A multineedle quilting machine for manufacturing continuously and automatically a quilted article consisting of an outer cover material, parallel and spaced apart strips of an elastic intermediate padding, and a foundation material. In this machine the padding material, continuously supplied by a feeding roll is cut by means of circular blades into longitudinal strips which are caused subsequently to meet with the foundation material. Then said strips, which are spaced apart a predetermined distance, are covered by the cover material which adapts to the form of the padding, and the assembly is quilted by the needles of the machine in the spaces between one padding strip and the next.
MUL'TINEEDLE QUILTING MACHINE FOR THE MANUFACTURE OF PADDLED UPHOLSTERY

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a multineedle quilting machine capable of manufacturing automatically and continuously padded articles of a type wherein the padding consists of parallel and spaced apart longitudinal strips of an elastic material which articles are particularly suitable for car seats. This type of article consists of an outer cover material (fabrics, plastics, artificial leather, etc.), an elastic intermediate padding (for example expanded polyvinyl chloride, rubber foam, etc.) in the form of longitudinal strips, and a foundation or base material supporting said padding material, the whole being superimposed and quilted together by stitching in the spaces between one padding strip and the next. The attached tubes of cover and foundation material enclosing the padding strips will sometimes be referred to hereinafter as "canes."

This kind of article is known and is meeting more and more success inasmuch as the canes have a marked height and an aesthetically more valuable appearance as compared with the traditional type of article obtained by simply compressing the padding in the form of entire panels subjected to parallel stitching.

Furthermore, the article with separated canes is more comfortable as compared with the traditional type, since it keeps its elastic properties unchanged and provides for improved air circulation. This is why it is much in demand, especially for use in car seats.

2. Prior Art

The processes presently employed for manufacturing such quilted article are, however, slow and expensive and require an extensive use of manual labor, inasmuch as they are still performed on a manual lever and not on an industrial level. Actually, the quilting in the spaces between the canes, for the purpose of joining the upper fabric to the supporting material, has been made so far with the aid of single needle machines, so that the stitching operation had to be repeated for every strip of padding. Moreover, the preliminary operation of coupling the materials to be joined together had to be performed manually thereby involving a considerable waste of time and labor.

SUMMARY OF THE INVENTION

An object of this invention is, therefore, that of making it possible to manufacture continuously and on an industrial scale a quilted article as described hereinabove, so as to achieve a great increase in production per time unit, with a reduced employment of labor and, accordingly, a reduction in costs.

This object, and further objects are attained by this invention, which provides a multineedle quilting machine modified so as to be able to perform all of the operations required to convert the three component materials fed by three separate rolls into the finished padded product.

BRIEF DESCRIPTION OF THE DRAWINGS

The objects, advantages and characteristics of the machine according to this invention will be evident to those skilled in the art from the following detailed description given with reference to the accompanying drawings, wherein:

FIG. 1 represents an overall, diagrammatic side-view of a machine according to this invention;
FIG. 2 represents an enlarged detail of FIG. 1; and
FIGS. 3 and 4 are, respectively, plan and enlarged perspective views of portions of the apparatus shown in FIGS. 1 and 2.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to FIGS. 1-4, there can be seen the base 1 on which are arranged the two shoulders of the machine 2 (of which only one can be seen in the figure), connected together and made integral by suitable spacing bars 3. The motor 6 is mounted within the base 1, on a board 4 having its fulcrum at 5. Said motor is connected to an expanding pulley 7 of a known type which permits variation of the speed of the machine, by controlling the handwheel 8. The shaft 9 is driven by the motor 6 by means of the driving belts 10.

In the base 1, there are also housed the cones of the lower yarn 11 feeding the hooks 12 in case of chain-stitch quilting (as shown in the figure), or the shuttles in case of knot-stitch quilting. The yarn used in quilting passes through the yarn stretchers 13, 13' and a reel 14 under the hook 12 (or as a shuttle, as the case may be), which is secured to a lever 15, and is operated by the shaft 16 along an elliptic path resulting from the composition of two perpendicular oscillating motions, as is known in the art. The needles 17 are assembled on the needles 18 carrying a support 26 which are driven by the main shaft 9 in any manner known for quilting machines. Before reaching the needle 17, the upper yarn, coming from the cones 11' arranged on a creel journalled on the shoulders 2, crosses the yarn stretchers 19 and 19' and passes around a shaft 20.

