US 20170138058A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2017/0138058 A1

Swartz (43) Pub. Date: May 18, 2017

(54) **DRYWALL TAPE, METHOD OF MAKING AND METHOD OF USING THE SAME**

(71) Applicant: **Badger Innovative Technologies, LLC**, Appleton, WI (US)

(72) Inventor: **Gary Swartz**, Appleton, WI (US)

(21) Appl. No.: **15/347,288**

(22) Filed: **Nov. 9, 2016**

Related U.S. Application Data

(60) Provisional application No. 62/285,939, filed on Nov. 13, 2015.

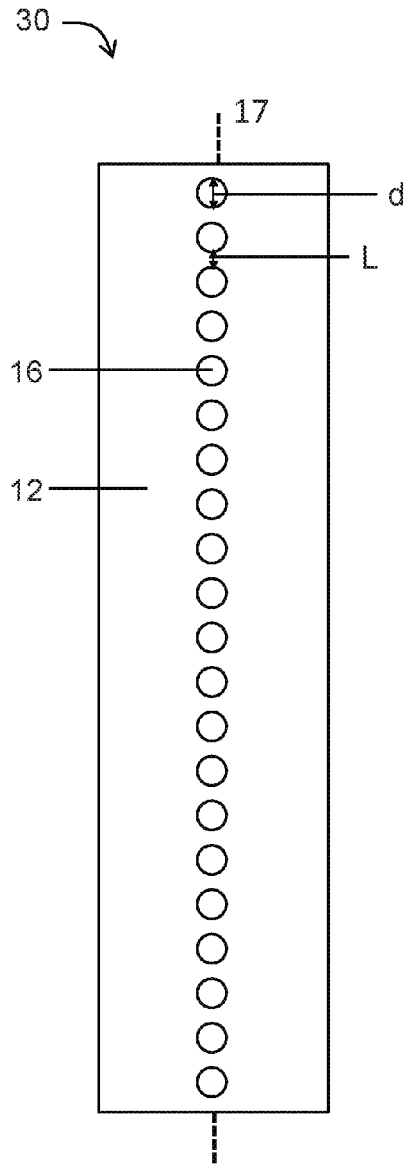
Publication Classification

(51) **Int. Cl.**
E04F 13/04 (2006.01)

(52) **U.S. Cl.**
CPC ***E04F 13/042*** (2013.01)

(57) **ABSTRACT**

A tape includes a paper substrate, and a coating of resin-remoistening adhesive on one surface of the paper substrate. The paper substrate defines a plurality of holes or interstices patterned longitudinally in a single line along or near a center line of the paper substrate. The tape is used for taping gaps, seams or joints between wallboard or drywall members, for example, for sealing a dry wall joint. Methods of making the tape and using the tape are also provided.



