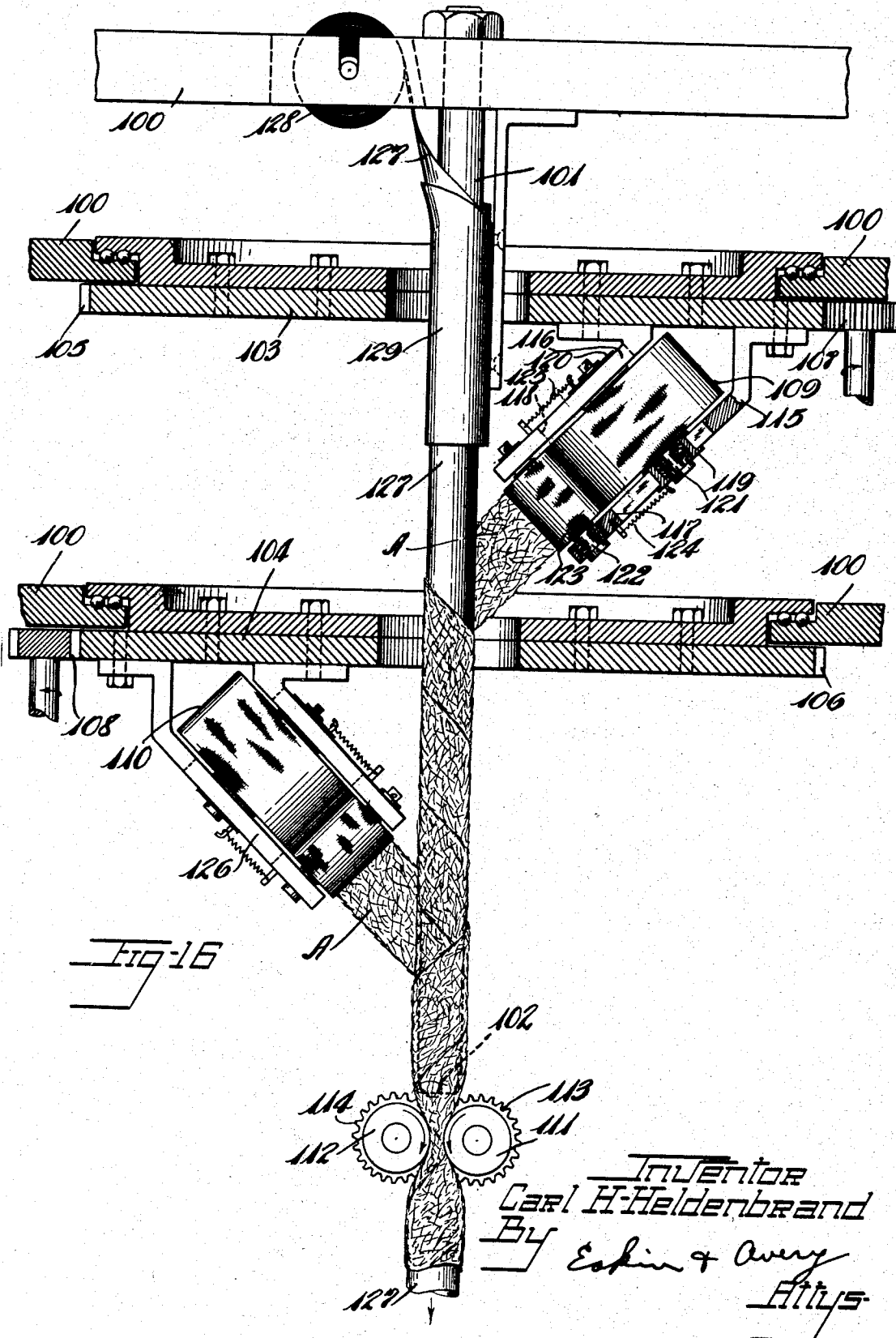
C. H. HELDENBRAND

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4 Sheets-Sheet 4



UNITED STATES PATENT OFFICE

1,988,843

CUSHIONING BODY AND METHOD OF
PRODUCING THE SAME

Carl H. Heldenbrand, Akron, Ohio, assignor to
B. F. Goodrich Company, New York, N. Y., a
corporation of New York

Application August 18, 1931, Serial No. 557,810

29 Claims. (Cl. 154—33)

This invention relates to cushioning bodies suitable for use as upholstery in mattresses, upholstered furniture, seat cushions, and the like, and to procedure for producing the same.

