

- [54] APPARATUS FOR MAKING A CUSHION
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- [73] Assignee: **Stryker Corporation**, Kalamazoo, Mich.
- [22] Filed: **Nov. 8, 1971**
- [21] Appl. No.: **196,534**

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Attorney, Agent, or Firm—Woodhams, Blanchard and Flynn

- [52] U.S. Cl. 249/83, 249/117, 264/45
- [51] Int. Cl. B22d 19/00
- [58] Field of Search 249/69, 82, 83, 84, 85, 249/112, 116, 117, 118, 119, 129, 155, 172, 183, 91, 95; 425/121, 122, 88, 89, 123, 124, 125, 126, 117, 450 C, DIG. 48; 264/251-261, 279, 45, 46

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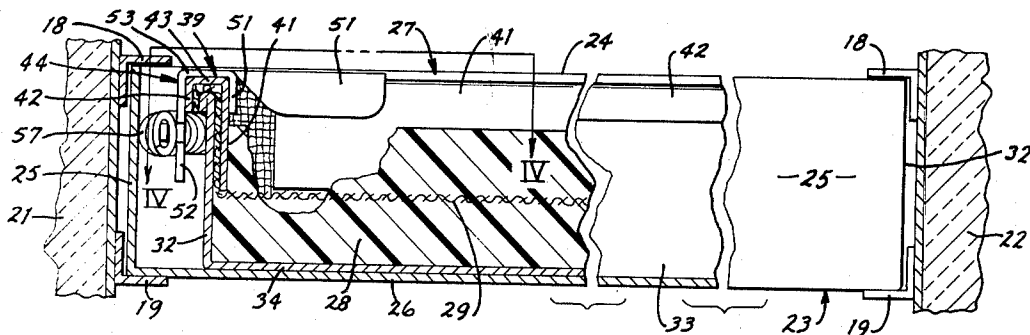
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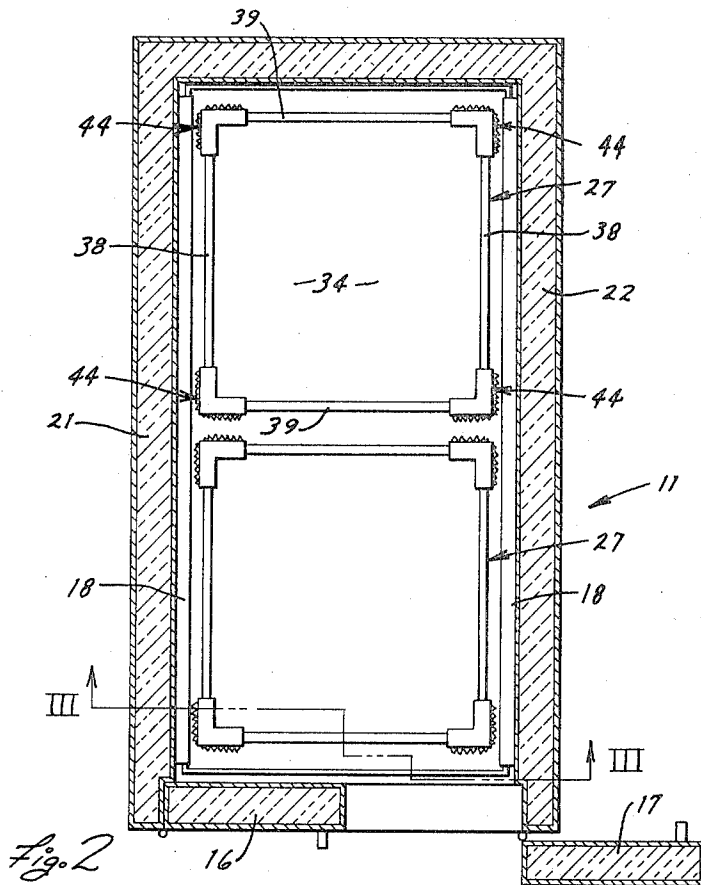
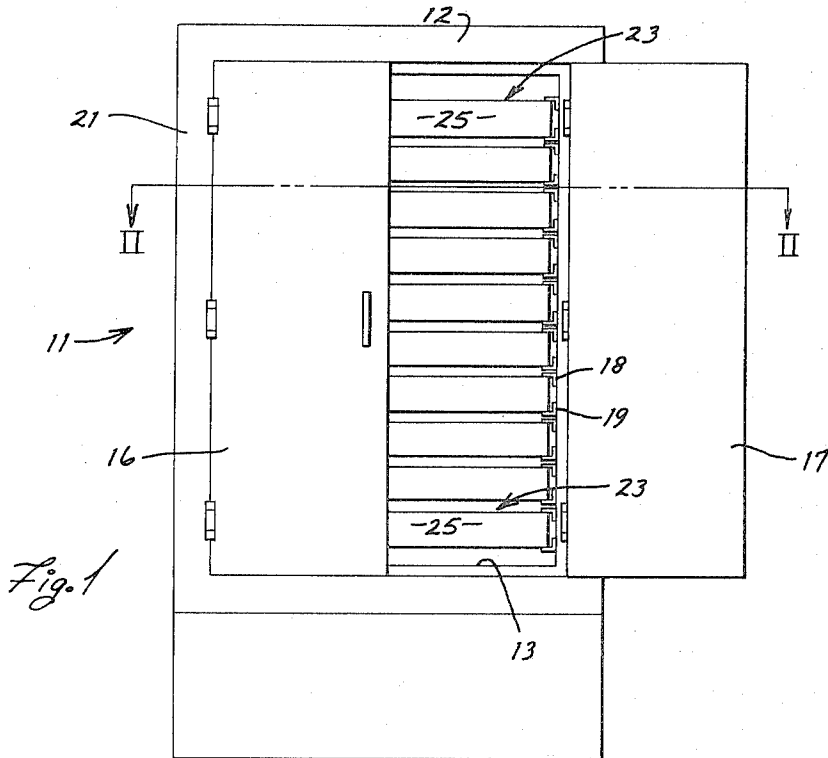
[57] **ABSTRACT**