The needles 18 are guided by fixed bodies 21, and said bodies 21 support a shaft 22 carrying cams 23, which operate, through the lever 23, and bar 23' the feeder feet 24, in order to cause the material to be quilted to move forwards under the needles 17. The feeder feet 24 are carried by a lever 24' secured to the bar 23' by a screw 24" and are lined up with the needles 17 and the motion is conferred to them by the cams on the shaft 22 in a vertical, reciprocating direction, while the horizontal reciprocating motion is imparted by the lever 25 which is driven by the oscillating shaft 25'. The pressure feet 24 move in synchronism with the needles 17. Within the sleeves 18, there are slideably arranged the rods 26 of the fabric pressers 27 operated through suitable cams 28, so as to have reciprocating vertical motion, in a pre-fixed relation of phase with respect to the motion of the corresponding needle. The function of the fabric pressers 27 is, in fact, to immobilize the material to be quilted, whereas the needles 17 penetrate and are subsequently lifted up again.

Referring specifically to FIG. 4, the shaft 25' is driven by the lever 43 having a pin connection 44' with the rod 44 pivoted at 44" on the drum 45, 45' keyed on the shaft 22. The shaft 22, by the sprockets 46' and 46" and the chain 46, drives the shaft 47 which through the bevel gears 48 drives the shaft 48' and the cam 48". The cam 48" engages the roller 16' secured to the shaft 16 by the pin 16" and thereby drives the shaft 16 longitudinally.

The shaft 47 drives a crank 47' pivotally connected at 47' to the connector 49' of the rod 49 which oscillates the shaft 16 through the lever 49' connected thereto.

The quilting mechanism is not described and illustrated in further detail herein, since it is the well-known conventional mechanism employed in usual quilting machines.

The base 1 is rigidly connected, through the side-frames 1', to a stand 29 which carries on appropriate supports 30 and 31, the rolls of material to be processed, i.e., respectively, the lower, or supporting material 32, and the upper, or cover material 33 which passes over a roll 33'. The padding material 34 is supplied from a roll, 34' situated at the left-hand side of FIG. 1, behind the operator who normally controls the working process standing on the board 35 (partly shown). The padding material 34, coming from the feeding roll passes under the standing board 35 and, guided by the roll 36, is caused to pass through a cutting device which cuts it into longitudinal strips. Said device is composed of circular blades 37 spaced by spacer 37' and driven by motor 37' and by opposite rolls 38. Obviously, the number of sets composed of a blade 37 and an opposite roll 38 is equal to the number of parallel padding strips which are required to be obtained in the finished product, less one. The distance between one set and the next is adjusted so as to correspond to the pre-established width of each padding strip. On the driving roll 39
of a conveyor belt 40, the padding strips thus cut meet with the foundation material 32, are superimposed on the latter and together are carried over the whole length of the conveyor belt up to the other drawing roll 39'. Towards the end of their movement by the belt 40, the padding strips meet with partitions 41 substantially in the form of wedges, which move said strips away from each other so that between the one strip and the next there is a predetermined distance corresponding to the desired spaces between one strip of padding and the next. At the end of the partitions 41, and upon a contrasting roll 42, the foundation material 32 and the padding strips 34 meet the upper material 33, previously shaped by a shaping device A so as to adapt itself perfectly to, and to be superimposed on, the padding strips, to form the required canes. The shaping device A is of the type which is described in detail in my co pending application Ser. No. 55,138, filed on July 15, 1970 and entitled Device for Feeding and Contemporaneously Shaping Materials into a Quilting Machine in the Manufacture of Padded Articles and does not therefore require detailed description herein.

Said device A essentially consists of a table provided with a plurality of projecting profiles having a substantially rectangular section defining, on the table, a plurality of lengthwise parallel grooves, two rotatable shafts anchored at a given distance apart on said table and extending perpendicularly with respect to the profiles and close to the ends thereof, a plurality of sprockets keyed on each of said shafts and arranged in such a way that each groove corresponds to a pair of sprockets keyed on the two shafts, each of said pairs supporting an endless chain adapted to slide in said grooves close to the lower part thereof, and a belt feeding the material to be shaped adapted to slide along one side of said table, parallel to the profiles, under the action of driving means which also drives the two rotatable shafts so as to move the chains in the same sense as the belt. Once the three materials are intimately superimposed, the shaping chains for the cover material leave said material and are replaced in the spaces between the padding strips by the feeder feet 24 which convey the whole towards the needles 17 to perform the quilting.