5 While it has been recognized heretofore that a material comprising matted hairs or fibers coated and united at their points of contact with a resilient agglutinant substance possesses advantageous cushioning properties, the random
10 arrangement of the fibers which heretofore has been proposed in such material has necessitated the use of a large amount of the fibrous material and the benefits of the material have not been fully availed of, and expeditious manufacture
15 of upholstery units in the desired sizes and shapes from such material has been attended by some difficulties.

Chief among the objects of this invention are to provide an improved cushioning body having
20 to a high degree the qualities of softness and resilience with a close approximation to the desired relation of yieldability to the amount of load imposed, to provide with economy of material a cushioning body which is capable of maintaining these qualities under long usage, and to
25 provide for facilitating the manufacture of the same.

Further objects are to provide for simplified manufacture of upholstery, and to produce fibers
30 coated with a flexible agglutinant in such form that the advantageous cushioning properties of the material are effectively and economically utilized.

More specific objects are to provide for producing from the material in sheet form a cellular
35 body of the desired cushioning characteristics, and to provide such a cushioning body in which the cells will have stability against erratic deformation, and in which pressure will be efficiently distributed in the structure and the resilience of
40 a comparatively large part of the material will be employed to give the cushioning effect, so that localized over-straining of the material will be avoided.

These and further objects will be apparent from the following description, reference being had to the accompanying drawings, in which:

Fig. 1 is a perspective view in section of a mattress embodying the invention.

Fig. 2 is a perspective view of apparatus for forming the sheet material into a cellular structure according to the invention.

Fig. 3 is a side view of a cushioning element constructed according to the invention.

Fig. 4 is a perspective view of a cushioning unit

made up of a plurality of the elements of Fig. 3.

Fig. 5 is a perspective view of a modified form of cushioning element.

Fig. 6 is a perspective view of a cushioning unit made up of elements of the form of Fig. 5.

Fig. 7 is a perspective view, partly broken away, of a modified cushioning unit comprising elements of the form of Fig. 5.

Figs. 8, 9 and 10 are perspective views of further modified forms of cushioning units.

Fig. 11 is a side view of a still further modified form of cushioning unit.

Fig. 12 is a perspective view of an element of the unit of Fig. 11.

Figs. 13 and 14 are views similar to Figs. 11 and 12, respectively, but showing a modified construction.

Fig. 15 is a perspective view, partly broken away, of a mattress comprising a cushioning unit of the construction of Fig. 11.

Fig. 16 is a side elevation partly broken away of apparatus adapted to provide a tubular, long length strip of the material.

Referring to the embodiment of Figs. 1 to 4, wherein is shown a preferred construction, the cushioning body comprises resilient sheet material indicated at A, which is sinuously folded upon itself into a plurality of loops or cells 20, 20, alternating with similar but inverted loops 21, 21 (Fig. 3) to constitute a cellular slab-like element 22.

The resilient sheet A may be quite thin and is preferably made up of loosely matted fibers, such as animal hair or vegetable fibers, a large proportion of the fibers preferably extending longitudinally of the sheet. The fibers are coated and united at their points of contact with a resilient agglutinant which may be such substance as a flexible glue, or nitrocellulose compound, but is preferably a rubber composition deposited on the fibers from a rubber cement or from an aqueous dispersion such as latex.