A method and apparatus for making a cushion constructed of a gel-like substance and having a flexible mesh-like sheet embedded therein. The mesh is placed within a tray so that the edges of the mesh drape over the upper edges of the side-walls of the tray where they are held by elongated channel-shaped clamping members. Each clamping member has an inner leg which projects downwardly into the tray to position the mesh at a desired level within the tray. Corner clips overlap adjacent ends of the channel members to hold same tightly in position. A liquid substance is poured into the tray and it passes through the mesh to fill the tray to the desired depth. The tray is placed in an oven and heated at a predetermined temperature for a predetermined time whereby the liquid substance becomes a gel-like cushion with the mesh embedded therein. After the cushion has cooled, it is removed from the tray and the edges of the mesh are trimmed. The gel-like cushion can then be covered by a suitable casing.

10 Claims, 9 Drawing Figures



SHEET 1 OF 2



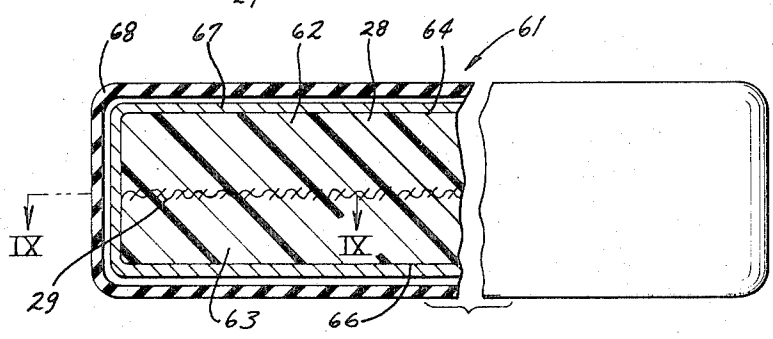
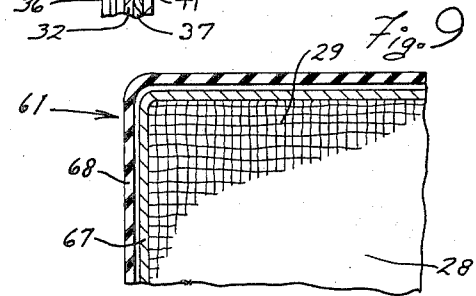
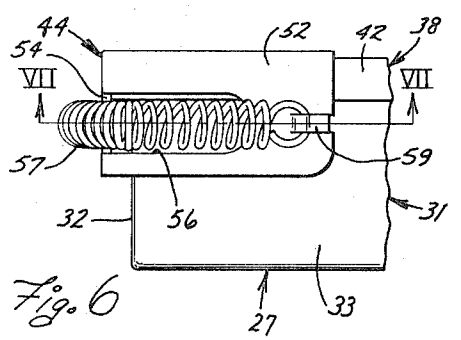
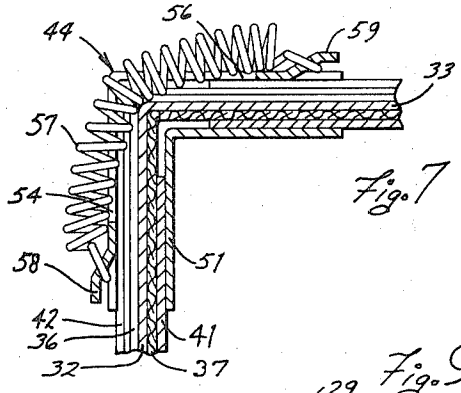
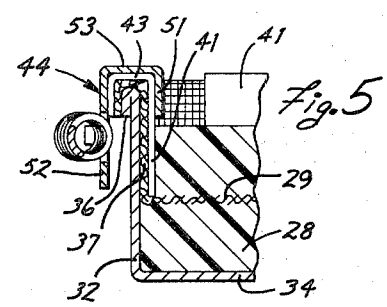
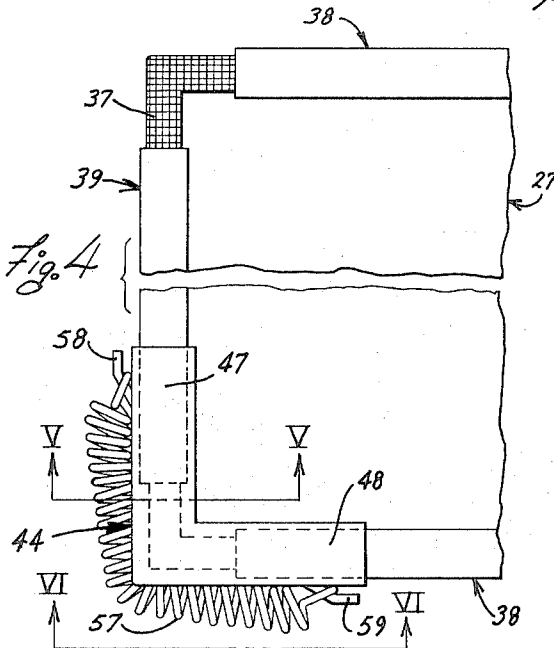
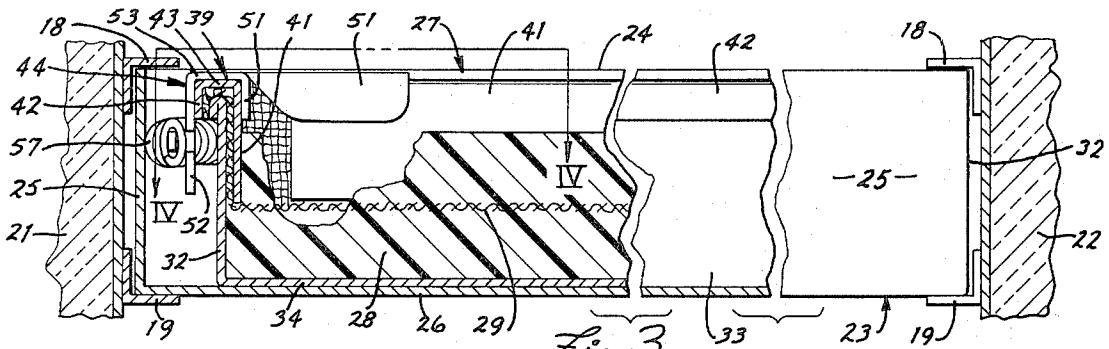


Fig. 8

APPARATUS FOR MAKING A CUSHION

CROSS REFERENCE TO RELATED APPLICATION

This application relates to a method and apparatus for forming a cushion of the type disclosed in copending application Ser. No. 98,816, filed Dec. 16, 1970 and now U.S. Pat. No. 3,663,973, and entitled "Cushion Structure" issued May 23, 1972.

FIELD OF THE INVENTION

This invention relates to a method and apparatus for making a cushion structure usable in patient treatment for protecting the body of a human or animal against localized pressures and, in particular, to a method and apparatus for making a cushion structure constructed of a gel-like substance and having a flexible mesh-like member embedded therein.

BACKGROUND OF THE INVENTION

Pat. No. 3,663,973 which is assigned to the assignee of this application, discloses a cushion structure particularly suitable for protecting the body of a human or an animal against localized pressures. The cushion structure comprises a core constructed of a gel-like substance having a mesh-like member embedded within the core. The mesh-like member has proven highly desirable since it greatly improves the durability of the cushion structure and substantially facilitates handling thereof without diminishing in the least the desired characteristics of the cushion structure without the mesh and, at the same time, permitting the gel-like substance of the core to be maintained in a relatively thin layer. However, during development of the cushion structure disclosed in the above-mentioned application, it was discovered that the cushion structure could be made with the mesh-like member embedded therein economically and efficiently only by the use of specialized equipment for positioning and holding the mesh-like member during formation of the gel-like core.

