

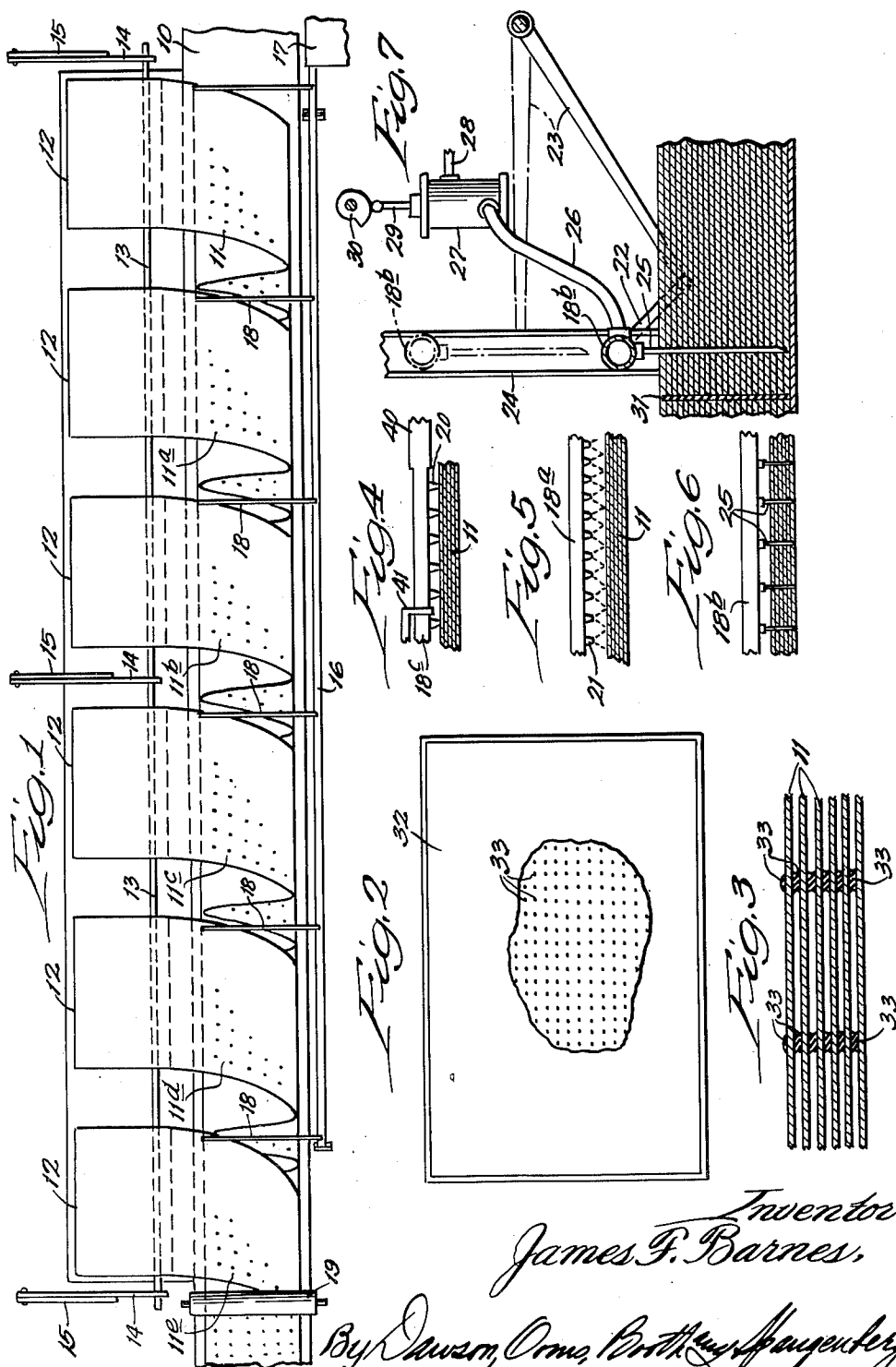
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INTEGRATION OF MULTIPLY WEB PADS

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INTEGRATION OF MULTIPLY WEB PADS

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This invention relates to the integration of multi-ply web pads and more particularly to the forming of pads for mattresses, cushions, etc., in which a large number of web plies of cotton, felt, etc., are united preferably by a resilient structure to a unitary pad or cushion, etc.

An object of the present invention is to provide a process and means for integrating a plurality of webs or folded web plies into a unitary pad structure through the use of bonding means engaging the several plies. Yet another object is to provide a method of rapidly integrating web bodies folded together in the forming of a pad through the use of a resilient bonding material engaging the web plies in spaced relation. A still further object is to provide a process and means for rapidly forming a pad of web plies through the forming of lines or spots of resilient material uniting the several plies in aligned areas of spots or lines. Other specific objects and advantages will appear as the specification proceeds.