The sheet A may be prepared by spreading the fibers in the desired loosely matted arrangement upon a flat surface, with or without the aid of a carding machine, and coating and uniting the fibers by spraying upon them the coating substance in the form of a liquid, this being preferably a natural or artificial dispersion of rubber containing such vulcanizing agents and other ingredients as may be necessary or desirable to secure in the final vulcanized structure a permanent, resilient union between contacting fibers, and preferably, though not necessarily, a coating of the resilient material upon each fiber

throughout its length. After the matted fibers have been sprayed with the coating liquid and dried, the sheet of matted fibers possesses sufficient integrity to facilitate handling of the sheet, and it may be then submitted to further coating of the fibers, as by immersion in a bath of the liquid. After another mesh drying to remove surplus moisture, the sheet of matted and coated fibers in its tacky unvulcanized state is ready to be brought to cellular form, such as that of the structure 22.

In order that the fibers may flex somewhat independently of each other they preferably are so loosely or thinly associated that the sheet will be of somewhat open mesh construction when incorporated in the cellular structure.

The sheet may be formed to the cellular shape by the procedure and apparatus illustrated in Fig. 2. A table 23, comprising a suitable supporting frame work is provided with a top 24 having at its material receiving side a downwardly curved portion 25 and at its delivery side a downwardly sloping portion 26 terminating in a vertical wall 27. A platform is provided at 28 for supporting a supply of the sheet material A in ribbon form, from which platform the ribbon is progressively fed up over the curved portion 25 and flat top 24 of the table and down to a looping station on the sloping portion 26.

Above the table top 24 there are supported by short columns 29, 29 a lower and an upper tray, 30 and 31, respectively, these trays being spaced apart vertically to afford free passage of the ribbon A between them. Each tray is adapted to accommodate a plurality of cylindrical loop-forming rods 32, 32, each of a length somewhat greater than the width of the material A, and each tray is preferably canted slightly toward the delivery side of the apparatus to cause the rods, when placed transversely on the tray, as shown in Fig. 2, to roll toward the delivery end. The trays are formed with end lips 34 and 35, respectively, which limit the free travel of the rods but permit easy manual removal of each end rod.

The sloping portion 26 of the table is provided with a pair of guide strips 36 and 37 extending along the sides of the table with such space between them as to accommodate freely the width of the ribbon and to be spanned by the rods 32 when the latter are placed across the table in contact with the guide strips. These strips 36 and 37 are secured to the table at their lower ends only, by means of spacer blocks 38 and 39, respectively, and extend in cantilever fashion upwardly along the sloping portion 26 of the table with a space between the guide strips and the table slightly greater than the diameter of a rod 32 so as to accommodate a group of the rods inserted beneath the strips from the upper ends of the latter, together with material looped about the rods and arranged between the strips.

A suitable retaining structure, comprising rails 40 and 41, is secured to the table adjacent the vertical wall 27 thereof by a brace 42, with space between the rails and the table wall to accommodate the material, after it has been looped to cellular form.

In the practice of this manner of forming the looped material, the ribbon A is fed from the supply platform 28 over the table top between the trays 30 and 31 and down onto the sloping portion 26 of the table where it is progressively looped by means of the rods 32. The rods are manually transferred one at a time from the end of each tray, in alternation, lengthwise of

the strip A to positions above and below the guides 36 and 37, in contact with the material, the rods of the lower tray being positioned on top of the guides and the rods of the upper tray being positioned beneath the guides in alternation with the other rods and with the material. In the position of the parts illustrated in Fig. 2, the rod designated 32a, which has just been removed from the lower tray, is about to be positioned alongside the previously positioned rods on top of the guides, whereupon the end rod of the upper tray 31 may, by movement longitudinally of the ribbon, be brought to a position alongside the previously positioned rods beneath the guides, the ribbon A by these manipulations being caused to be looped sinusously about the rods. By repeating this placing of the rods alternately above and below the guides in contact with the material, a continuous unit of the looped material may be produced, the rods being removed endwise from the loops after the material has been looped for a considerable extent along the guides, and this looped material being fed downwardly along the vertical wall 27 to make room for a fresh length of the ribbon to be looped.

The side walls of adjacent loops are pressed together, preferably while the rods are yet in the loops, to cause intimate adhesion of the tacky material of the loop walls along the zones 20a and 21a (see Fig. 3), which adhesion is made permanent by subsequent vulcanization.

The freshly formed looped material may be fed away from the looping station in continuous form by any suitable means such as a conveyor belt, or, the looped material, after being fed down between the guide rails 40, 41 and the vertical wall 27 of the table, may be cut and removed in sections from behind the guide rails, the guide structure being open at one side to facilitate this.

The cellular material 22 may now be vulcanized, but it is preferred first, while it is yet tacky, to build it into the desired shape and size for use as an upholstery unit, such for example as the cushioning body illustrated in Fig. 4. In this embodiment the cellular sheet material is plied up in a plurality of superimposed layers, adjacent layers being disposed in crossed relation. The assembled unit is preferably compressed moderately to cause the tacky material of the layers to become adhesively united at the multitudinous points of contact between adjacent layers. Prior to vulcanization also, if desired, the cushioning unit may be padded, covered or built into a complete or semi-complete upholstered article, for example, a mattress, as illustrated in Fig. 1, in which a layer of padding material 43 is provided around the cushioning unit and the whole is enclosed in a cover 44. The padding layer 43 serves to present a smooth cover surface and to prevent penetration of fibers through the cover, and by virtue of the rough and tacky surface of the cushioning unit, and especially in the case where the unit is vulcanized in contact with the padding, the padding is caused to be strongly restrained from the shifting and bunching which is an objectionable characteristic of most ordinary padding material when not properly restrained.

After vulcanization, which may be effected in open heat, the contacting wall surfaces, including the zones 20a and 21a of the loop walls, the contacting surfaces of adjacent layers, and if the unit is cured in contact with a cover or padding, these surfaces of contact as well, are permanently united by the vulcanization of the resilient coating, and a resilient cushioning structure is pro-

vided in which there can be substantially no permanent shifting or packing of the cushioning material during use. As the sheet of matted fibers may be quite thin, and as the proportion of material to the bulk of the unit is comparatively small, the desired results may be obtained with economy of material. A large part of the sheet material of the cells is adapted to be flexed under load application and a large part of the resilience of the material is therefore utilized for efficient cushioning. The cells in the form of Fig. 3 are braced laterally by adjoining cells and the cushioning action is effected by well distributed rather than localized flexure or mere lateral careening of the cells. The long useful life of this unit is contributed to, moreover, by the fact that but little, if any, frictional wear occurs between contacting cell walls, there being ample space for resilient distortion of the walls without substantial sliding contact, and rubbing of the walls being prevented also by the restraining influence of the adhesion at the many and well distributed zones of wall contact.

Although adhesion between all contacting wall surfaces of the cells is desirable, this is not necessary in all cases, as when the unit is properly restrained by the cover of an upholstery unit, the cells due to the resilience of the material, are caused to maintain their proper shape and disposition in the mass, even after many flexures, without a great amount of wear or loosening of the fibers, and with preservation of the cushioning properties.

The cushioning unit may be produced in other cellular forms to give the desired results. Referring to the embodiments of Figs. 5, 6, and 7, the resilient sheet material A is here formed into independent tubes 50, 50 which may be made by bringing together the lateral margins of a strip of the material and adhering the margins in overlapped relation as at 51. These tubes may be arranged in a plurality of layers, the tubes of each layer lying parallel to each other, and adjacent layers being disposed in crossed relation as shown in Fig. 6. The composite unit is preferably assembled before vulcanization, whereby a vulcanized union at the points of contact of the tubes of adjacent layers will be obtained from the cure, and the tubes will thus be held in their desired positions. If desired, a flat spacer sheet 52 of the material may be interposed between each of the layers, and the layers of tubes may be laid parallel to each other instead of in crossed relation, as shown in Fig. 7.