Accordingly, it is a primary object of the present invention to provide a method and apparatus for manufacturing a cushion structure which primarily comprises a layer of a gel-like substance having a mesh-like member embedded therein.

Particularly, it is an object of this invention to provide a suitable tray structure for manufacturing a cushion of the aforesaid type, which tray structure has suitable means for supporting and maintaining the mesh-like member in a desired position and level within the tray so that the gel-like substance can be formed around the mesh-like member.

A further object of this invention is the provision of a method for making cushion structures of the aforesaid type within trays designed for this purpose, which method results in the proper positioning and maintaining of the mesh-like member during the formation of the gel-like substance.

A further object of the present invention is the provision of a method and apparatus for manufacturing cushion structures of the aforesaid type in a simple and economical manner, said method and apparatus permitting mass production of the cushion structure while preserving the desired uniformity in appearance and structural characteristics of said cushion structures.

Other objects and purposes of the invention will be apparent to persons familiar with methods and appa-

tus of this type upon reading the following descriptive material and examining the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front elevational view of an oven structure for curing and solidifying the liquid substance from which the cushion is made.

FIG. 2 is a sectional view taken substantially along the line II—II of FIG. 1 and illustrating a pair of tray assemblies disposed side-by-side within the oven chamber.

FIG. 3 is a fragmentary, broken cross sectional view taken substantially along the line III—III OF FIG. 2.

FIG. 4 is a fragmentary top view of a tray assembly constructed according to the present invention, same being taken substantially along the line IV—IV of FIG. 3.

FIG. 5 is a fragmentary cross sectional view taken substantially along the line V—V of FIG. 4.

FIG. 6 is a broken elevational view illustrating a portion of the tray assembly, same being taken substantially along the line VI—VI of FIG. 4.

FIG. 7 is a fragmentary sectional view taken along the line VII—VII of FIG. 6.

FIG. 8 is a broken, partially sectioned view of a cushion structure constructed utilizing the apparatus illustrated in FIGS. 1—7.

FIG. 9 is a fragmentary sectional view taken along the line VIII—VIII of FIG. 8.

Certain terminology will be used in the following description for convenience in reference only and will not be limiting. The words "upwardly," "downwardly," "rightwardly," and "leftwardly" will designate directions in the drawings to which reference is made. The words "inwardly" and "outwardly" will refer to directions toward and away from, respectively, the geometric center of the device and designated parts thereof. Said terminology will include the words above specifically mentioned, derivatives thereof and words of similar import.

SUMMARY OF THE INVENTION

The objects and purposes of the present invention have been met by providing a tray assembly which includes a shallow rectangular container or tray which is open on its top side and is adapted to have channel-like clamping members positioned on the upper edges of the sidewalls thereof for securely holding a mesh-like member within the tray in parallel but spaced relationship to the bottom wall of the tray. Suitable L-shaped corner clips solidificaion positioned over the adjacent ends of the clamping members for securely fixing the clamping members in position whereby the mesh-like member is held in a taut condition. A liquid substance, such as a mixture of siloxanes containing a catalyst therein, is poured into the tray to the desired depth, which liquid substance flows through the mesh so that the central portion of the mesh is thus disposed entirely within and surrounded by the liquid substance. The tray is then positioned within a suitable oven and is heated at a predetermined temperature for a predetermined time to cause curing and solidification of the liquid substance into a substantially gel-like cushion or cushion core.

The trays may be supported in the oven by means of a shelf which is removably supported in the oven on elongated horizontal rails. The oven is preferably of the

upright type with a frontward opening. The oven preferably has a plurality of vertically spaced, horizontal rails for supporting a plurality of slidable shelves, each shelf having one or more trays thereon. After the curing and solidification operation, the trays are permitted to cool and then inverted to discharge the gel-like cushion structure. The edges of the mesh are trimmed and the resultant cushion can then be suitably covered.

DETAILED DESCRIPTION

FIGS. 1 and 2 illustrate an upright oven 11 used for curing and thereby solidifying the cushion structures which are constructed according to the present invention. The oven 11 includes a housing 12 defining a front-opening oven chamber 13 which is closed by a pair of vertically hinged doors 16 and 17. A plurality of cooperating upper and lower guide rails 18 and 19, respectively, are mounted on the opposite side walls 21 and 22 of the oven to support a plurality of slidable, box-like shelves 23 in the oven in vertically stacked but spaced relationships.