The invention is illustrated, in single embodiments, by the accompanying drawing, in which—

Fig. 1 is a top plan view of apparatus which may be employed in the practice of my invention; Fig. 2, a broken top plan view of a finished pad structure; Fig. 3, a sectional detailed view of a portion of the pad, the view being greatly enlarged; Fig. 4, a broken detailed sectional view illustrating the application of spots or resilient adhesive to the pad; Fig. 5, a view similar to Fig. 4 but showing the application of the bonding material to the plies in the form of spray; Fig. 6, a view similar to Fig. 4 but showing the use of a hollow needle for the application of bonding material to the web plies; and Fig. 7, a sectional view on an enlarged scale of apparatus employed in the application of bonding material to the web plies through the use of a hollow needle.

In the practice of my invention, web material formed of cotton, felt, or any other suitable material, is folded upon a conveyor to form folded strips thereon while, by the folding operations, I apply latex or other suitable bonding material to the web plies in order to unite the plies.

In the specific illustration given in Fig. 1, 10 designates a conveyor belt adapted to receive the folded plies of material. The belt 10 may be continuous and carried by rollers driven in the usual manner.

As shown in Fig. 1, continuous webs 11, 11a, 11b, 11c, 11d and 11e, are carried over the belt 10 transversely thereof and folded back and forth. As the belt advances, the folded portions occupy substantially inclined or oblique positions upon

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the belt, as shown best in Fig. 1. The folding may be done by hand, operators being stationed along the belt, but I prefer to employ standard machines which are used for this purpose. The machines are indicated in Fig. 1 by the numeral 12 and these deliver near the top forward end thereof continuous webs of material. An arm 13 carried by pivoted levers 14 is advanced through the actuating levers 15 so as to move the web repeatedly back and forth across the conveyor to form the folded portions indicated best in Fig. 1. Since the web-forming apparatus and the means for folding the web repeatedly across the width of the conveyor 10 is well known in the art and is commonly employed, a detailed description is believed to be unnecessary.

In the practice of my invention, I provide a manifold pipe 16 which leads from a source of supply such as, for example, a tank 17 containing a body of bonding liquid urged into the outlet pipe 16 by compressed air, pistons, or any other suitable means. A spray pipe 18 leads from the connection 16 and extends across the belt 10 and between each of the webs delivered from the machines 12. The pipes 18 may be provided on their under sides with perforations or spray nozzles or nozzles for discharging a thin stream or drop of bonding material.

After the webs have been folded upon the conveyor, as shown in Fig. 1, I prefer to employ a compression roller 19 which presses the various plies of folded web upon each other causing the areas of bonding material deposited thereon to unite and thus to form continuous bonding lines or threads extending through the finished pad. Any desired number of rollers may be employed.

The compacted pad web leaving the rollers may be wound into a roll and later cut into the desired lengths or widths for pads employed in mattresses, cushions, etc.

In the illustration given in Fig. 4, the pipe 18c is shown equipped with depending hollow nipples 20 adapted to discharge tiny drops or lines of latex or other suitable bonding material upon the web ply 11 there below.

In the structure shown in Fig. 5, the pipe 18a is provided with spray nozzles 21 which discharge a fan-shaped spray of bonding material upon the topmost ply 11 of the web material.

In the structure shown in Fig. 7, the pipe 18b is mounted for vertical movement upon an arm 22 pivotally connected to the actuating lever arm 23. The pipe 18b is guided within a slotted tube 24 and is equipped with a plurality of hollow needles 25. A flexible tube 26 leads from the pipe

18b to a stationary receptacle 27 receiving bonding liquid through the pipe 28. A valve stem 29 is urged upwardly by a spring against an actuating cam 30. The valve stem 29 is pressed downwardly at intervals to control the release of bonding liquid at desired intervals through the flexible conduit 26 and to the pipe 18b. The bonding material is released preferably through the needle 25 as it is being raised to elevated position so as to leave a thread 31 of latex or other suitable bonding material extending through the plies of material, as shown best in Fig. 7. The belt 10 carrying the plies of material may be operated intermittently so that movement of the web plies occurs only after the withdrawal of the needle to elevated position, as shown in Fig. 7. It will be understood, however, that the needle structure may be moved, if desired, in timed relation with the advancing web, etc.

I have found that particularly good results are obtained by depositing minute drops or a very thin line of latex in a spaced order upon the plies of the web as they are formed and advanced. As illustrated in Fig. 3, the deposition of a drop of latex results in the penetrating of the ply 11 so that the latex drop appears both above the body 11 and slightly below it. When a similar drop has been applied to the other plies, it is found that a thread of latex is formed which extends through the entire pad. However, by applying an extremely thin drop or line of bonding material to each ply or a small number of plies, I find that the pad can be united with a relatively small amount of latex, etc., while at the same time the latex forms a relatively thin thread or web which does not interfere with the flexibility or softness of the finished pad.