The tubes of each layer may be positioned alongside one another but are preferably spaced from one another sufficiently for free lateral distension of the tube walls during flexure of the structure. During compression of the unit there is a partial flattening of the tubes from their cylindrical form with an increase of the contacting areas between layers by rolling contact of the flexible walls rather than by objectionable sliding contact. The resilient resistance to flexure is maintained under comparatively heavy loads as well as the lighter loads, the flexure being manifested principally by lateral distension of the curved loops with accompanying decrease in their radii of curvature, and not by any substantial careening or collapse of elements of the structure or mere localized flexure of the material. The vertical semi-circumference of each tube constitutes in effect a toggle, which remains broken at no load, as well as under flexure, and retains a substantially uniform mechanical advantage to

resist flexure during its decrease in radii under distension, and which is thus superior to the toggle that is formed by an initially straight, vertical cell wall, which, as an open toggle, strongly resists flexure at first, but once broken by flexure along a narrow zone, collapses easily as its mechanical advantage rapidly decreases. A large part of the material, of the cells of this form also, gives its resilience and flexibility to the result of efficient cushioning, so that local over-straining or excessive flexure is avoided and as there is substantially no rubbing of wall surfaces, objectionable frictional wear and loosening of the matted fibers is to a large extent avoided.

In Fig. 16 there is shown an apparatus for manipulating the ribbon material expeditiously into tubular form of long length which may subsequently be cut into shorter lengths as needed and assembled into cushioning units in various manners as above described.

Mounted in a suitable supporting framework, fragmentary elements of which are indicated at 100, 100, is a vertically disposed, cylindrical mandrel 101 secured at its upper end to the framework and being suspended therefrom with its lower end free as indicated at 102. A pair of annular winder wheels 103 and 104 are mounted in the framework for rotation in opposite directions about an axis coinciding with that of the mandrel. The wheels are provided with gear teeth 105 and 106 respectively, meshing with respective pinions 107 and 108 which are driven by any suitable means (not shown).

The oppositely rotating winder wheels 103, 104 carry rolls 109, 110, respectively, of the ribbon material A, and are adapted to wrap the ribbons helically about the mandrel in superimposed layers of opposite helices, there being provided a mechanism in the form of a pair of pinch rolls 111, 112, driven from a suitable source of power by means of coacting gears 113, 114, respectively, for continuously feeding the wrapped tube from the free end of the mandrel.

For supporting the roll 109 on winder wheel 103 there is provided on the wheel face a pair of spaced parallel bracket arms 115, 116 extending obliquely toward the mandrel. These arms are formed with lengthwise slots 117, 118, respectively, in which ride floating bushings 119, 120 having a removable ribbon roll shaft 121 journaled therein. At the outer extremities of the bracket arms there is journaled a removable shaft 122 for supporting a liner rewinding roll 123, the ribbon of roll 109 being preferably interwound with a liner to prevent undesirable adhesion of the tacky material.

The roll 109 is resiliently urged outwardly of the bracket arms by tension springs 124, 125 secured to the floating bushings 119, 120 and to the rigid bracket arms.

The arrangement is such that the roll 109 is resiliently urged against the liner rewinding roll 123, and as the ribbon A is drawn from roll 109 onto the mandrel, the liner is caused to be wound onto the roll 123. For renewing the supply of the ribbon material, the rolls 109 and 123 may be removed by axially withdrawing the shaft 121, and 122 and fresh rolls inserted in their stead.

For the ribbon roll 110 there is provided on winder wheel 104 a supporting structure 126, similar in all respects to that above described for roll 109, except that the disposition of the roll 110 and its supporting structure 126 is such as to permit the ribbon of roll 110 to be wrapped

on the mandrel in the opposite direction from that of the ribbon of roll 109 during the opposite rotation of the winder wheels.

In order to facilitate slipping of the tacky material along and off the mandrel, a lining 127 of a suitable sheet material, such as cloth or paper, is fed onto the mandrel at its upper end from a supply roll 128, mounted in the framework, and through a horn 129 which folds the liner strip about the mandrel. The ribbon material is then wrapped over the liner and the lined tube is drawn from the free end of the mandrel, the liner facilitating free movement of the tacky material over the surface of the mandrel and serving also to hold the shape of the wrapped tube and to facilitate the gripping action of the pinch rolls 111, 112 by stiffening the tube against excessive yielding of its walls.