Each box-like shelf 23 has, as illustrated in FIG. 3, an upward opening 24 which is defined by sidewalls 25 connected to a bottom wall 26 which is adapted to extend laterally between the bottom guide rails 19 connected to the opposite side walls 21 and 22 for slideably supporting the shelf relative to the oven chamber 13. The shelf 23 is adapted to support one or more trays 27 therein, two said trays 27 being disposed within a single shelf in a side-by-side relationship in the embodiment illustrated in FIG. 2. Each tray 27 is used to permit formation of a gel-like cushion core 28 (FIG. 3), which has a net or mesh-like fabric 29 at least partially embedded therein.

The tray 27 which, as illustrated in FIGS. 2-7, opens upwardly, has a first pair of opposed substantially parallel sidewalls 32 and a further pair of opposed substantially parallel sidewalls 33 interconnected between the sidewalls 32. The tray also has a substantially rigid and flat bottom wall 34. The sidewalls 32 and 33 have an upper rolled edge 36 which provides the tray with added strength and rigidity. The tray 27 is preferably constructed of aluminum and coated with a plastic (such as Teflon) on the interior thereof to provide a low friction, nonsticking surface.

The net 29 has an area larger than the cross-sectional area of the tray 27 so that the free edge portions 37 of the net can drape over the upper edges of the sidewalls of the tray. The edge portions 37 of the net are adapted to be held in position on the tray by means of elongated channel members 38 and 39 which open downwardly to clamp the net 29 onto the upper portions of the sidewalls 33 and 32, respectively. The members 38 and 39 have identical cross sections defined by substantially parallel inner and outer flanges 41 and 42, respectively, interconnected by a web 43. The flanges 41 and 42 are laterally spaced by a distance slightly greater than the width of the rolled edges 36 of the tray sidewalls to permit the edge portions 37 of the net to be tightly clamped therebetween.

The inner flange 41 is substantially longer than the outer flange 42 and extends downwardly (preferably a little more than half way) into the tray. The lower free edges of the inner flanges 41 of the channel members 38 and 39 thus cause the central portion of the net 29 to be positioned within the tray substantially parallel with, but spaced above, the bottom wall 34. Obviously,

the elevation of the net 29 above the bottom wall 34 can be selectively varied by utilizing members having flanges 41 of the desired length.

The tray 27 in the illustrated embodiment is substantially square in cross section, so that the members 38 and 39 may have substantially the same length. However, the trays could have any desired configuration, such as elongated, in which case the members 38 and 39 would be provided with different lengths. The members 38 and 39, as illustrated in FIG. 4, are preferably slightly shorter than the sidewalls 33 and 32 on which they are mounted so that the members extend close to but terminate short of the corners of the tray 27.

The tray 27 is also provided with corner clamps 44 which are adapted to slide downwardly over and engage the adjacent ends of the members 38 and 39, as illustrated in FIG. 4, for maintaining said members in tight clamping engagement with the edge portions 37 of the net during the cushion forming process.

Each corner clamp 44 is L-shaped and has perpendicular channel portions 47 and 48 adapted to embrace the adjacent ends of the holding members 38 and 39, respectively. The channel portions 47 and 48 may have identical cross sections, both of which include inner and outer flanges 51 and 52, respectively, which are substantially parallel to one another and are interconnected adjacent their upper ends by a web 52. The flanges 51 and 52 are laterally spaced by a distance substantially equal to the lateral width of the channel members 38 and 39 so that the channel portions 47 and 48 will be snugly engageable with the ends of the members 38 and 39.

When the clamps 44 are in position, the webs 53 thereof will be disposed in abutting engagement with the webs 43 of the holding members. Further, the inner and outer flanges 51 and 52 will be respectively positioned snugly adjacent the inner and outer flanges 41 and 42, substantially as illustrated in FIGS. 3 and 5.

The inner flange 51 is relatively short and thus extends into the interior of the tray for only a short distance. On the other hand, the outer flange 52 is substantially longer than the inner flange 51 and extends downwardly a substantial distance below the rolled edges 36 of the flanges 32 and 33, and the outer flange 42.

The outer flanges 52 of the channel portions 47 and 48 have elongated slots 54 and 56, respectively, which slots communicate with one another at the corner of the clamp, substantially as illustrated in FIG. 6. The slots 54 and 56 are wide enough to freely accommodate a tension spring 57, which has the opposite ends thereof anchored to tabs 58 and 59 lanced from the outer flanges 52 adjacent the opposite free ends of the L-shaped clamp 44.

The tray 27 permits formation therein of the cushion core structure 28 of a cushion 61 as illustrated in FIGS. 8 and 9. The cushion 61 specifically comprises the gel-like core 28 having a thin central mesh-like sheet or fabric 29 embedded therein. The net 29, which is preferably a dacron mesh, is disposed within the core 28 so that the gel effectively forms layers 62 and 63 on opposite sides thereof. However, due to the porosity of the net, the gel forming the core effectively impregnates and totally surrounds the net strands so that the gel layers 62 and 63 are in fact integrally bonded together and the layers are integral parts of a single mass of gel.