In Fig. 2, there is shown a finished pad having a cover 32 and the plies within the cover are united by tiny threads 33 of latex which extend all the way through the pad to form a continuous resilient integrating body. The spaced threads illustrated are highly effective as are also the continuous thin lines of bonding material which, like the thread, extend through the plies from the top to the bottom, forming a thin continuous web. The line of adhesive is effectively applied by the mechanism shown in Fig. 4 in which the liquid material is fed through outlet nozzles provided with minute discharge openings so that a continuous stream is fed therefrom as the web plies are advanced. By the use of air pressure or other suitable means, the bonding liquid may be fed evenly through the tubes and discharged therefrom with no air admixture therewith and with an extremely minute line of liquid being applied to the moving material. As already stated, the conveyor may be moved continuously while using the various bonding material applying means or, if desired, the conveyor may be moved intermittently between the application stages. Any suitable bonding material may be used, such as, for example, latex, liquid rubber compositions, polyvinyl material, and other plastics, etc. I prefer, however, to employ latex, a natural rubber composition, a synthetic rubber composition, or other material which forms a resilient bond which will yield as the pad is compressed while at the same time firmly uniting the various plies of the pad.

In the specific structure shown in Fig. 4, the pipe 18c may be supported as a stationary pipe or, if desired, it may be supported for movement to cause the latex to be deposited along waved or zigzag lines. For example, the pipe 18c may

be connected to the fixed inlet pipe (not shown in this figure) by a resilient tube 40, and a shaft 41 leading to an eccentric or other driving member may be employed for moving the member 18c back and forth in a longitudinal direction. It will be understood that any suitable means may be provided for reciprocating the pipe 18c in a longitudinal plane to give the desired zigzag or waved flow lines. A number of pipes 18c may be provided so that the waved lines formed by one of the pipes overlap or intersect the waved lines of another pipe 18c, thus forming diamond-shaped or overlapping lines which thus strengthen the connections between the webs.

In addition to supporting the pipes 18c over the webs after they are overlapped, the pipes 18c and the other pipes, 18a and 18b may be supported directly over the web formers or machines 12. In other words, the webs may be sprayed or provided with lines of drops, etc. of latex or other bonding material before they are formed in the overlapping zigzag relation described.

While in the foregoing specification, I have set forth specific structures and steps in considerable detail for the purpose of illustrating the embodiments of my invention, it will be understood that such details of structure or operation may be varied widely by those skilled in the art without departing from the spirit of my invention.

I claim:

1. In a pad-forming process, the steps of positioning a bonding fluid in a regular, repeated geometric pattern on each layer of a plurality of layers of fibrous web material, said bonding fluid being characterized by setting to a resilient solid, and then matting together a plurality of said layers with points in the pattern of each layer approximately aligned with corresponding points in the patterns of the other layers, whereby said bonding fluid upon setting provides spaced resilient supports extending from the upper to the lower of said layers.

2. The process steps of claim 1 in which said bonding fluid contains a resilient material selected from the groups consisting of natural rubber and synthetic rubber.

3. The process steps of claim 1 in which a sufficient amount of said bonding fluid is applied to said web material to penetrate said web and to form a raised design thereon corresponding to said pattern, whereby said layers can be matted together in slightly spaced-apart relation.

4. The process steps of claim 1 in which said geometric pattern is composed of spaced points.

5. The process steps of claim 1 in which said geometric pattern is composed mainly of spaced lines.

6. The process steps of claim 5 in which said lines composing said geometric pattern are winding lines.

7. In a pad-forming process, the steps of continuously folding a fibrous web back and forth upon itself to form a plurality of superposed layers while advancing the web with its layers in superposition, applying a bonding fluid in a regular, repeated geometric pattern to at least one surface of each of said layers, said bonding fluid being characterized by setting to a resilient solid, and then matting together said superposed layers with points in the pattern of each layer approximately aligned with corresponding points in the patterns of the other layers, whereby said bonding fluid upon setting provides spaced resilient supports extending from the upper to the lower of said layers.

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8. The process steps of claim 7, in which said bonding fluid is applied by spraying it on the upper surface of said layers.

9. The process steps of claim 7 in which said bonding fluid contains a resilient material selected from the group consisting of natural rubber and synthetic rubber. 5

10. The process steps of claim 7 in which a sufficient amount of said bonding fluid is applied to said layers to penetrate said layers and to form a raised design thereon corresponding to said pattern, whereby said layers can be matted together in slightly spaced-apart relation. 10

11. The process steps of claim 7 in which said geometric pattern is composed mainly of winding lines. 15

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