The tubular material may be cut to length, assembled into units and vulcanized with the liner 127 remaining in the structure, especially if a liner material is used which is non-crinkly so as to be silent under flexure and which is sufficiently flexible to keep from objectionably affecting the yieldability of the cushion. The presence of the liner in some cushioning units may be desirable as an added stiffener and reinforcement without detracting objectionably from the resilience of the unit, but, if desired, the liner may be removed, axially of the tube, preferably before cure.

Due to the reverse helices of the superimposed ribbon wrappings, the tubular structure possesses considerable form-holding strength which is contributed to by the permanent adhesion of contacting coated fibers after vulcanization, and if desired, the integrity of the resilient structure may be further enhanced by further coating the material with an adhesive, as by spraying the ribbon during the wrapping operation.

Preferably, the ribbon of each layer is wound with the edges of adjacent convolutions in close contact to form a strong seam by vulcanized adhesion of the contacting edge coatings. As there is substantial symmetry of the wrapped structure of opposite helices and substantially uniform wall thickness throughout, the uniform flexure of the cell walls with even distribution of the working stresses in the material is facilitated.

Good results may be obtained by forming the cushioning elements into semi-circular channel shapes, which may be either of single wall thickness, as shown at 60, 60 in the embodiment of Fig. 8, or may be of double wall thickness, as may be effected by bringing the walls of a tube into contact to produce a C-shaped, double wall element. The elements are preferably adhered in laterally spaced relation to a sheet 61 which facilitates building into a multi-layer unit and serves to stabilize the structure and prevent undesirable shifting of the elements. Or, the unit may be built up of a plurality of pairs of the channel shaped elements with the elements of each pair opposingly arranged, as shown at 62, 63 in Fig. 9. The elements are held in the desired relation preferably spaced apart sufficiently for freedom from lateral distension, by adhesion to upper and lower base sheets 64 and 65 respectively, which may also be of the resilient sheet material A.

The invention lends itself well to the procuring of various cushioning properties, by such simple expedients as varying the thickness of the sheet material or the density of the matted fibers and coating substance, and making the cells

of the proper shape, size and disposition in the mass. Further variations may be made by providing layers of different cushioning characteristics which act together to produce the desired characteristics of the whole unit. For example, layers of similar construction but of different thicknesses, and therefore of different degrees of yieldability and resilience, may be assembled to constitute a unit of the desired properties, as shown in the embodiment of Fig. 10, wherein each layer of the unit is of the cellular form of Fig. 3, but the layers are of gradually diminishing thickness from one face to the other, the layer 70 of least thickness and of least yieldability being shown as disposed at the bottom of the unit, and the layer 71 of greatest thickness and of greatest yieldability disposed as the top layer of the unit, the intermediate layers being graduated as to thickness and yieldability.

In the embodiment of Figs. 11-15 the resilient elements are of a proper form to be disposed vertically in the unit as distinguished from the horizontal arrangement of the elements in the previously described embodiments. Referring to Figs. 11 and 12, each of a plurality of corrugated elements, similar to one another in size and shape, is formed from a plurality of generally U-shaped sub-elements 81 of the resilient sheet material, the sub-elements being disposed alongside each other, as is clearly shown in Fig. 12, with the outwardly flared margins of adjacent sub-elements adhered to one another at 82 to constitute the corrugated or sinuous sheet elements 83.

Pairs of the corrugated elements 83 are assembled in back to back relation, as shown at 83a-83b, and with the respective pairs abutting each other end on as at 84. The pairs which are composed of the elements 83a-83b are assembled with the pairs composed of the elements 83c-83d in such manner that the loops having the outwardly projecting seams 82 are disposed partially within the unseamed loops of the adjacent pair as shown in Fig. 11. The contacting side walls of the loops or cells are adhesively united at 85, 85 and these zones of adhesion together with the zones 84, 84 provide zones of union which are uniformly distributed throughout the mass and contribute to stability of the structure while facilitating efficient flexure. The adhesion at the contacting surfaces is preferably secured by vulcanization of the contacting coatings during the cure of the unit, which may be either before or after assembly of the unit into the article to be upholstered. Such article may, for example, be a mattress as shown in Fig. 15 in which 86 indicates a cushioning unit constructed in the manner above described, and 87 and 88 designate a layer of padding and a cover, respectively.