The cushion 61 is normally provided in the form of a seat cushion having substantially parallel major surfaces 64 and 66, and the net or mesh 29 is preferably disposed substantially midway between and substantially parallel to the surfaces 64 and 66. Although the gel of the core 28 is normally of such shape and strength that it is capable of maintaining its own continuity, nevertheless the type of use to which it is exposed generally dictates the use of some form of container. For this purpose, the core 28 is preferably placed in a resiliently flexible envelope 67, which may be made from a stockinette material. The combined core 28 and envelope 67 are then preferably inserted into a waterproof casing 68 such as one made from pure latex rubber cover.

The gel-like substance which comprises the core 28 is preferably made from an organosiloxane gel substantially of the type disclosed and described in United States Pat. Nos. 3,020,620, 3,308,491 and 3,548,420. The core will thus have a soft, slightly tacky, nonfriable and gel-like consistency in its cured condition. The core thus substantially comprises a semisolid and possesses very desirable hydrostatic properties in that the gel is capable of easily flowing laterally under pressure, the gel being capable of returning toward its original shape as the result of an internal restoring force when the external pressure is removed.

The gel-like substance of core 28 is preferably, but not necessarily, made from the reaction product of an intimate mixture consisting essentially of (1) an organosiloxane having a viscosity of from 100 to 10,000 centistokes at 25°C. and being a copolymer consisting essentially of units of the formula $R\text{ViSiO}$, $R_2\text{SiO}$ and CH_3R_2SiO , where each R individually is selected from the group consisting of methyl and phenyl radicals and Vi represents a vinyl radical, at least 0.174 molar percent of the units in said copolymer being the said $R\text{ViSiO}$ units, (2) a liquid hydrogenosiloxane of the average general formula $\text{HRCH}_3\text{SiO} (R_2\text{SiO})_n\text{SiCH}_3\text{RH}$ where each R is as above defined and n has an average value such that the viscosity of the hydrogenosiloxane is no more than 10,000 cs. at 25°C., no more than 25 molar percent of the total R radicals present in (1) and (2) being phenyl, and (3) a platinum catalyst in an amount sufficient to furnish at least 0.1 part per million of Pt based on the combined weight of (1) and (2); the proportions of (1) and (2) being such that prior to reaction there is an average of from 1.4 to 1.8 grams atoms of the silicon-bonded H atoms in (2) per gram molecular weight of (1) and there being at least one $R\text{ViSiO}$ unit in (1) for every silicon-bonded H atom in (2), the molecular weight of (1) being calculated by the equation:

$\log \text{visc.} = 1.00 + 0.0123M^{-.5}$ where M is the molecular weight and "visc." is the viscosity of (1) is cs. at 25°C.

While the gel-like substance may be made of a pure reaction product, as described in the preceding paragraph, it may be found desirable in some cases to incorporate a quantity of a filler or extender material in the reaction product in order to minimize cost. It has been found satisfactory to use a filler consisting essentially of dimethyl polysiloxane fluid which can be uniformly mixed in the reaction mixture before the reaction begins. The dimethyl polysiloxane fluid may be of viscosity of about 1,000 cs. at 25°C. It has been found quite

desirable to use about 25 percent by weight of the filler material, but approximately 10 percent up to 50 percent by weight can be used for some applications.

Other gels, having the same or similar characteristics and properties as organosiloxane may be used in forming said cushion core 28.

OPERATION

The apparatus of the present invention, and the method of using same, will be described in further detail hereinbelow for a better understanding of the invention.

In order to form a cushion, such as the cushion 61 illustrated in FIG. 8 and 9, the interior of a clean tray 27 is coated with a suitable catalyst release agent (such as Dow 200) for preventing the cushion from sticking to the tray. The net 29 is then positioned upon the tray so that the edges of the net drape over the upper free edges of the sidewalls of the tray. The net is initially pulled taut to remove the wrinkles therefrom, after which the channel members 38 and 39 are positioned over the upper edges of the side walls of the tray 27 to clamp the edge portions 37 of the net 29 against said tray sidewalls. The net is straightened and tightened as the holding members 38 and 39 are being applied to insure that the net will remain substantially taut and substantially parallel with the bottom wall of the tray.

After all of the holding members 38 and 39 have been positioned, the corner clamps 44 are applied to tightly hold the members 38 and 39 in position. Each clamp is applied by pushing it downwardly over the corner of the tray and over the adjacent ends of the members 38 and 39. As the corner clamp 44 is applied to the tray, the spring 57 is resiliently forced outwardly by the rolled edge 36 at the corner of the tray. The spring is then moved downwardly into a tensioned position disposed below the edge 36. The spring 57 thus resiliently engages the corner of the tray to hold the corner clamps thereon and to prevent the corner clamps and the holding members from being accidentally dislodged or moved upwardly during the remainder of the cushion-forming process.