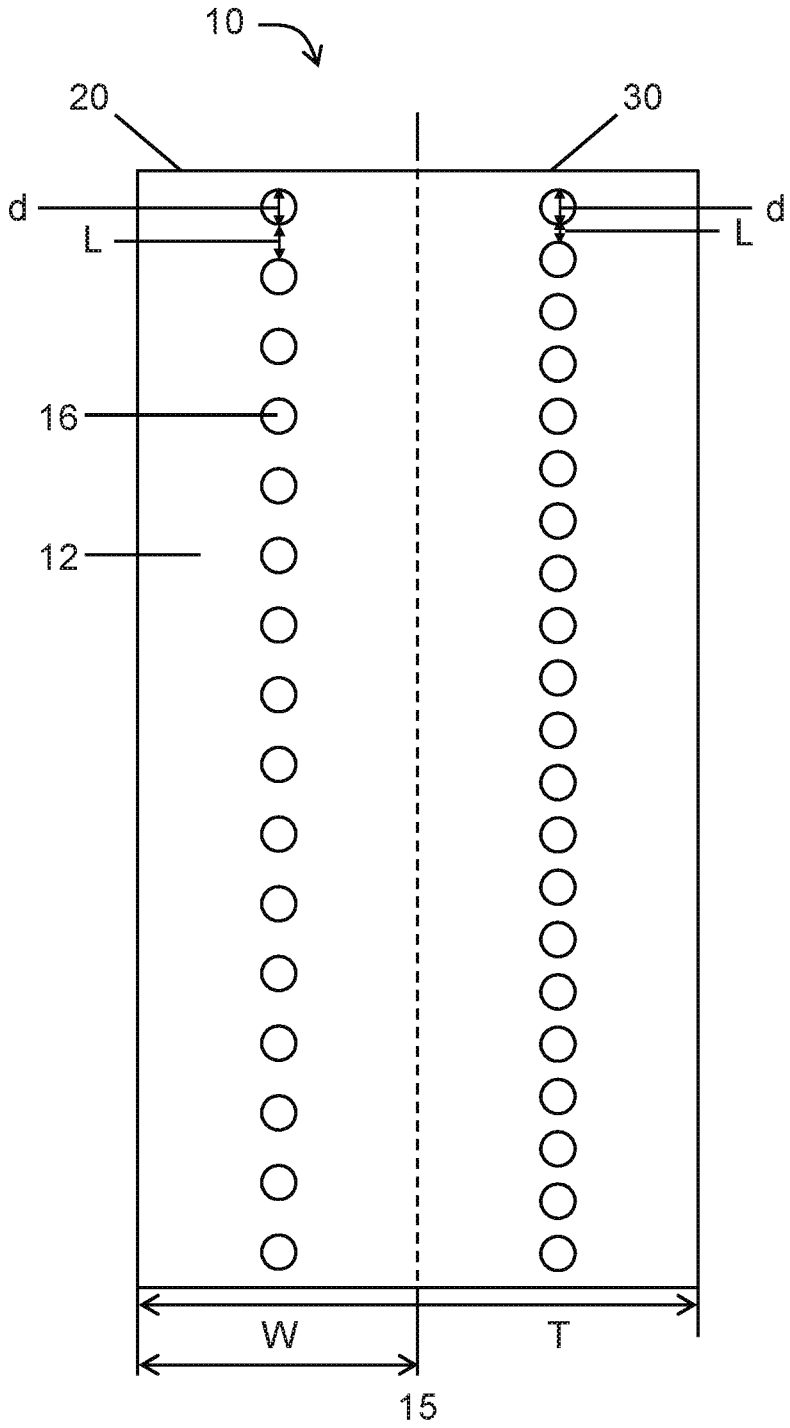


FIG. 1

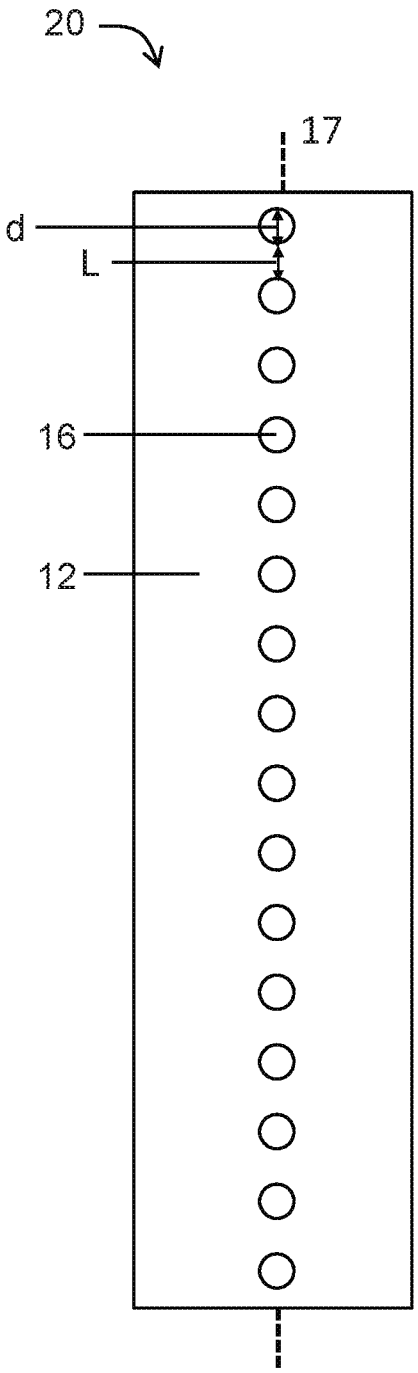


FIG. 2

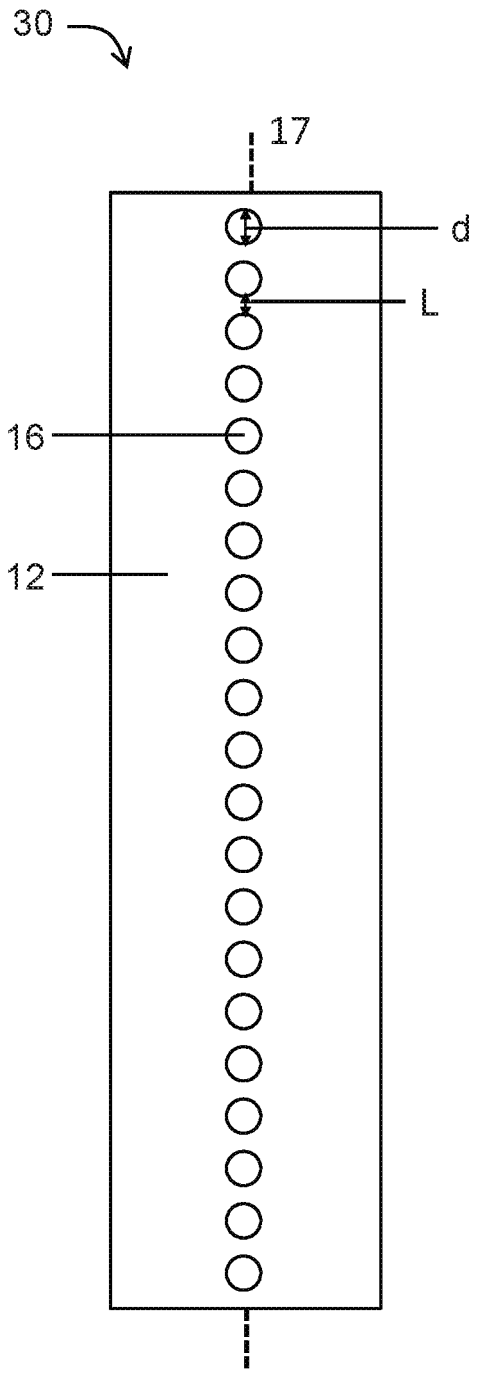


FIG. 3

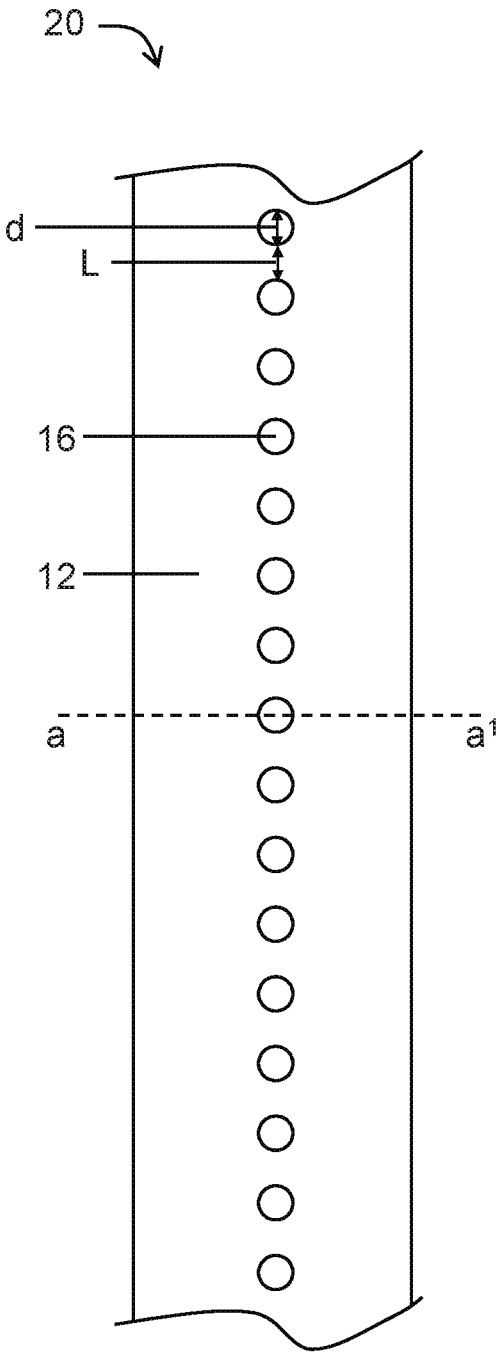


FIG. 4

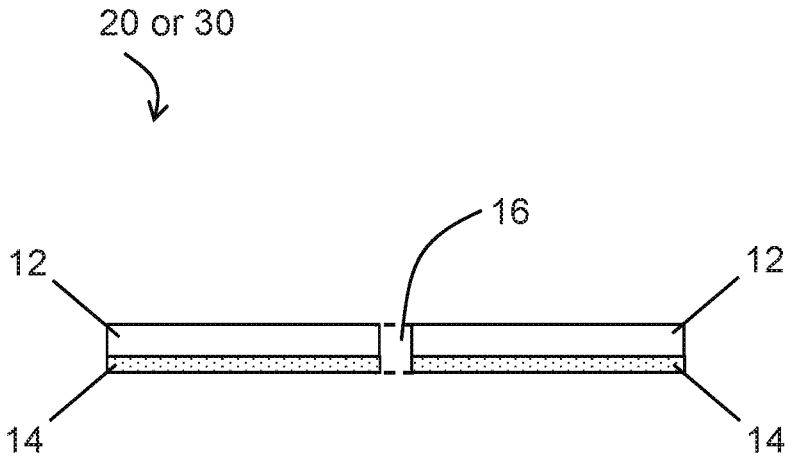


FIG. 5

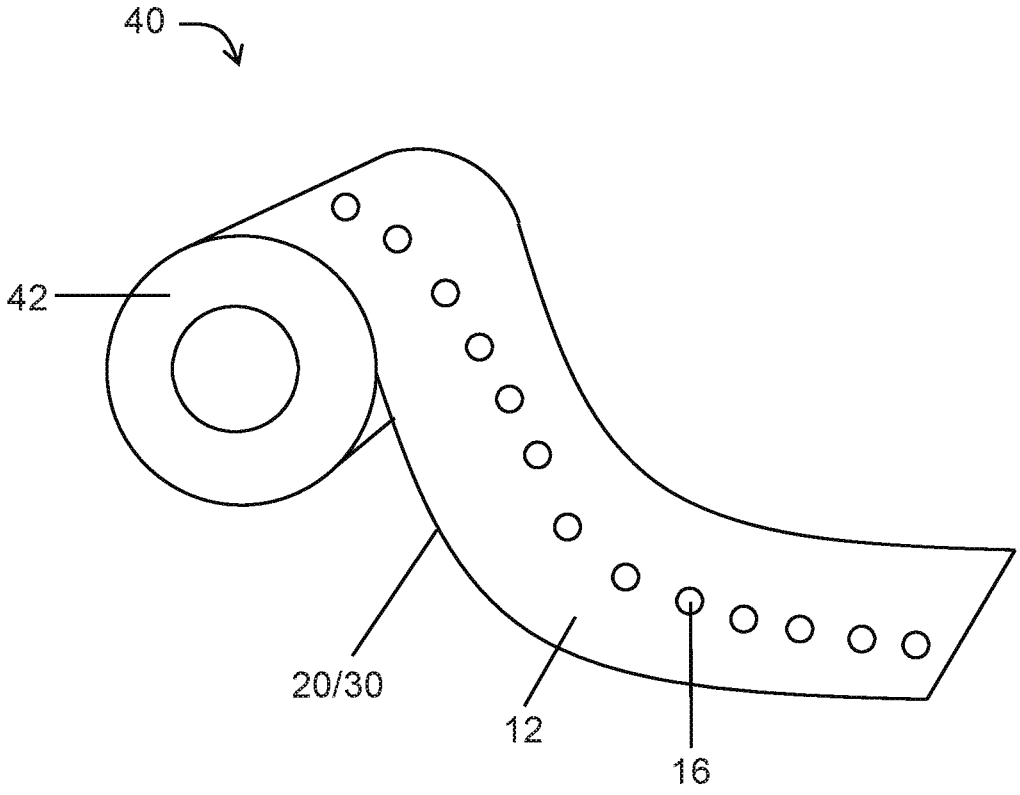


FIG. 6

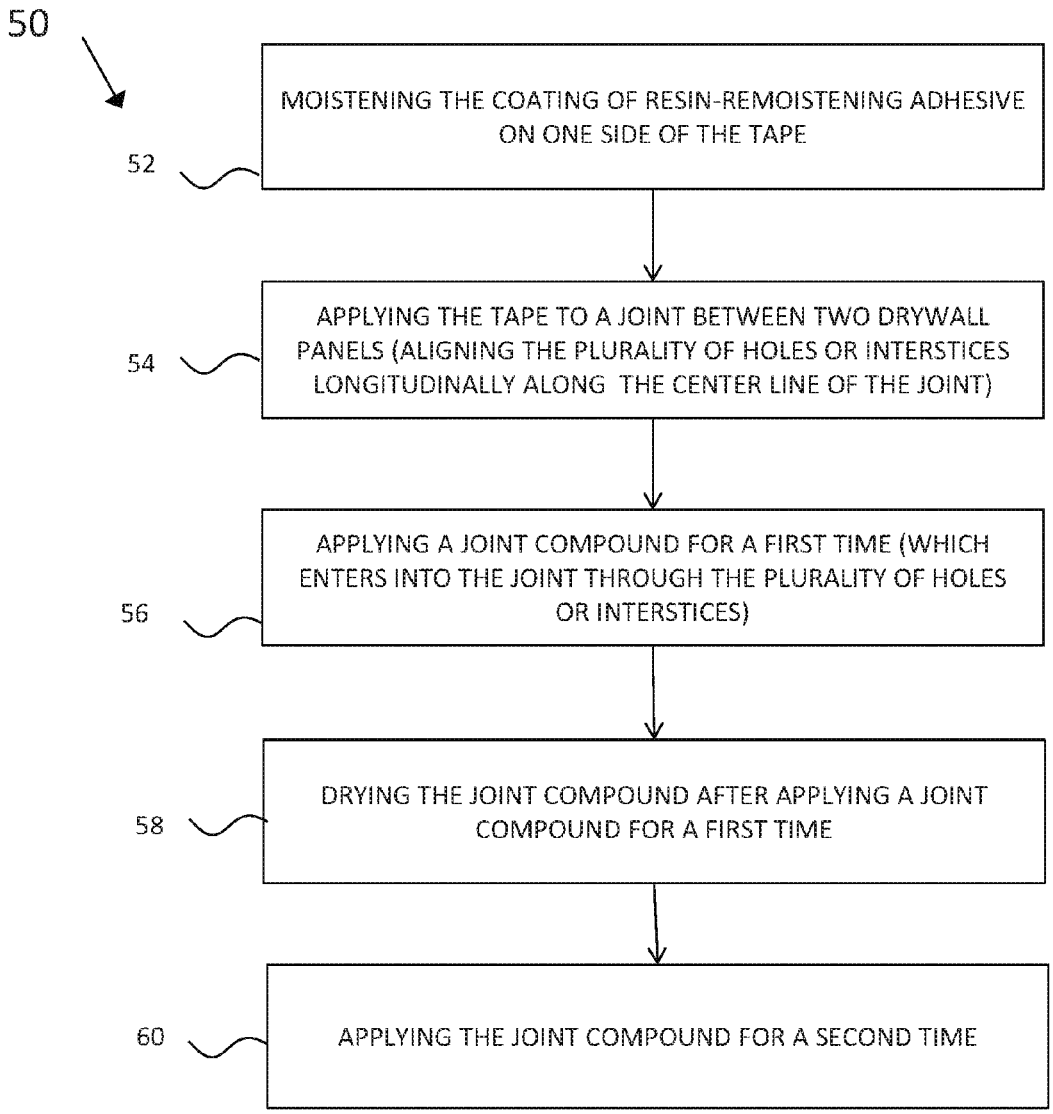

50
MOISTENING THE COATING OF RESIN-REMOISTENING ADHESIVE ON ONE SIDE OF THE TAPE
52
APPLYING THE TAPE TO A JOINT BETWEEN TWO DRYWALL PANELS (ALIGNING THE PLURALITY OF HOLES OR INTERSTICES LONGITUDINALLY ALONG THE CENTER LINE OF THE JOINT)
54
APPLYING A JOINT COMPOUND FOR A FIRST TIME (WHICH ENTERS INTO THE JOINT THROUGH THE PLURALITY OF HOLES OR INTERSTICES)
56
DRYING THE JOINT COMPOUND AFTER APPLYING A JOINT COMPOUND FOR A FIRST TIME
58
APPLYING THE JOINT COMPOUND FOR A SECOND TIME
60

FIG. 7

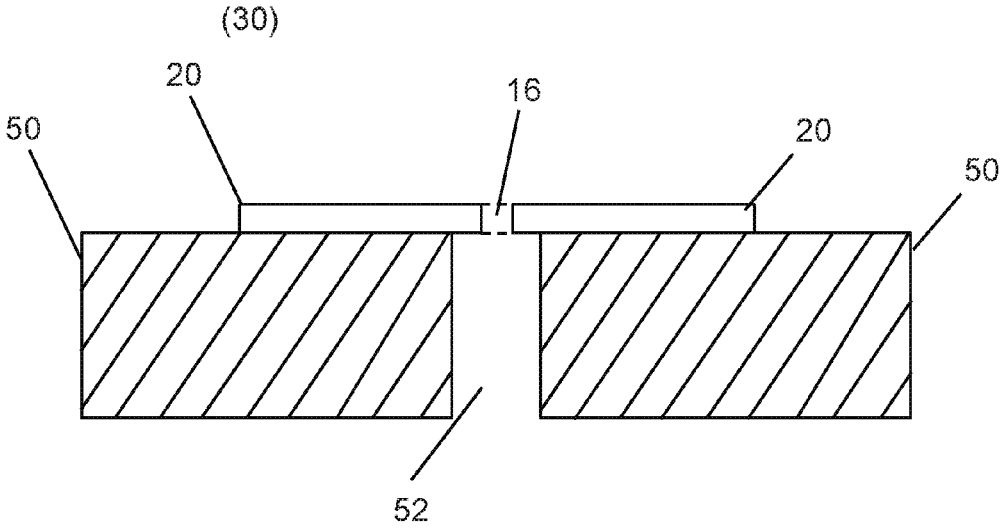


FIG. 8

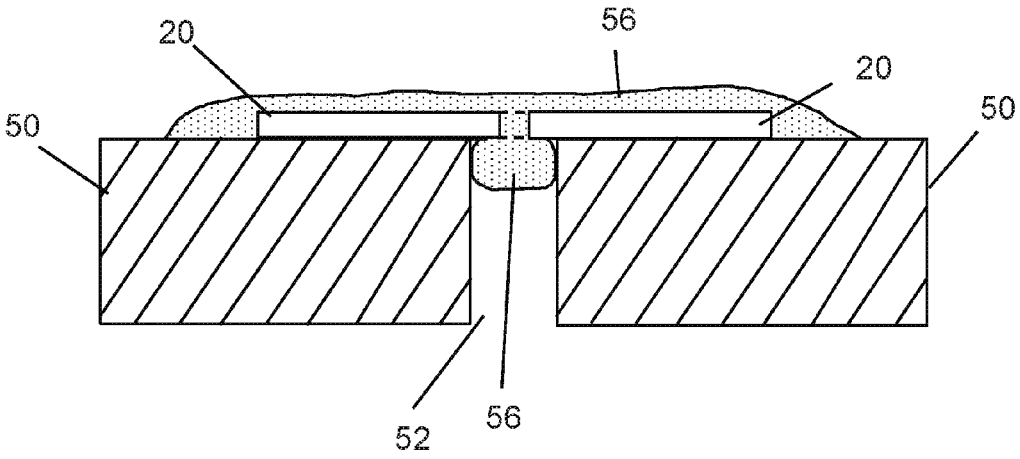


FIG. 9

DRYWALL TAPE, METHOD OF MAKING AND METHOD OF USING THE SAME

PRIORITY CLAIM AND CROSS-REFERENCE

[0001] This application claims the benefit of U.S. Provisional Application No. 62/285,939, filed Nov. 13, 2015, which application is expressly incorporated by reference herein in its entirety.

FIELD OF THE INVENTION

[0002] The disclosure relates to a tape for construction generally. More particularly, the disclosed subject matter relates to a drywall sealing tape and a method for using the drywall sealing tape for finishing drywall joints or seams or taping gaps, seams and joints between wallboard or drywall members in the fields of commercial, residential and do-it-yourself construction and finishing or re-furbishing.

BACKGROUND

[0003] In the field of modern building construction or refinishing, both commercial and residential building techniques incorporate the use of interior wall boards formed by flat sheets or panels. These wall boards are available in standard dimensions, such as 1.23 meter (m)×2.44 m (4 feet×8 feet), 1.23 m×3.05 m (4 feet×10 feet), or 1.23 m×3.66 m (4 feet×12 feet), for example, and are intended to be mounted to standard wood or metal studs having separations of typically 0.41 m (16 inches) or 0.61 m (24 inches) for walls and ceilings. These wallboards are generally referred to as drywall, and also may be called gypsum board, wallboard, gyp-board, and Sheetrock® (a registered trademark of United States Gypsum Company).

[0004] A plurality of drywall sheets are secured to the underlying wood or metal members in adjacent or abutting side-to-side, end-to-end, and/or side-to-end relation in order to form a wall surface of larger dimensions. The long edges of the drywall are tapered so that when panels are set adjacent to each other, these "factory edges" create a shallow recess. Even though the adjacent drywall sheets are placed as closely as possible next to each other, a shallow recess or gap is present between adjacent or abutting side and/or adjacent factory edges of the sheets. Furthermore drywall joints also are formed along the adjacent or abutting factory edge and/or the end or cut edges of adjacent or abutting drywall sheets. The end of a drywall panel (normally the 1.23-meter length edge) is cut, not tapered, and it is much more difficult to conceal the "butt edge" or cut edge. An individual wall surface typically has numerous joints, which interrupt the continuity of the wall surface and present an unattractive appearance. If left unfinished, the joints would be visible through the final wall finish, such as paint, wallpaper or other decorative coating applied to the wall surface.

[0005] Conventional building or refinishing techniques involve finishing the joints formed by adjacent or abutting drywall sheets so as to render the joints or seams as invisible as possible after application of the final wall finish. The joints are finished conventionally using a drywall tape that is secured over the joints with joint compound, or mud, an aqueous, cement-like adhesive. Conventional drywall tapes are 5.08 centimeters (two inches) in width and of a uniform minimal thickness. The tape is supplied in rolls of various lengths.

[0006] According to typical drywall finishing methods, an initial or bedding layer or coat of joint compound is applied over the joints, and the drywall tape is thereafter applied to the joints over the initial or bedding layer of joint compound. When applying the tape, the width of the tape is centered or substantially centered over the corresponding joint so that the tape bridges the gap or groove and is secured to the outer surfaces of the adjacent or abutting drywall sheets, respectively, forming the joint. The bedding coat of joint compound serves the purposes of filling the gaps of the drywall joints, filling the depressions formed at the joints and by the sloping outer surface portions, i.e., the factory edges, of the adjacent or abutting drywall sheets and securing the drywall tape to the outer surfaces of the drywall sheets. The end of the drywall sheets, or cut edge (normally the four-foot length) is not tapered, and it is much more difficult to conceal the butt edge or cut edge with drywall tape and joint compound.

[0007] After the bedding layer of joint compound dries, another layer or coat of joint compound is applied over the tape, a step known as "blocking," to smoothly blend or merge the tape with the non-sloping outer surface portions of the drywall sheets. Typical "blocking" involves applying the layer or coat of joint compound as a band or strip extending along the corresponding joint. The joint compound serves to blend or merge the side edges of the tape into the non-sloping outer surface portions of the drywall sheets. Conventionally, the band or strip is applied so as to have a width of approximately 20.32 centimeters to 25.4 centimeters (8 to 10 inches) for drywall tape that is 5.08 centimeters (2 inches) wide, the width of the band or strip being centered over the width of the drywall tape. The joint compound is allowed to dry, which takes approximately 24-48 hours, and, thereafter, one or more layers of joint compound are applied over the joints in a step known as "skimming." Skimming renders the joints as indistinguishable as possible from the non-sloping outer surface portions of the dry wall sheets. The joint compound typically has to dry for 24-48 hours between each additional coat or layer of joint compound, and, when dry, the individual coats of joint compound must be sanded to obtain a smooth surface blending imperceptively, with the non-sloping outer surfaces of the drywall sheets. In addition, the joints have to be cleaned between each application of individual coats or layers of joint compound in order to achieve the best result aesthetically. For example, it is preferable that the joints be cleaned to remove dust or other surface debris, such as that rendered by sanding.

[0008] Nails, screws, and similar fasteners that secure the drywall sections into the framework are driven into the drywall sections until the fastener heads are recessed below the surface of the drywall sections. The fastener heads are covered by joint compound. While filling the opening, a thin layer of joint compound is spread a few centimeters wide onto the drywall surfaces adjacent to the filled opening. A length of drywall tape is applied by hand or machine to bridge across the filled opening and adheres onto the thin layer of joint compound. The thin layer is at least as wide as the drywall tape to adhere the entire width of the drywall tape to the drywall sections. After drying the thin layer, at least one more layer of joint compound is applied to cover the drywall tape. The second layer is applied and spread and smoothed out by hand using a trowel, referred to as a drywall knife or blade, to blend smoothly coplanar with the surfaces

of the drywall sections, such that the drywall joint compound hides the openings, and the drywall sections appear to be smooth and seamless covering the holes made by the screws, nail or other fasteners.

[0009] Wall finishing in accordance with this typical procedure is costly, time-consuming, and labor-intensive due to the materials and labor required. In particular, the need for several coats or layers of joint compound and the need for relatively wide bands of joint compound to "block" the joints add to construction and finishing costs. Since the coats of joint compound must be allowed to dry for at least 24-48 hours prior to sanding and the application of additional layers of joint compound, it conventionally takes several days to finish a wall for painting, papers or other final wall finish. In addition to the substantial time and cost required, conventional wall finishing techniques also require considerable skill and expertise. It is crucial, for instance, that the tape lays uniformly or evenly as flush or flat as possible with the non-sloping outer surface portions of the drywall. It also is required that the tape not be wrinkled and that there are no air bubbles under the tape. The finished drywall joints should not present abrupt variations in level but, rather, should be imperceptible after wall finishing. It is essential, accordingly, that the right amount of joint compound be applied to the joints in the correct manner for each layer or coat. The drywall tape itself requires skill to apply over the bedding layer of joint compound. Further, for each additional layer of joint compound, the proper amount of time to dry, prior to the application of additional coats or layers of joint compound and prior to sanding, is required to ensure the aesthetic and structural integrity of the joints.

[0010] Over time, methods for sealing drywall panels and joints have evolved from a simple paper tape to more sophisticated tapes with pressure-sensitive or elastic adhesive strips. For instance, the original paper tape used to seal drywall joints consisted of thick paper tape that was coated on top and bottom with joint compound and placed over a seam. This was allowed to dry and one or more additional coats of joint compound were applied the now-dry tape to smooth the seam to match the drywall panels. A variety of devices also have been used to increase the speed of applying the paper tape over the joint compound. One device, known as a "bazooka," dispenses both the paper tape and joint compound simultaneously to cover the seams in one step. If a seam is taped by hand, the seam receives the bed of mud, over which the tape is applied, and then one or more layers of joint compound are applied.

[0011] While paper drywall tape is generally effective, it can be difficult to handle due to the slippery nature of the joint compound used to hold it in place, and it is prone to shrinkage when drying. This can be particularly problematic in seam applications where a large amount of joint compound is needed for larger seams, i.e., 0.375 inch, factory edge to butt edge seams, and patchwork over nails, screws or indentations in the drywall. To try to avoid shrinkage of a sealed joint and reduce drying time, a common practice has been to apply a minimal thickness of the bedding layer of joint compound between the paper and the drywall panels. However, if too little joint compound were applied, following application of the tape, the tape would either fall off or bubble in areas of very thin joint compound once it had dried. Excessive shrinkage, difficult application, and extended drying times, and proclivity to mold, have made paper tape difficult to use.

[0012] Another drawback to conventional finishing of joints and seams is that joints also crack in response to natural contraction and expansions in response to the associated wall or walls. In such cases, the joints as well as the final wall finish need to be repaired. Cracking, however, tends to recur. A further problem with conventional methods of applying drywall tape to finish a joint is that joints may be impaired due to environmental conditions during the finishing procedure. Wall finishing often takes place in partially completed and unheated structures. Depending on the temperature and/or humidity present during conventional wall finishing, the quality of the joints finished may be less desirable, even if they were finished with a high level of skill and expertise.

[0013] Numerous drywall tapes have been proposed in order to facilitate wall finishing as illustrated in U.S. Pat. No. T887,014 to Overbay, et al., U.S. Pat. No. 1,751,327 to Haire, et al., U.S. Pat. No. 2,064,785 to Crandell, U.S. Pat. No. 4,042,739 to Emal et al., U.S. Pat. No. 4,313,991 to Lamb, U.S. Pat. No. 4,792,473 to Vitale, U.S. Pat. No. 5,246,775 to Loscuito, U.S. Pat. No. 5,486,394 to Stough, U.S. Pat. No. 5,604,001 to Schold, U.S. Pat. No. 5,687,523 to Stough, and U.S. Pat. No. 5,711,124 to Stough, et al.

[0014] U.S. T887,014, U.S. Pat. No. 4,042,739, U.S. Pat. No. 4,313,991, U.S. Pat. No. 4,792,473, U.S. Pat. No. 5,246,775, U.S. Pat. No. 5,486,394, U.S. Pat. No. 5,687,523, U.S. Pat. No. 5,687,523, and U.S. Pat. No. 5,711,124 relate to adhesive drywall tapes for direct application to drywall joints without the need of a bedding coat of joint compound. U.S. Pat. No. 4,042,739 discloses an adhesive drywall tape with a synthetic resin-based adhesive. Drywall tapes with acrylic adhesives are disclosed in U.S. Pat. No. 4,792,473, U.S. Pat. No. 5,246,775, U.S. Pat. No. 5,486,394, U.S. Pat. No. 5,687,523, and U.S. Pat. No. 5,711,124. Adhesive drywall tapes having a hot melt adhesive are disclosed in U.S. Pat. No. T887,014 and U.S. Pat. No. 5,604,001.

[0015] U.S. Pat. No. T887,014 discloses that the hot melt adhesive is applied to the drywall tape non-uniformly so as to provide a maximum amount of adhesive along a centerline of the tape. U.S. Pat. No. 4,313,991 teaches an adhesive drywall tape having a central projection on an outer or non-adhesive surface of the tape to cause a trowel for applying plaster over the tape to form a perfectly feathered edge. U.S. Pat. No. 4,042,739 teaches an adhesive drywall tape wherein the tape has a thickened center portion on an outer or non-adhesive surface thereof so that the non-adhesive surface becomes flat when the tape is applied to a joint.

[0016] U.S. Pat. No. 5,604,001 teaches an adhesive drywall tape wherein side edges of the tape are buffed so that the side edges are thinner than the center of the tape whereby a finish coat of spackle can be applied over the side edges of the tape to obtain a smooth finish. U.S. Pat. No. 5,604,001 also discloses a plastic bead on an inner or adhesive surface of the tape, the bead having raised portions for enhancing the hinging action of the tape with the tape is applied to corner joints.

[0017] U.S. Pat. No. 1,039,363 relates to an adhesive tape for joining abutting or adjacent edges of corners of paper boxes. The tape is formed of a narrow inner strip of tape and a wider outer strip of tape placed over the inner strip. The inner and outer strips of tape are made of materials having different strengths, with the inner strip being made of cloth and the outer strip of paper.

[0018] U.S. Pat. No. 4,042,739 relates to a paper drywall tape with self-adhesive on one side of the tape, which can be wetted and adhered against the drywall and dried. Once the adhesive is dried, the adhesive becomes impervious to water. A top layer of joint compound is applied to cover the paper tape. The tape separates the top layer from the remainder of the drywall joint, which prevents the top layer of joint compound from penetrating the paper tape and bonding to the remainder of the drywall joint. The entire surface of the tape may be perforated with holes to expel trapped air bubbles. However, the holes covering the entire surface of the tape compromise the tape's strength. As the inventor has experienced, a user finds many problems with this type of tape such as one commercial product called E-Z Taping Systems. The top layer of joint compound is susceptible to forming a crack over time and the tape is also susceptible to mold or mildew growth over time in a humid environment, such as kitchens or bathrooms.

[0019] While some paper tapes are generally effective, but it can be difficult to handle due to the slippery nature of the joint compound used to hold it in place. Another alternative taping method includes the use of a mesh tape, formed with mesh pattern of fibrous material. Mesh tapes often are covered on one slide with a slight adhesive material to facilitate placement of the mesh tape on the drywall. Once in position, the mesh tape is covered with a bedding layer of joint compound and allowed to dry. Due to the rough and perforated surface texture of the mesh tape, joints sealed with this tape also are prone to cracking or showing the mesh pattern in the joint compound. Thus, this tape requires multiple coats of joint compound to achieve a smooth wall surface for finishing.

[0020] Another drawback of the mesh tape is the tendency of joint compound to pass completely through the mesh if too much pressure is applied by the taping knife during application. In these instances, the top surface of the mesh tape has no joint compound covering it and can be totally exposed. Eventually, the mesh tape peels from the wall leaving a checkerboard pattern of joint compound on the wall. Hairline cracks also will develop in at wall, at a joint seam, or at corners and can be visible through the mesh tape. Such small cracks particularly occur around doors or windows.

[0021] Other variations in the design of drywall tape have been used but not successfully. U.S. Pat. No. 5,246,775 relates to a self-sticking tape with holes extending in rows across the width of the tape with one row being spaced or staggered from the other along the length of the tape. The pattern of perforations comprises a multiplicity of perforations extending across the width and spaced along the entire length of the tape. An acrylic adhesive with a release backing is applied to one surface of the tape, after peeling away the release backing, so that the perforated tape can be attached to the drywall seam. Joint compound placed on the top or outer surface of the tape supposedly penetrates the perforations and holding the tape to the seams. This tape has the same drawbacks and disadvantages as the tape disclosed in U.S. Pat. No. 4,042,739 as discussed above. The drawbacks also include that the tape weakens and falls apart when wet.

[0022] U.S. Pat. No. 5,687,523 discloses a drywall tape for taping seams between adjacent drywall units. Such a tape includes a first layer of flexible paper material with an inwardly facing pressure-sensitive adhesive coating, a second layer of reinforcing woven fiber materials overlying the first layer, and a third layer of flexible material overlying the woven fiber material to encapsulate the fiber material between the first and second layers. The third layer has an outwardly facing release coating. The process of applying multiple layers of joint compound over the tape is costly, time-consuming and messy to handle. Such a tape has serious drawbacks in installation. Specifically, the tape is only held in place on the wall seam with the adhesive instead of the joint compound. Thus, when the adhesive eventually weakens, the tape will delaminate from the drywall panels, likely creating a crack through the overcoat of joint compound. Further, because the adhesive provides different expansion characteristics from the drywall panels, the walls exposed to severe temperatures and humidity variations are prone to cracking.

[0023] U.S. Pat. No. 5,711,124 discloses a self-adhesive wallboard joint tape, which includes a paper base layer with a mud- or compound-receptive surface and the other surface with a pressure sensitive adhesive, and a transfer release liner. The transfer release liner is applied with a release coating against the adhesive surface of the paper base layer, and is coated on the backside with a low-tack releasable adhesive. The drawbacks of such a tape include the complex structure of the tape, high cost, and several layers of joint compound, with the necessitated drying time and costly labor and other materials of the conventional drywall tape and seaming methods.

[0024] U.S. Pat. No. 6,413,606 teaches a drywall paper tape having a narrow paper tape of uniform width but non-uniform thickness, including a central portion of greater thickness and side portions of less thickness. The tape has a width to be disposed in a depression formed at a drywall joint by sloping outer surface portions of drywall sheets, respectively, forming the joint or seam, such that a planar outer surface of the tape is substantially flush with non-sloping outer surface portions of the drywall sheets, respectively. The tape has a layer of *yucca* adhesive pre-applied on one surface. The drawback of these tapes is that the raised central portion of the tape tends to bubble rather than sink into the depressions.

[0025] U.S. Pat. No. 7,141,284 This invention relates to a composite construction for use as a label or a tape to be adhered to a second substrate comprising a rubber-based material (e.g., vehicular tire). U.S. Pat. No. 8,795,808 discloses a reinforcing drywall tape having a greige combined with a laid scrim constructed in situ on the greige and bonded to the greige by a resin coating, and a pressure sensitive adhesive fully covering an inward facing surface of the greige wherein the greige is adapted for adherence to drywall sections.

[0026] U.S. Pat. Pub. No. 20080139064 (issued as U.S. Pat. No. 9,376,824) discloses a joint tape for finishing joints between wallboards comprising a nonwoven substrate (e.g., polymer or glass fibers) that does not swell substantially in the presence of water. A method of finishing a joint includes steps of applying the joint tape to the joint between boards by embedding the joint tape in a first coat of joint compound; applying a second coat of joint compound over the tape before the first layer of joint tape and compound have substantially dried and, optionally, applying a third fill or finish coat of joint compound over the tape wherein this third application is carried out before the joint tape and second coat have substantially dried.

[0027] U.S. Pat. No. 8,291,663 discloses a drywall sealing tape, which includes a substrate layer and a mesh layer made of mesh filament. The mesh layer is an array of filaments formed together which, when adjacent the substrate, create an inter-filament cavity for receiving and retaining joint compound between the substrate and the drywall panel. The inter-filament cavities retain a volume of joint compound corresponding to the approximate thickness of the mesh filament. The joint compound retained within the cavities serves to adhere to the drywall sealing tape to the drywall panels. Such a tape may also include an adhesive coating on the mesh layer. The substrate is either paper or a polymer. The filaments can be made of nylon, glass fibers, rigid vinyl, or metal.

[0028] U.S. Pat. No. 8,828,892 discloses a drywall tape having a nonwoven fabric and a reinforcing scrim, wherein the nonwoven fabric has chopped glass fibers laid flat in the nonwoven fabric. The fibers are substantially straight, randomly laid and bonded to one another to resist forces exerted in random directions. The reinforcement scrim has elongated reinforcing strands of low profile thickness joined against a side of the nonwoven fabric, such that the scrim and the nonwoven fabric reinforce each other, and reinforce a joint compound in which the drywall tape is imbedded.

[0029] Some of the tapes comprising glass fibers are described "fire-retardant," and "mold or mildew-resistant." But they are very expensive and may not be actually "fire-retardant," and "mold or mildew-resistant."

[0030] The drawbacks of the tapes disclosed in U.S. Pat. No. 8,291,663 and U.S. Pat. No. 8,828,892 are that these tapes require at least three layers of joint compound to be applied to form a seamless joint and does not reduce the time, labor or materials needed to create seams between the wallboards.

SUMMARY OF THE INVENTION

[0031] The present disclosure provides a tape, a method of using the tape and a method of making the tape. The tape is used for taping gaps, seams or joints between wallboard or drywall members, for example, for sealing a dry wall joint. Such a tape may be also called as a drywall tape or a drywall sealing tape, and is used in the fields of commercial, residential and do-it-yourself construction and finishing or re-furbishing.

[0032] In one aspect, a tape for sealing a dry wall joint is provided. Such a tape comprises a paper substrate, and a coating of resin-remoistening adhesive on one surface of the paper substrate. The paper substrate and the tape define a plurality of holes or interstices patterned longitudinally in a single line along or near a center line of the paper substrate.

[0033] In some embodiments, the plurality of holes or interstices is spaced evenly apart along the centerline of the paper substrate. Each of the plurality of holes or interstices is in a shape being round, oval, oblong or any combination thereof. Each of the plurality of holes or interstices has a suitable size to permit a joint compound to penetrate through the holes or interstices to a drywall joint so as to bond the drywall panels. The plurality of holes or interstices are patterned in a line and spaced apart in a suitable distance. The coating of resin-remoistening adhesive is activatable with water, a wetting gel or any other suitable fluid.

[0034] In some embodiments, the tape further comprises a longitudinal line of crease along the centerline of the tape. The centerline of the tape is creased or folded down. The plurality of the holes or interstices are also disposed along the centerline of the paper substrate and the tape.

[0035] In another aspect, a tape product comprising a core and the tape described herein is provided. The tape for sealing a dry wall joint is wound in a roll around the core. The tape comprises a paper substrate; and a coating of resin-remoistening adhesive on one surface of the paper substrate. The paper substrate (and the tape) define a plurality of holes or interstices patterned longitudinally in a single line along or near a center line of the paper substrate. Such a tape product is configured to be pulled and applied manually or by a machine at the longitudinal direction.

[0036] In another aspect, the present disclosure provides a method of using the tape or the tape product described above. Such a method comprises the following steps: moistening the coating of resin-remoistening adhesive on one side of the tape; applying the tape to a joint between two drywall panels. The one side of tape with the coating of resin-remoistening adhesive faces the two drywall panels, and the plurality of holes or interstices are aligned longitudinally along about the center line of the joint. The coating is moistened and the tape may be applied manually or using a machine. The machine direction is the longitudinal direction. The method further comprises applying a joint compound for a first time, wherein the joint compound enters into the joint through the plurality of holes or interstices. The method may also comprise a step of drying the joint compound after applying a joint compound for a first time. The method can further comprise applying the joint compound for a second time.

[0037] The present disclosure also provides a method of making the tape described above. Such a method comprises at least one step of forming the plurality of holes or interstices aligned longitudinally along or near the center line of the tape. The holes or interstices can be formed on the paper substrate or the tape by any suitable means such as die cutting. The tape can be wound around the core to form a tape product as described.

[0038] In some embodiments, the present disclosure provides a novel paper drywall tape that has holes or interstices in a round, oval, slit or other shape that are die cut in a singular longitudinal pattern down the center of the tape in machine direction. Because the tape has only a single line of holes or interstices down the center of the tape, the tensile strength of the tape is not compromised. On one side of the tape a resin-remoistening adhesive is applied. When the tape is moistened on the adhesive side with water, a wetting gel or similar fluid mixture, either manually or by the use of an applicator with an enclosed reservoir of water, the tape is easily applied directly to the surface areas of two adjacent drywall boards. The center holes or interstices make it easy to align and apply the tape down the center of the joint between the boards whether on walls, floorboards, corners or in ceiling applications. A first layer of joint compound is applied over the tape to secure the tape fully to the outer surface portions of the wallboards. The longitudinal holes down the center of the tape allow the joint compound to enter between the tape and the drywall seam and adhere to the tape to the seam. The holes aligned longitudinally also permit air bubbles to release as needed.

[0039] As the joint compound and tape dry after approximately 24 hours or a shorter period if using a dry-type joint compound, the center holes or interstices recess into the seam or joint between the wall panels to form depressions or

recesses in the shape of the holes. When a second application of joint compound is applied over the seams, the recesses or depressions in the seams completely disappear, leaving smoothly surfaced joints ready for further finishing of the walls with plaster, paper or other material. The advantages of the present invention include that it obviates the need for a third layer of joint compound, saves considerable time, materials and money over the conventional method of drywall tape application. Further, the tape retains its tensile strength, does not require a multilayer structure with fibers in the structure, and is less expensive to manufacture than multilayer nonwoven structures containing fiber materials.

[0040] The advantages also include the ease of application of the tape and formation of joints or seams between wallboard panels that does not require the lengthy 48- to 72-hour drying time before finishing because two additional joint compound layers are not applied over the conventional tapes and bedding compound, as is the conventional joint sealing method. Rather, it may take only 15-20 minutes for the tape to set after application to the drywall panel before a layer of bedding joint compound can be applied and the recesses or depressions in the tape form. Moreover, upon application of a second layer of joint compound, the recesses or depressions disappear and a smooth joint for wall finishing is created. Thus, a third application of joint compound is unnecessary. The tape obviates the need for an additional joint compound application, saving considerable cost, materials and labor.

[0041] For a more complete understanding of the above listed features and advantages of the drywall tape disclosed herein, reference should be made to the attached drawings. Further, additional features and advantages of the invention may be described and will become apparent from a detailed description of the drawing and the details description. Other features and advantages of the present invention will become apparent to those skilled in the art from the descriptions herein. It is to be understood, however, that the detailed description of various embodiments and specific examples, while indicating preferred and other embodiments of the present invention, are given by way of illustration and not limitation. Many changes and modifications within the scope of the present invention may be made without departing from the spirit thereof, and the invention includes all such modifications.

BRIEF DESCRIPTION OF THE DRAWINGS

[0042] The present disclosure is best understood from the following detailed description when read in conjunction with the accompanying drawings. It is emphasized that, according to common practice, the various features of the drawings are not necessarily to scale. On the contrary, the dimensions of the various features are arbitrarily expanded or reduced for clarity. Like reference numerals denote like features throughout specification and drawings.

[0043] FIG. **1** is a plan view illustrating an exemplary dual-tape product which can be cut into two exemplary tapes in accordance with some embodiments.

[0044] FIG. **2** is a plan view illustrating a portion of an exemplary tape in accordance with some embodiments.

[0045] FIG. **3** is a plan view illustrating a portion of another exemplary tape in accordance with some embodiments.

[0046] FIG. **4** illustrates the tape of FIG. **2**.

[0047] FIG. **5** is a sectional view illustrating the tape of FIGS. **2-4** comprising adhesive on one side (for example, a section along line a-a^1 of the tape of FIG. **4**).

[0048] FIG. **6** illustrates a tape product comprising a core and a tape in accordance with some embodiments.

[0049] FIG. **7** is a flow chart diagram illustrating a method of using an exemplary tape for sealing a dry wall joint in accordance with some embodiments.

[0050] FIG. **8** is a sectional view illustrating the structure after a tape is applied to a joint between two drywall panels.

[0051] FIG. **9** is a sectional view illustrating the structure after a joint compound is applied to the tape in some embodiments.

DETAILED DESCRIPTION

[0052] This description of the exemplary embodiments is intended to be read in connection with the accompanying drawings, which are to be considered part of the entire written description. In the description, relative terms such as "lower," "upper," "horizontal," "vertical,", "above," "below," "up," "down," "top" and "bottom" as well as derivative thereof (e.g., "horizontally," "downwardly," "upwardly," etc.) should be construed to refer to the orientation as then described or as shown in the drawing under discussion. These relative terms are for convenience of description and do not require that the apparatus be constructed or operated in a particular orientation. Terms concerning attachments, coupling and the like, such as "connected" and "interconnected," refer to a relationship wherein structures are secured or attached to one another either directly or indirectly through intervening structures, as well as both movable or rigid attachments or relationships, unless expressly described otherwise.

[0053] For purposes of the description hereinafter, it is to be understood that the embodiments described below may assume alternative variations and embodiments. It is also to be understood that the specific articles, compositions, and/or processes described herein are exemplary and should not be considered as limiting.

[0054] The present disclosure provides a tape, an assembled tape product comprising such a tape, a method of using the tape and a method of making the tape. The tape is used for taping gaps, seams or joints between wallboard or drywall members, for example, for sealing a dry wall joint.

[0055] For purposes of this present application, the term "drywall" shall be used to refer to the material used on interior walls. Drywall comprises a core of plaster-like gypsum sandwiched between layers of heavy paper.

[0056] In FIGS. **1-9**, like items are indicated by like reference numerals, and for brevity, descriptions of the structure, provided above with reference to preceding drawings, are not repeated. FIGS. **1-3** only illustrate a portion or segment of exemplary tapes or tape product, which are continuous with a certain length on a roll.

[0057] Referring to FIG. **1**, a portion or segment of an exemplary dual-tape product **10** is illustrated. Dual-tape product **10** can be cut into two exemplary tapes **20**, **30** in accordance with some embodiments. FIGS. **2** and **3** illustrate the corresponding portions of exemplary tapes **20**, **30**. FIG. **4** illustrates a portion of exemplary tapes **20**, **30** showing an exemplary tape may be in any suitable length. FIG. **5** illustrates a cross-section of exemplary tapes **20**, **30**. Exemplary tapes **20**, **30** have the same structure except the pattern

of the holes or interstices. So unless expressly indicated otherwise, an exemplary tape can be referred to tape **20** or **30** interchangeably.

[0058] Referring to FIG. **1**, the portion or segment of an exemplary dual-tape product **10** may have a suitable width, for example, 10.16 centimeters (cm) (4 inches), and each of resulting exemplary tapes **20**, **30** has a width (T) of 5.08 cm (2 inches). The segment of an exemplary dual-tape product **10** and corresponding portions of tapes **20**, **30** have any suitable length, for example, 20.32 cm (8 inches) as shown for the purpose of illustration only. The tape **10** is to be cut down along the center line **15** into tapes **20**, **30**, which are of equal width (W). The width (T) of dual-product **10** is twice the width (W) of tapes **20**, **30**.

[0059] Referring to FIGS. **1-5**, a tape **20** (or **30**) provided in the present disclosure comprises a paper substrate **12**, and a coating of resin-remoistening adhesive **14** on one surface of the paper substrate **12**. The paper substrate and also the tape **20** or **30** define a plurality of holes or interstices **16** patterned longitudinally (lengthwise) in a single line along or near a center line **17** of the paper substrate **12**. For example, centers of the holes or interstices **16** off the center line **17** by 5% or 10% or less of the width (W) of the tape can be considered as "near" the center line **17**.

[0060] In some embodiments, the plurality of holes or interstices **16** is spaced evenly apart along the centerline **17** of the paper substrate **12**. Each of the plurality of holes or interstices **16** is in a shape, for example, being round, oval, oblong or any combination thereof. Each of the plurality of holes or interstices **16** has a suitable size, for example, a diameter or length (d) in the range of from about 3.175 mm to about 22.225 mm (i.e. from about ⅛ inch to about ⅞ inch). The plurality of holes or interstices may be spaced by any suitable distance (L), for example, by about 6.35 mm (i.e. 1/4 inch) or about 3.175 mm (i.e. ⅛ inch).

[0061] Referring to FIG. **2**, a preferred pattern of holes in a segment of exemplary tape **20** having 20.32 cm (8 inches) in length is illustrated. Each of the plurality of holes or interstices **16** is circular and has a diameter (d) of 6.35 mm (i.e. 1/4 inch). The plurality of holes **16** is uniformly spaced by a distance (L) of 6.35 mm (i.e. 1/4 inch) between two adjacent holes. In every 20.32 cm (8 inches) long segment, sixteen holes are spaced by 6.35 mm (i.e. 1/4 inch). Referring to FIG. **4**, any two adjacent holes are spaced by spaced by 6.35 mm (i.e. 1/4 inch) in the whole exemplary tape **20**.

[0062] Referring to FIG. **3**, another preferred pattern of holes in a segment of exemplary tape **20** having 20.32 cm (8 inches) in length is illustrated. Each of the plurality of holes or interstices **16** is circular and has a diameter (d) of 6.35 mm (i.e. 1/4 inch). The plurality of holes **16** is uniformly spaced by a distance (L) of 3.175 mm (i.e. ⅛ inch) between two adjacent holes. In some embodiments, twenty-one circular holes **16** having a diameter (d) of 6.35 mm (i.e. 1/4 inch) are spaced by 3.175 mm (i.e. ⅛ inch) between two adjacent holes, while a space of 6.35 mm (1/4) in length is interposed between two holes or interstices **16** in every 20.32 cm (i.e. 8 inches) of the tape **30** in length.

[0063] In some embodiments, the paper substrate has a base weight in the range from 2.44 Kg/m^2 to 3.25 Kg/m^2 (i.e. from 15 lbs. to 20 lbs. per 3,000 sq. feet). The paper substrate may have a dry tensile strength of at least 9.5 Kg of force per centimeter (i.e. 53 lb. of force per inch) in a longitudinal direction, and at least 4.5 Kg of force per centimeter (i.e. 25 lbs. of force per inch) in a cross direction. The paper substrate may have any suitable width, for example, preferably a width of about 2.54 cm (i.e. 2 inches). The paper substrate comprises a caliper of at least 0.001 inch (0.0254 mm).

[0064] Referring to FIG. **5**, the coating of resin-remoistening adhesive **14** is activatable with water, a wetting gel or any other suitable liquid. A viscous liquid may be used. The paper substrate comprises a wet tensile strength in machine direction (i.e. longitudinal) of at least 2.3 Kg/cm (i.e. 13 lbs. of force per inch). The resin-remoistening (or rewetting) adhesive can be water-based, and may comprise a suitable ingredient. Examples of a suitable ingredient **14** include but are not limited to polyvinyl alcohol, polyvinyl acetate. The adhesive **14** may have fast re-wetting tack properties, and also have non-blocking and non-curling properties.

[0065] Specifically, the tape is generally between slightly less than two inches or greater than two inches in width, and the holes or interstices are die cut longitudinally down the center of the tape, making it easy to align and apply the tape in corners and center the tape along the joints between adjacent or abutting wallboards. The tape is typically a wallboard tape, of between 20 lb. to 30 lb. basis weight, and the adhesive is a resin-remoistening adhesive or tape adhesive such as Sierra Remoistenable WB 145 C1S manufactured by Sierra Coating, LLC located at 1820 Enterprise Dr., De Pere, Wis. 54115.

[0066] In some embodiments, the tape **20** or **30** further comprises a longitudinal line of crease along the centerline of the tape **17** as shown in FIGS. **1-2**. The centerline **17** of the tape **20** or **30** is creased or folded down. The plurality of the holes or interstices **16** are also disposed along the centerline **17** of the paper substrate and the tape.

[0067] Referring to FIG. **6**, an exemplary tape product **40** comprises a core **42** and the tape (for example, exemplary tape **20** or **30**) described above. The tape **20** or **30** for sealing a dry wall joint is wound in a roll around the core **42**. The tape **20** or **30** comprises a paper substrate **12**, and a coating of resin-remoistening adhesive **14** on one surface of the paper substrate **12**. The paper substrate **12** (and the tape **20** or **30**) defines a plurality of holes or interstices **16** patterned longitudinally in a single line along or near a center line **17** of the paper substrate **12**.

[0068] In some embodiments, the tape **20** or **30** has a length in the range of from about 7.62 m to about 152.4 m (i.e. from about 25 feet to about 500 feet). The core **42** has a diameter in the range from about 6.35 cm to about 7.62 cm (i.e. from about 2½ inches to about 3 inches). Each of the plurality of holes or interstices **16** in the tape has a suitable size, for example, a diameter or length in the range of from about 3.175 mm to about 22.225 mm (i.e. from about ⅛ inch to about ⅞ inch). In some embodiments, the paper substrate **12** has a width of about 2.54 cm, and the plurality of holes or interstices **16** in the tape are spaced by about 6.35 mm (i.e. 1/4 inch) or about 3.175 mm (i.e. ⅛ inch). The coating of resin-remoistening adhesive **14** is activatable with water or a wetting gel.

[0069] Preferably, the tape product **40** comprises a 2-inch wide tape **20** or **30** having a basis weight of 3.25 Kg/m^2 (i.e. 20 lbs. per 3,000 sq. feet). The tape **20** or **30** is wound on a core that is 2½ inches in diameter. The caliper of the tape is approximately 0.0254 mm (0.001 inch), with a dry tensile strength of about 9.5 Kg/cm (53 lb. of force per inch) in machine direction, and 4.5 Kg/cm (25 lb. of force per inch) in cross direction. When re-moistened with water or a

wetting gel or other similar viscous material, the machine direction tensile strength is at least 2.3 Kg/cm (13 lb. of force) per inch. The adhesive used before coating can be a resin-remoistening adhesive that comprises approximately 55% solids with a viscosity of approximately 8,500 centipodes (cps.) in some embodiments. The adhesive may also be used to form an envelope seal, has excellent nonblocking and noncurling properties, and has a fast re-wetting tack. The adhesive on the tape, for example, on the tape of a roll, is dry and smooth.

[0070] The present disclosure also provides a method of using the tape or the tape product for sealing a dry wall joint described above. Referring to FIG. **7**, an exemplary method **50** of using an exemplary tape **20** or **30** comprises the following steps.

[0071] At step **52**, the coating of resin-remoistening adhesive **14** is moistened on one side of the tape **20** or **30**. Tape **20** or **30** may be pulled out and moistened from a roll in tape product **40** manually or by a machine. The moistening step may be formed using water, a wetting gel or any other suitable liquid. The coating **14** is moistened and the tape may be applied using a machine in some embodiments. The machine direction is the longitudinal direction.

[0072] At step **54**, the tape **20** or **30** is applied to a joint **52** between two drywall panels **50**. The one side of tape **20** or **30** with the coating of resin-remoistening adhesive **14** faces the two drywall panels **50**. The plurality of holes or interstices **16** are aligned longitudinally along or approximately along the center line of the joint **52**. The structure after step **54** is illustrated in FIG. **8**.

[0073] At step **56**, a joint compound **56** is applied for a first time, wherein the joint compound **56** enters into the joint **52** through the plurality of holes or interstices **16**, and bond the drywall panel **50**. FIG. **9** illustrates the structure after a joint compound **56** is applied to the tape **20** or **30** in some embodiments. FIG. **9** is for illustration only. The surface is flat after step **56**. Joint compound **56** may fill a portion of the joint or the whole joint **52**.

[0074] At step **58**, the joint compound **56** is dried after applied for the first time. The drying may be performed in air. The drying time may last for a time of period, for example less than 30 minutes (e.g., 15-20 minutes).

[0075] At step **60**, the joint compound **56** is optionally applied for a second time to flatten the surface and make the joint invisible. The drywall joint becomes invisible and the drywall boards are finished with a flat surface after step **60**.

[0076] The present disclosure also provides a method of making the tape **20** or **30**, and tape product **40** described above. Such a method comprises at least one step of forming the plurality of holes or interstices **16** aligned longitudinally along about the center line of the tape. The holes or interstices **16** can be formed on the paper substrate or the tape by any suitable means such as die cutting. The tape **20** or **30** can be wound around the core **42** to form a tape product **40** as described.

[0077] The advantages of the present invention are the ease of application of the tape and formation of joints or seams between wallboard panels that does not require the lengthy 48- to 72-hour drying time before finishing because two additional joint compound layers are not applied over the conventional tapes and bedding compound, as is the conventional joint sealing method. Rather, it may take only 15-30 or 15-20 minutes for the tape and the moistened adhesive to dry and set after application to the drywall panel before a layer of bedding joint compound can be applied and the recesses or depressions in the tape form. Moreover, upon application of a second layer of joint compound, the recesses or depressions disappear and a smooth joint for wall finishing is created. Thus, a third application of joint compound is unnecessary. The tape obviates the need for an additional joint compound application, shortens the drying time, and saves considerable cost, materials and labor. In comparison, three application steps of joint compounds are needed in those methods using existing tapes, and each application step of joint compound requires a drying period of 24-48 hours.

[0078] In addition, unlike other tapes, the tape in the present disclosure avoids the bubbling issue experienced with other tapes, has higher tensile strength and better adhesion to walls, and does not crack or shrink when it dries. Other tapes bubble and shrink due to either the lack of holes or the configuration of holes throughout the entire surface of the tape.

[0079] Although the subject matter has been described in terms of exemplary embodiments, it is not limited thereto. Rather, the appended claims should be construed broadly, to include other variants and embodiments, which may be made by those skilled in the art.

What is claimed is:

1. A tape for sealing a dry wall joint, comprising:

a paper substrate; and

a coating of resin-remoistening adhesive on one surface of the paper substrate;

wherein the paper substrate defines a plurality of holes or interstices patterned longitudinally in a single line along or near a center line of the paper substrate.

2. The tape of claim **1**, wherein the plurality of holes or interstices are spaced evenly apart along the centerline of the paper substrate.

3. The tape of claim **1**, wherein each of the plurality of holes or interstices is in a shape being round, oval, oblong or any combination thereof.

4. The tape of claim **1**, wherein each of the plurality of holes or interstices has a diameter or length in the range of from 3.175 mm to 22.225 mm.

5. The tape of claim **1**, wherein the plurality of holes or interstices are spaced by about 6.35 mm or about 3.175 mm.

6. The tape of claim **1**, wherein the plurality of holes or interstices are spaced by 3.175 mm while a space of 6.35 mm in length is interposed between two holes or interstices in every 20.32 cm of the tape in length.

7. The tape of claim **1**, wherein the paper substrate has a base weight in the range from 2.44 Kg/m^2 to 3.25 Kg/m^2.

8. The tape of claim **1**, wherein the paper substrate has a dry tensile strength of at least 9.5 Kg of force per centimeter in a longitudinal direction, and at least 4.5 Kg of force per centimeter in a cross direction.

9. The tape of claim **1**, wherein the paper substrate has a width of about 2.54 cm.

10. The tape of claim **1**, wherein the coating of resin-remoistening adhesive is activatable with water or a wetting gel.

11. The tape of claim **1**, further comprising a longitudinal line of crease along the centerline of the tape.

12. A tape product, comprising:

a core; and

a tape for sealing a dry wall joint wound in a roll around the core, the tape comprising:

a paper substrate; and

a coating of resin-remoistening adhesive on one surface of the paper substrate;

wherein the paper substrate defines a plurality of holes or interstices patterned longitudinally in a single line along or near a center line of the paper substrate.

13. The tape product of claim **12**, wherein the tape has a length in the range of from 7.62 m to 152.4 m, and the core has a diameter in the range from 6.35 cm to 7.62 cm.

14. The tape product of claim **12**, wherein each of the plurality of holes or interstices in the tape has a diameter or length in the range of from 3.175 mm to 22.225 mm.

15. The tape product of claim **12**, wherein the paper substrate has a width of about 2.54 cm, and the plurality of holes or interstices in the tape are spaced by about 6.35 mm or about 3.175 mm.

16. The tape product of claim **12**, wherein the coating of resin-remoistening adhesive is activatable with water or a wetting gel.

17. A method of using the tape of claim **1**, comprising:

moistening the coating of resin-remoistening adhesive on one side of the tape;

applying the tape to a joint between two drywall panels, wherein the one side of tape with the coating of resin-remoistening adhesive faces the two drywall panels, and the plurality of holes or interstices are aligned longitudinally along about the center line of the joint; and

applying a joint compound for a first time, wherein the joint compound enters into the joint through the plurality of holes or interstices.

18. The method of claim **17**, further comprising:

drying the joint compound after applying a joint compound for a first time.

19. The method of claim **17**, further comprising:

applying the joint compound for a second time.

20. The method of claim **17**, wherein the coating is moistened and the tape is applied using a machine.

* * * * *