Under compression of this unit, lateral careening of each of the vertically disposed elements is resisted by the bracing effect of the other elements through the many and well distributed zones of union and especially through the end-on abutment of loops at 84, 84. The loops which have the seams 82, 82 are caused to move further into the spaces of the unseamed loops as they are distended and as their radii are shortened under compression of the structure, with the advantages, before discussed, of uniformity of mechanical advantage of the toggle constituted by the arcuate vertical cell walls, and the action is substantially without sliding contact of the walls and with utilization of the resilience and flexure of a large part of the material rather than by mere localized

flexure or lateral careening of cell walls as would be likely if the U-shaped elements were disposed vertically on end in the structure.

For facilitating manufacture of the element, instead of being constructed of a plurality of U-shaped sub-elements as above described, it may be formed from continuous ribbon or sheet material, as shown at 90, 90 in Figs. 13 and 14, by any suitable method of producing the corrugations. The unit of Fig. 13 constitutes a plurality of these corrugated elements assembled in a like manner to that described for the embodiment of Fig. 11 and functioning in the same way.

It will be understood that cushioning bodies constructed according to the invention may be utilized in various associations in articles to be cushioned; that the cellular elements or units may be used in association with springs, pads and other known forms of cushioning devices in an auxiliary capacity as well as in the capacity of the main cushioning body.

Variations may be made without departing from the scope of the invention as it is defined in the following claims, in which the word "fibers" in its various forms is to be understood as meaning any filamentary material whatever may be its origin.

What is claimed is:

1. A cushioning body comprising a resilient cellular structure having cell walls of resilient material comprising fibers held in reticulated sheet form.

2. A cushioning body comprising a resilient cellular structure having reticulated cell walls of fibers united at their crossing positions by a flexible agglutinant.

3. A cushioning body comprising a cellular structure having curved cell walls of resilient reticulated sheet material comprising unwoven fibers united at their crossing positions by rubber composition.

4. A cushioning body comprising a plurality of cells having walls of resilient, reticulated sheet material comprising crossed fibers united at their crossing positions by rubber composition.

5. A cushioning body comprising a plurality of elongated cells having walls of resilient material comprising unwoven fibers held in reticulated sheet form, said cells being disposed in a plurality of superimposed layers in crossed relation with wall surfaces of adjacent layers in adhesion with each other.

6. A cushioning body comprising a plurality of elongated cells having walls of resilient material comprising unwoven fibers held in reticulated sheet form by rubber composition, said cells being disposed in a plurality of superimposed layers in crossed relation with wall surfaces of adjacent layers in vulcanized adhesion with each other.

7. A cushioning body comprising a layer of a plurality of contacting cells having walls of reticulated sheet material comprising unwoven fibers, the walls of said cells being adhered to one another at their zones of contact.

8. A cushioning body comprising a sheet of resilient material comprising unwoven fibers held in reticulated sheet form, said sheet being looped sinuously upon itself in a plurality of cells.

9. A cushioning body comprising a sheet of resilient material comprising unwoven fibers united at their crossing positions by rubber composition, said sheet being looped sinuously upon itself in a plurality of cells.

10. A cushioning body comprising a sheet of resilient material comprising unwoven fibers held

in reticulated sheet form by rubber composition, said sheet being looped sinuously upon itself in a plurality of cells, and the walls of adjacent cells being adhered to one another.

11. A cushioning body comprising a sheet of resilient material comprising unwoven fibers held in reticulated sheet form by rubber composition, said sheet being looped sinuously upon itself in a plurality of cells and the walls of adjacent cells being united in contact with one another.

12. A cushioning body comprising a plurality of layers of cells, said cells having walls of resilient material comprising unwoven fibers held in reticulated sheet form by rubber composition, the walls of said cells being in vulcanized adhesion with surfaces of the body in contact therewith.