After the tray 27 has been assembled as described above, the tray is then in condition to have the liquid mixture, from which the gel-like core 28 is formed, poured therein. Particularly, the liquid siloxanes are first mixed with a suitable catalyst, such as platinum, in the desired ratio, such as approximately in the ratio of 10 to 1. The liquid mixture is then poured into the tray 27 whereupon it runs through the net 29 totally filling the tray to the desired level while it totally surrounds the central portion of the net. The liquid mixture within the tray is then degassed by gentle agitation thereof, as by gently manually stirring the liquid mixture. The tray 27 containing the liquid mixture is then positioned on a shelf 23 (if it has not previously been positioned on the shelf), after which the shelf is slideably moved into the oven 11.

The oven 11 is preferably preheated to a desired temperature, such as 250°F., and the trays are inserted into the oven and heated at said predetermined temperature for a predetermined time, such as for approximately 2 hours. This heating of the trays containing the liquid mixture therein causes a curing, hence solidification, of the mixture, particularly due to a polymerization-type reaction.

After the tray containing the mixture has been heated the predetermined time, the tray is then permitted to cool, which cooling may be performed either inside or outside the oven. After the tray has cooled sufficiently to permit ease of handling, the tray is turned upside down over a substantially flat support surface, which normally results in the solidified core structure 28 dropping from the tray onto the support surface. The surface of the gel-like core 28 is then powdered to reduce the tackiness thereof, and the free edges of the net 29 which extend beyond the core are trimmed. The core 28 can then be covered if desired.

For example, the core can be inserted into the stockinette envelope 67, after which the core and the stockinette can then be inserted into the latex casing 68. The latex casing is preferably sealed to completely surround the core 28 and the net 29 embedded therein.

As is readily apparent, a further core structure 28 can then be made in the same tray 27 merely by repeating the above described operational sequence. Further, due to the manner in which a plurality of trays are adapted to be disposed on a single shelf 23, with a plurality of shelves 23 being positionable within the oven 11 at any time, a large number of core structures can be simultaneously cured and solidified.

Although a particular preferred embodiment of the invention has been disclosed in detail for illustrative purposes, it will be recognized that variations or modifications of the disclosed apparatus, including the rearrangement of parts, lie within the scope of the present invention.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. An apparatus for constructing a cushion structure having a porous flexible fabric embedded therein, said apparatus comprising:

upwardly opening tray means defining therein an upwardly opening compartment for forming a cushion structure, said tray means including a substantially horizontal bottom wall and sidewall means fixed to said bottom wall and extending therearound, said sidewall means including a plurality of substantially straight and elongated sidewalls extending upwardly from said bottom wall and having a substantially free upper edge;

clamping means removably mounted on said sidewall means and coacting therewith for holding a thin sheet of flexible porous material within said compartment spaced upwardly from and substantially parallel to said bottom wall, said clamping means holding said sheet spaced downwardly from the free upper edge of said sidewall means;

said clamping means including a plurality of clamping members adapted to be clampingly engaged on the upper portion of said sidewall means for permitting the edge portion of said sheet of porous material to be tightly gripped between said clamping members and said sidewall means while maintaining the central portion of said sheet of material spaced from and substantially parallel to said bottom wall;

each of said clamping members being adapted to coact with one of said sidewalls, said clamping members each having a length slightly smaller than the sidewall with which it coacts so that each

clamping member extends over at least a major portion of the length of its respective sidewall; each said clamping member including a leg portion adapted to be disposed adjacent the inner surface of its respective sidewall, said leg portion extending downwardly a substantial distance from the upper edge of said sidewall into the interior of said compartment, the lower free edge of said leg portion being spaced upwardly a predetermined distance from said bottom wall for determining the elevation of the central portion of the sheet of porous material relative to the bottom wall; and

corner clip means adapted to be mounted on each corner of said tray means in overlapping relationship with the ends of the adjacent clamping members for securely maintaining said clamping members on said tray means.

2. An apparatus according to claim 1, wherein said corner clip means includes a substantially L-shaped member having a channel-shaped configuration and being adapted to overlie the upper edge of the sidewalls and also the clamping members, said corner clip means also including spring means mounted on said L-shaped member and disposed for resilient engagement with the outer corner of said tray means when said clip means is mounted thereon.