The machine herein described may also be used for conventional type processes, i.e., for performing usual quiltings. This can be obtained by omitting the blades 37 and the rolls 38 for cutting the padding into strips and by lifting the device A by causing it to rotate around the axis B on which it is suspended, until it takes the position indicated by the dashed and dotted lines in FIG. 2.

In this case the upper material coming from the roll 33 will join the padding material 34 and the lower material 32 directly on the roll 39 of the conveying belt 40, without having to pass over the rool 33 which directs it to the table B.

Of course, many additions and/or modifications may be contributed by those skilled in the art to the quilting machine according to this invention. For example, the outset of said machine may be provided with a device C for transversal cutting at a given size, so as to have the pieces ready for use, which device is controlled by photoelectric cells or other equivalent systems. The device C follows a table 54 and comprises a motor 50 on rails 51 and is pulled by chains 52 driven by a motor 51'. The motor 50 drives a blade 53, and the material is held down by a presser 55 operated by cylinder 56. The material is pulled out of the machine by rollers 57.

Furthermore, the stitching system illustrated here is the one using a lower hook, which supplies a chain-stitch quilting. This is preferred because of the fact that this kind of stitch is more flexible and therefore, better adapts itself to the deformations of the padding material and is more suited to this kind of quilting. Of course, this also applies to quilting machines provided with a shuttle instead of a hook and supplying knot-stitch quilting. Similarly, the supplying rolls of the materials to be joined together to form the finished product may be arranged differently, and the cones of the upper and lower yarn and other parts whose structural or accessory characteristics are not essential for attaining the object of the present invention may also be arranged differently. It must therefore, be kept in mind that the embodiment described hereinbefore and illustrated in the accompanying drawings has been given only by way of non-limiting example of the present invention the scope of which is defined by the appended claims.

What I claim is:

1. A multiline automatic quilting machine for the continuous manufacture of a padded product comprising a foundation material, an upper cover material, and parallel, spaced apart strips of padding material intermediate said foundation and cover materials, said machine comprising:
   a. a plurality of stitching needles mounted for stitching of said cover material to said foundation material, said needles being spaced from each other in a predetermined direction and the spacing being substantially equal to the spacing between corresponding points on said strips,
   b. a conveyor belt for receiving said foundation material and conveying it toward said needles in a direction transverse to said predetermined direction,
   c. cutting means in advance of said conveyor belt for cutting said padding material into strips,
   d. feeding means for feeding said strips lengthwise thereof and on top of said foundation material on said conveyor belt,
   e. means for feeding said cover material on top of said strips carried by said foundation material and said belt and for shaping said cover material in a direction transverse to its direction of feed to provide a cross-section therefor which mates with the cross-section of said strips on said foundation material,
   f. a plurality of feeder feet at the end of said belt nearest said needles and aligned therewith for engaging said cover material intermediate said strips and feeding the superimposed materials toward said needles with the spaces between said strips beneath said needles, and
   g. and means for driving said needles, said belt, said feeding means and said feeder feet in synchronism and thereby stitching said cover material to said foundation material between said strips as they are advanced toward and beneath said needles.

2. The machine as set forth in claim 1 wherein said cutting means comprises a plurality of rotatable, circular blades spaced axially of each other and a plurality of opposed rolls in- 
   servable intermediate said blades.

3. The machine as set forth in claim 1, wherein said means for feeding and shaping the cover material includes a table provided with a plurality of spaced projecting profiles having a substantially rectangular section which define a plurality of parallel grooves on said table extending in the direction of feed of said cover material, two rotatable shafts mounted on said table in spaced relation and extending perpendicularly with respect to said profiles and close to the opposite ends thereof, a plurality of sprockets keyed on each of said shafts and arranged so that each pair of sprockets keyed on the two shafts corresponds to one of said grooves, each of said pairs supporting an endless chain adapted to slide within said grooves close to the bottom thereof, a feed belt for engaging and feeding the material to be shaped and adapted to run along one side of said table parallel to the profiles, and means for driving said shafts and said feed belt.

4. The machine as set forth in claim 3 wherein said shafts, sprockets and chains are mounted on a pivotally mounted frame permitting tilting thereof toward and away from said table.

5. The machine as set forth in claim 1, wherein hooks cor- 
   responding to each needle are mounted below said needles for quilting the superimposed materials with a chain-stitch.

6. The quilting machine of claim 1, wherein said feeder feet are synchronized with the quilting needles so as to feed said superimposed materials when the needles are withdrawn therefrom.

7. The machine as set forth in claim 1 further comprising cutting means following said needles for cutting the superim-
posed and stitched materials transversely to the direction of movement thereof.