13. A cushioning body comprising a plurality of layers of sheet material comprising loosely matted fibers coated with a resilient rubber composition, the sheet material of each layer being looped sinuously upon itself in a plurality of cells having contacting walls in vulcanized adhesion and said layers being disposed in crossed relation with contacting wall surfaces of adjacent layers in vulcanized adhesion.

14. The method of making a cushioning body which comprises preparing a sheet of fibers held in reticulated sheet form and forming said sheet into a cellular structure.

15. The method of making a cushioning body which comprises loosely matting fibers in reticulated sheet form, uniting the fibers at their crossing positions to cause them to hold the reticulated sheet form and forming said sheet into a cellular structure.

16. The method of making a cushioning body which comprises preparing a sheet of unwoven fibers united at their crossing positions by rubber composition, and forming said sheet into a cellular structure.

17. The method of making a cushioning body which comprises preparing a reticulated sheet of unwoven fibers united at their crossing positions by a flexible agglutinant, forming from said sheet a plurality of tubular cells, and assembling the cells into a cushioning unit.

18. The method of making a cushioning body which comprises preparing a reticulated sheet of unwoven fibers united at their crossing positions by rubber composition, forming from said sheet a plurality of cells, assembling the cells into a cushioning unit and adhering together contacting cells.

19. The method of making a cushioning body which comprises preparing a reticulated sheet of unwoven fibers united at their crossing position by a flexible agglutinant, looping said sheet sinuously along its length and adhering together wall portions of adjacent loops.

20. The method of making a cushioning body which comprises preparing a sheet of loosely matted fibers coated with an unvulcanized rubber composition, forming said sheet into a cellular structure, and vulcanizing the structure.

21. The method of making a cushioning body which comprises preparing a sheet of loosely matted fibers coated with an unvulcanized rubber composition, looping said sheet sinuously along its length, bringing portions of the loop walls into contact with one another, and vulcanizing the so prepared structure.

22. The method of making a cushioning body which comprises preparing a sheet of loosely matted fibers coated with an unvulcanized rubber composition, forming from said sheet a plurality

of cells, assembling the cells into a unit, and vulcanizing the assembled structure.

23. The method of making a cushioning body which comprises forming a cellular structure from reticulated sheet material comprising unwoven fibers united at their crossing positions by unvulcanized rubber composition, pressing walls thereof into intimate contact, and vulcanizing the structure.

24. The method of making a cushioning body which comprises forming a plurality of elongated cells from reticulated sheet material comprising unwoven fibers united at their crossing positions by unvulcanized rubber composition, assembling layers of the cells in crossed relation and vulcanizing the structure.

25. The method of making a cushioning unit which comprises preparing a sheet of loosely matted fibers united at their crossing position by an unvulcanized rubber composition, flexing the sheet material to closed cell form about a core and vulcanizing the formed material.

26. The method of making a cushioning unit which comprises preparing a sheet of loosely matted fibers coated with flexible agglutinant, looping the sheet material sinuously about a plurality of loop forming cores, and by means of the cores

pressing together the walls of adjacent loops into adhesive engagement.

27. The method of making a cushioning unit which comprises preparing a strip of loosely matted fibers united at their crossing positions by a flexible agglutinant, wrapping the strip helically about a core while drawing the strip in tubular form from the core.

28. The method of making a cushioning unit which comprises preparing a strip of loosely matted fibers coated with an unvulcanized rubber composition, wrapping the strip material helically about a core in superimposed layers of opposed helices, stripping the wrapped tubular structure from the core and vulcanizing the structure.

29. The method of making a fibrous body which comprises disposing loose fibers in loosely-matted arrangement, uniting the fibers at their crossing positions by a flexible agglutinant in a liquid carrier while retaining the open-mesh character of the structure, partially drying it, and forming a plurality of layers of the same into a plied-up cellular structure in which the plies are united by the flexible agglutinant.

CARL H. HELDENBRAND.