3. An apparatus for constructing a cushion structure having a porous flexible fabric embedded therein, said apparatus comprising:

upwardly opening tray means defining therein an upwardly opening compartment for forming a cushion structure, said tray means including a substantially horizontal bottom wall and sidewall means fixed to said bottom wall and extending therearound, said sidewall means extending upwardly from said bottom wall and having a substantially free upper edge;

said sidewall means including a pair of substantially straight and elongated sidewalls disposed in substantially parallel relationship, said sidewalls having a height which is only a small fraction of their length;

clamping means removably mounted on said sidewall means and coacting therewith for holding a thin sheet of flexible porous material within said compartment spaced upwardly from and substantially parallel to said bottom wall, said clamping means holding said sheet spaced downwardly from the free upper edge of said sidewall means;

said clamping means including a pair of elongated clamping members each being adapted to be clampingly engaged on the upper portion of one of said sidewalls for permitting the edge portion of said sheet of porous material to be tightly gripped between said clamping members and said sidewalls while maintaining the central portion of said sheet of material spaced from and substantially parallel to said bottom wall, said clamping members each having a length slightly smaller than the sidewall with which it coacts so that each clamping member extends over at least a major portion of the length of its respective sidewall; and

each said clamping member including a leg portion adapted to be disposed adjacent the inner surface of said sidewall means, said leg portion extending over at least a major portion of the length of its respective sidewall and extending downwardly a sub-

stantial distance from the upper edge of said sidewall into the interior of said compartment, the lower free edge of said leg portion being spaced upwardly a predetermined distance from said bottom wall for determining the elevation of the central portion of the sheet of porous material relative to the bottom wall.

4. An apparatus according to claim first-mentioned wherein each clamping member coacting channel-shaped and includes a second leg portion spaced from and substantially parallel to said first-mentioned leg portion, said second leg portion being adapted to be disposed adjacent the outer surface of said sidewall means.

5. An apparatus according to claim 3, further including removable holding means coacting with and extending between each adjacent pair of clamping members for releasable holding said clamping members on said tray means.

6. An apparatus according to claim 5, wherein said removable holding means includes spring means coacting with said tray means for holding said clamping members thereon.

7. An apparatus for constructing a cushion structure having a porous flexible fabric embedded therein, said apparatus comprising:

one-piece upwardly opening tray structure defining a shallow upwardly opening substantially rectangular compartment for forming said cushion structure therein, said tray structure including a substantially horizontal bottom wall and sidewall means fixedly secured to said bottom wall and extending therearound, said sidewall means including a first pair of substantially parallel sidewalls and a second pair of substantially parallel sidewalls connected between the opposed ends of said first pair of sidewalls, said sidewalls extending upwardly from said bottom wall through a predetermined distance which is only a small fraction of the horizontal dimensions of the tray structure; and

clamping means removably mounted on the upper portion of said sidewall means and coacting there-

with for holding a thin sheet of flexible porous fabric within said compartment at a location which is spaced downwardly a substantial distance from the upper edge of said sidewall means but is spaced upwardly a substantial distance from said bottom wall, said clamping means holding said thin sheet of porous material within and extending across said compartment in substantially parallel relationship to said bottom wall;

said clamping means including a plurality of clamping members removably mounted on the upper edge of said sidewall means, each said clamping member including a portion projecting downwardly halfway said compartment adjacent the inner surface of said sidewall means for gripping an edge portion of said sheet of porous fabric therebetween, said leg portion extending downwardly at least halfway from said upper edge toward said bottom wall and having a lower free edge thereon which determines the elevation of the center portion of the sheet of porous material relative to said bottom wall.

8. An of each according to claim 7, wherein at least one of said clamping members is removably mounted on the upper edge of each of the sidewalls of said first pair, each said clamping member being elongated and engaging its respective sidewall over a major portion of the length thereof.

9. An apparatus according to claim 7, wherein at least one of said clamping members is removably mounted on the upper edge of each of the sidewalls of said first pair and on each of the sidewalls of said second pair, whereby said sheet of porous fabric is gripped on all four edges thereof.

10. An apparatus according to claim 7, wherein said clamping means grips said sheet of porous fabric adjacent each of the sidewalls of said first pair in at least two locations which are widely spaced from one another in the lengthwise direction of the respective sidewall.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3 799 491 Dated March 26, 1974

Inventor(s) Wayne N. Warfield and John E. Barnett

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 9, lines 8 & 9; "claim first-mentioned wherein each clamping member coating" should read:
---Claim 3, wherein each clamping member is---

Column 10, line 14; "halfway said compartment" should read
---into said compartment---

Column 10, line 12, after "clamping" insert -- member --;
line 13, cancel "the".

Signed and sealed this 17th day of September 1974.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents