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(54) **SCRIM FOR SEAMS AND JOINS OF PAPERMAKING FABRIC**

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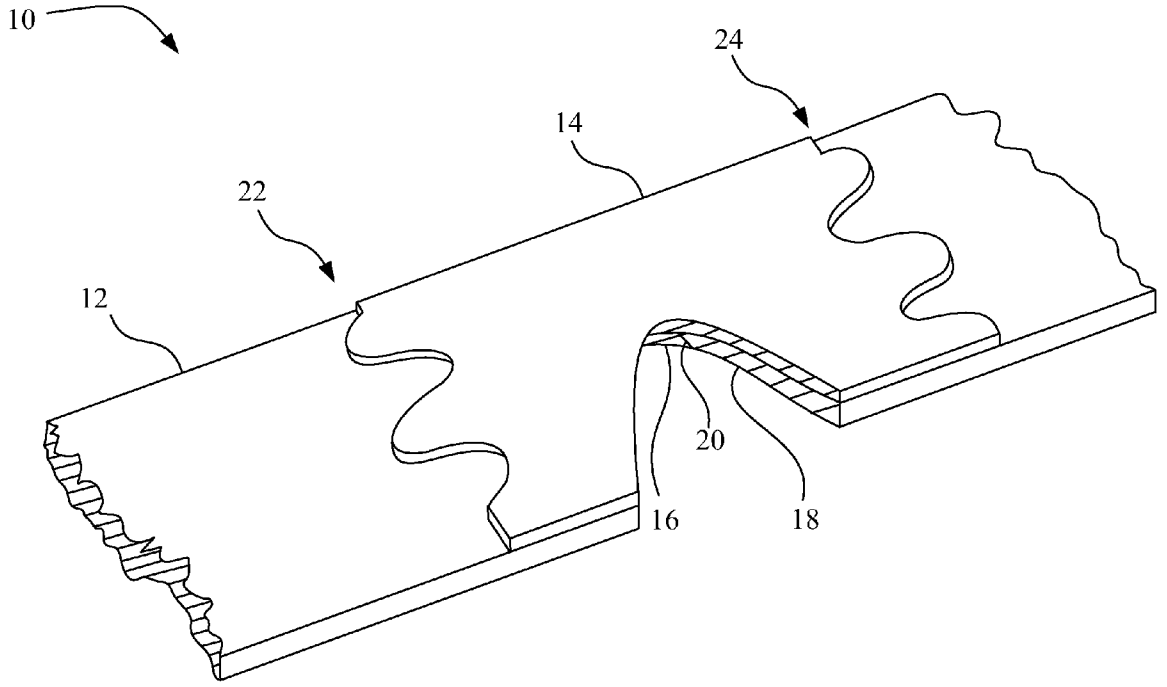
(57) **ABSTRACT**

A papermachine fabric includes a base fabric and a strip of material covering a join or seam of the base fabric. The strip of material has an edge with a plurality of crenulations therein.



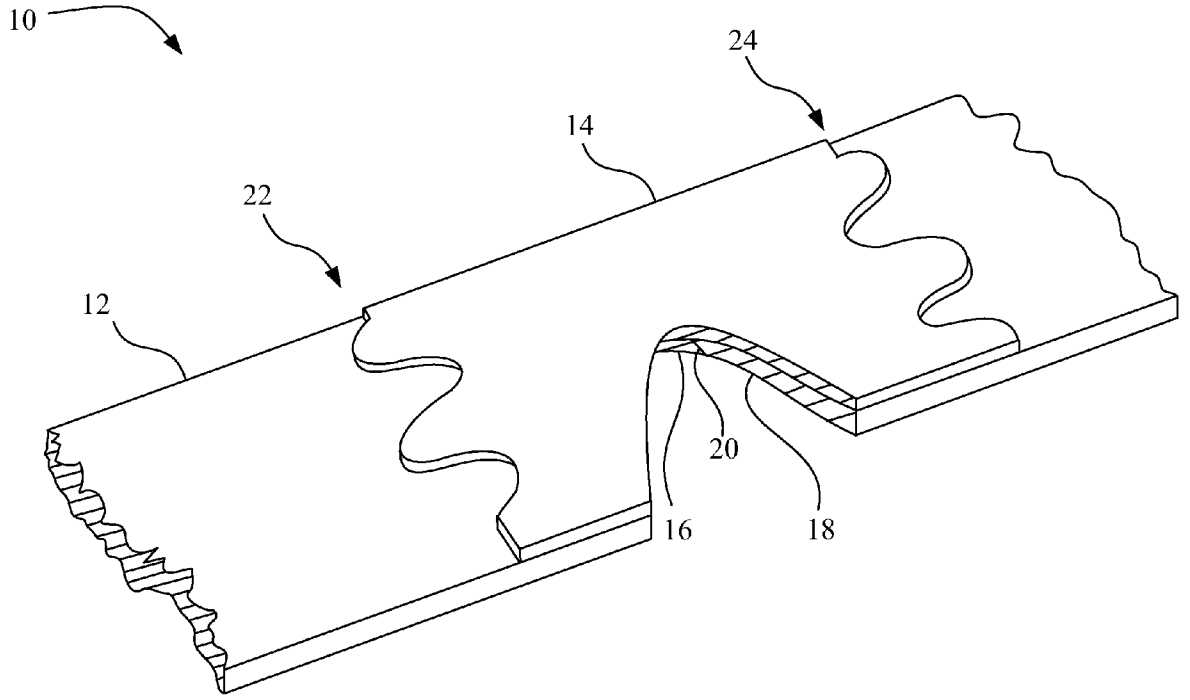


Fig. 1

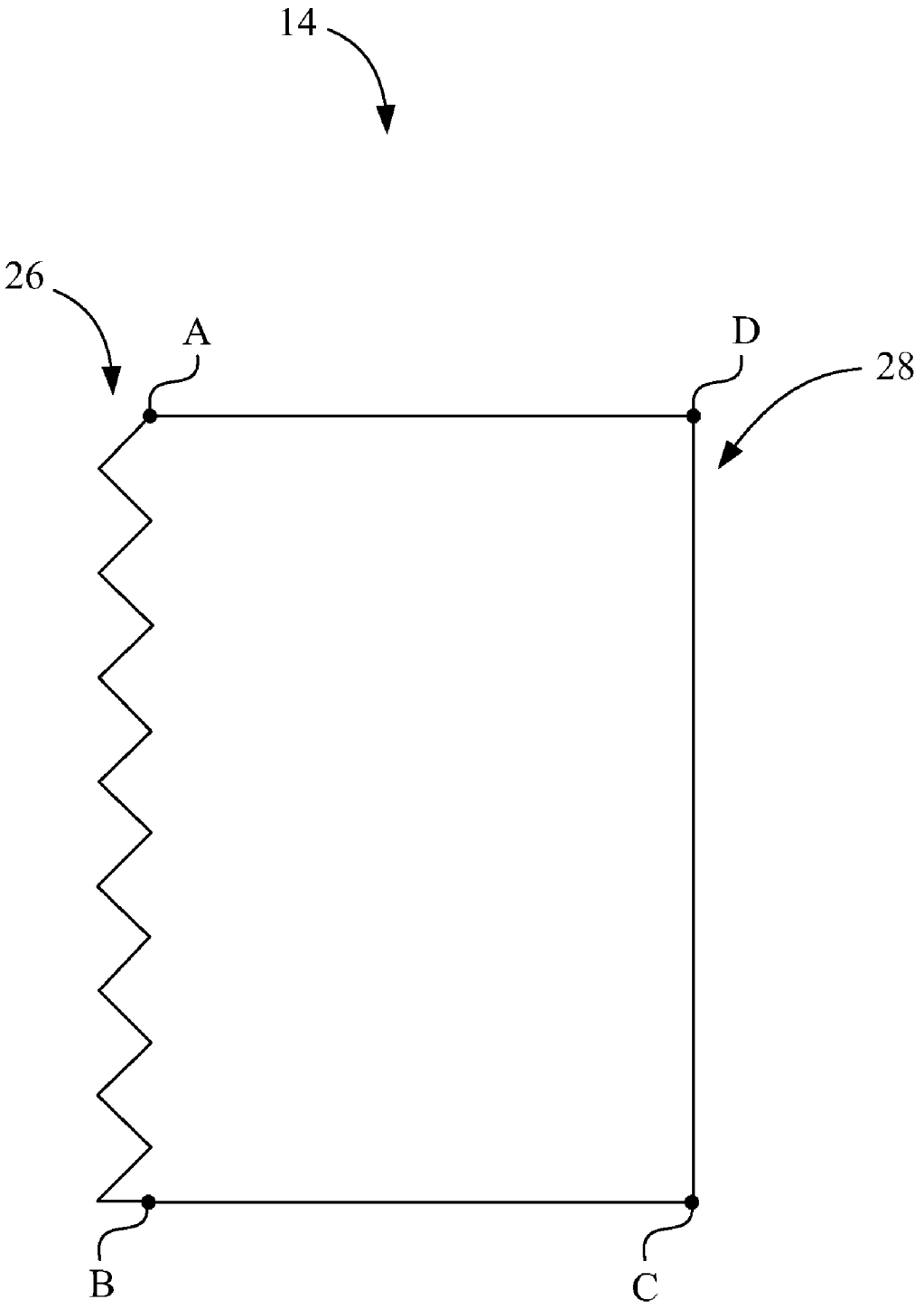


Fig. 2

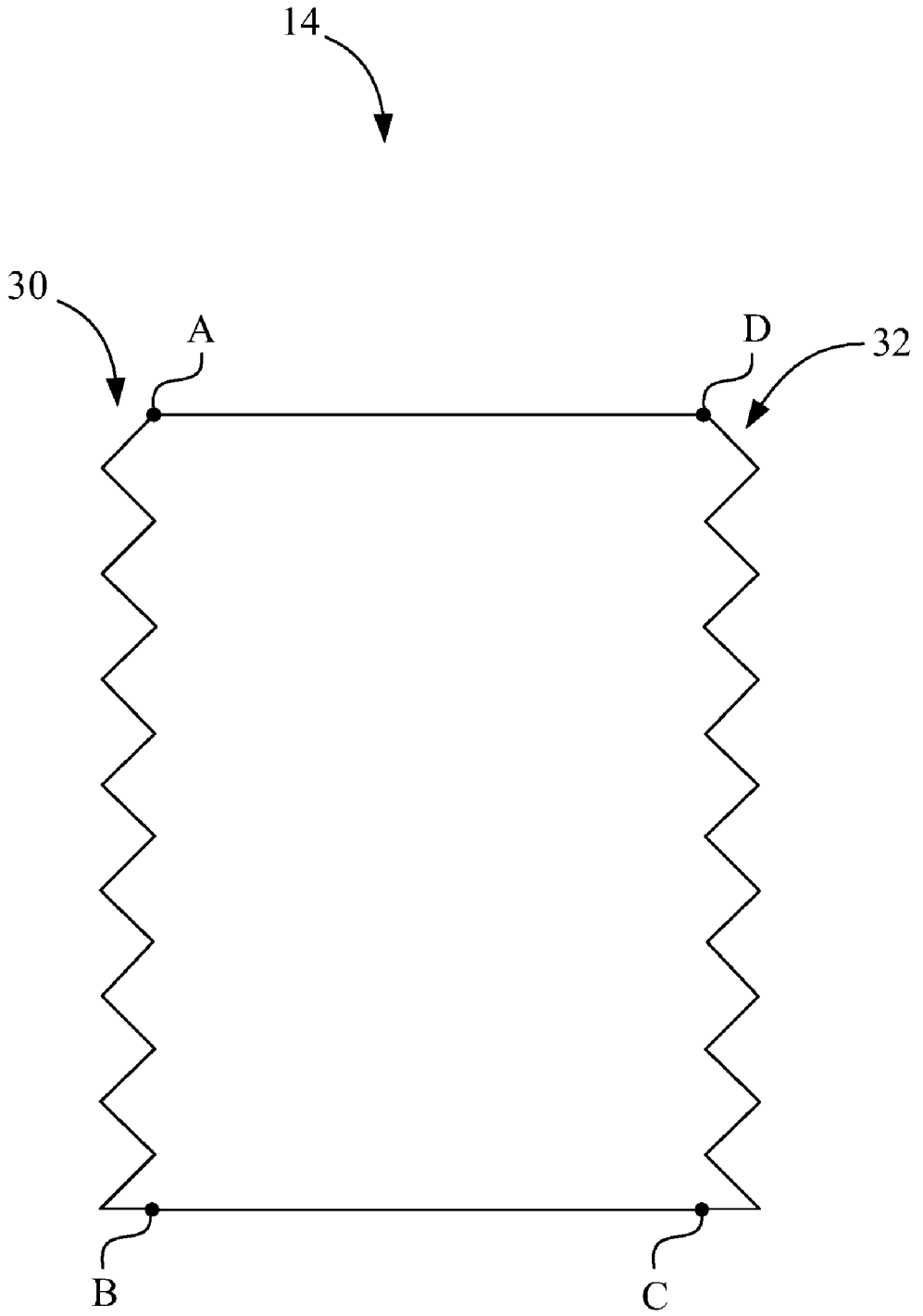


Fig. 3

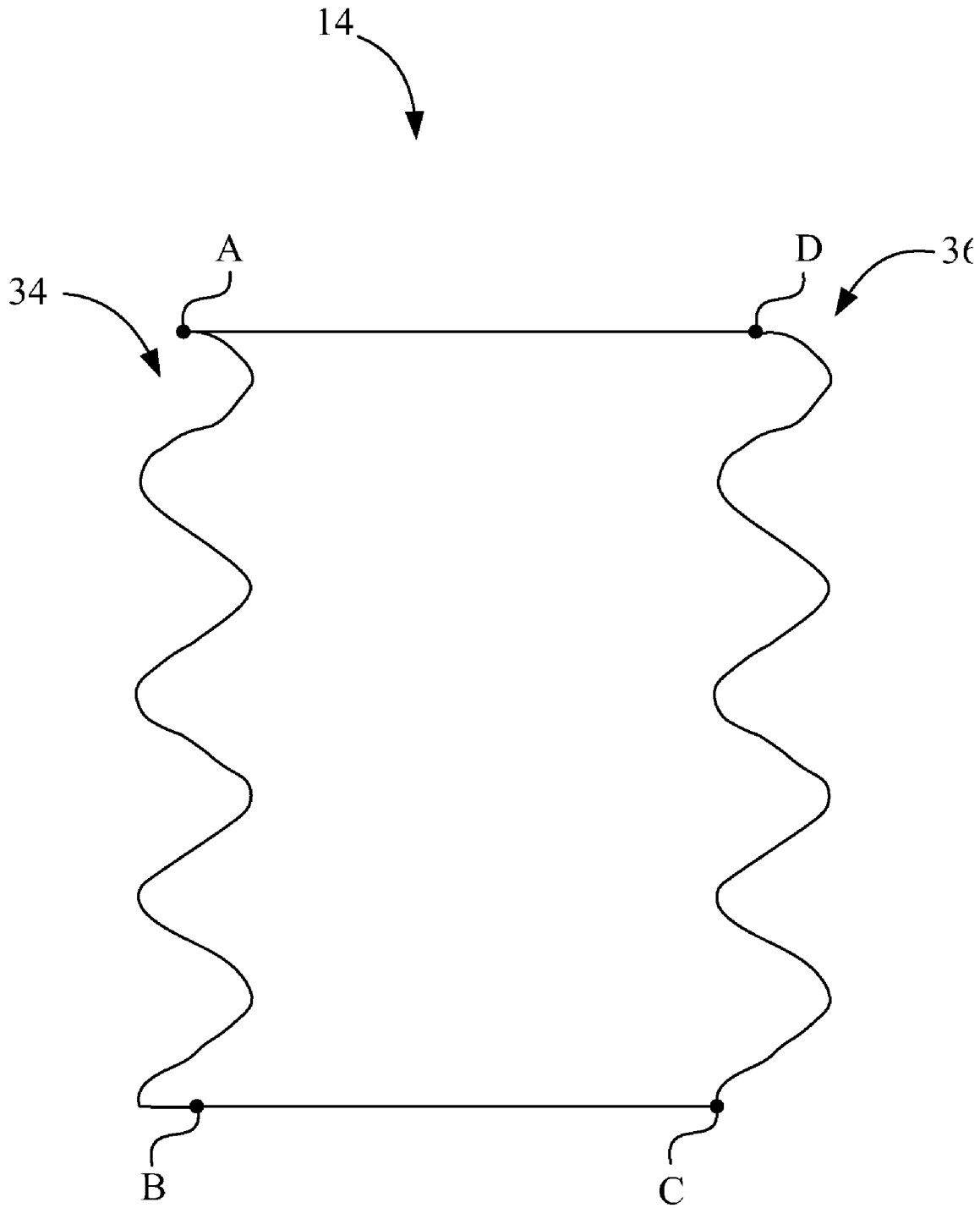


Fig. 4

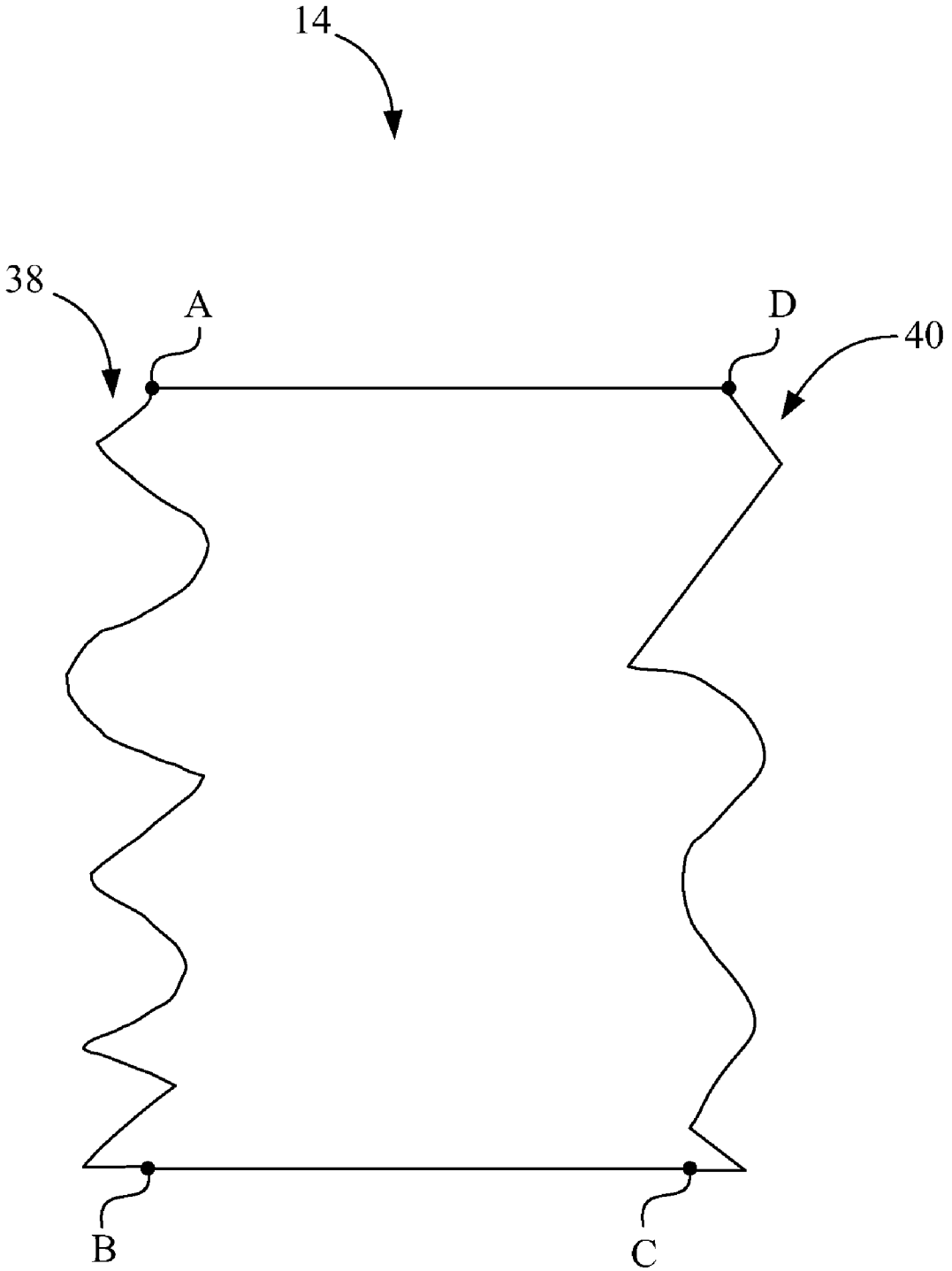


Fig. 5

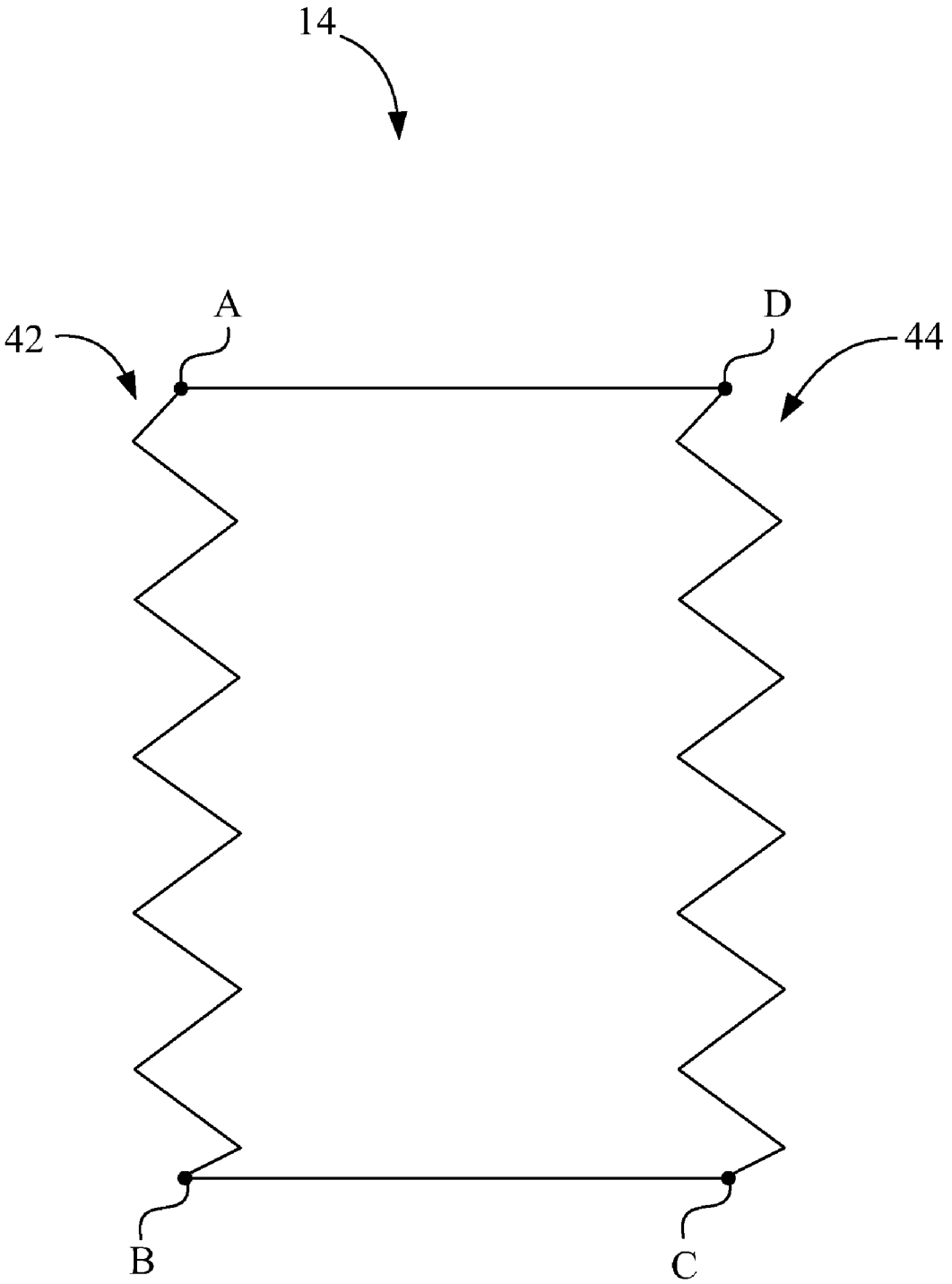


Fig. 6

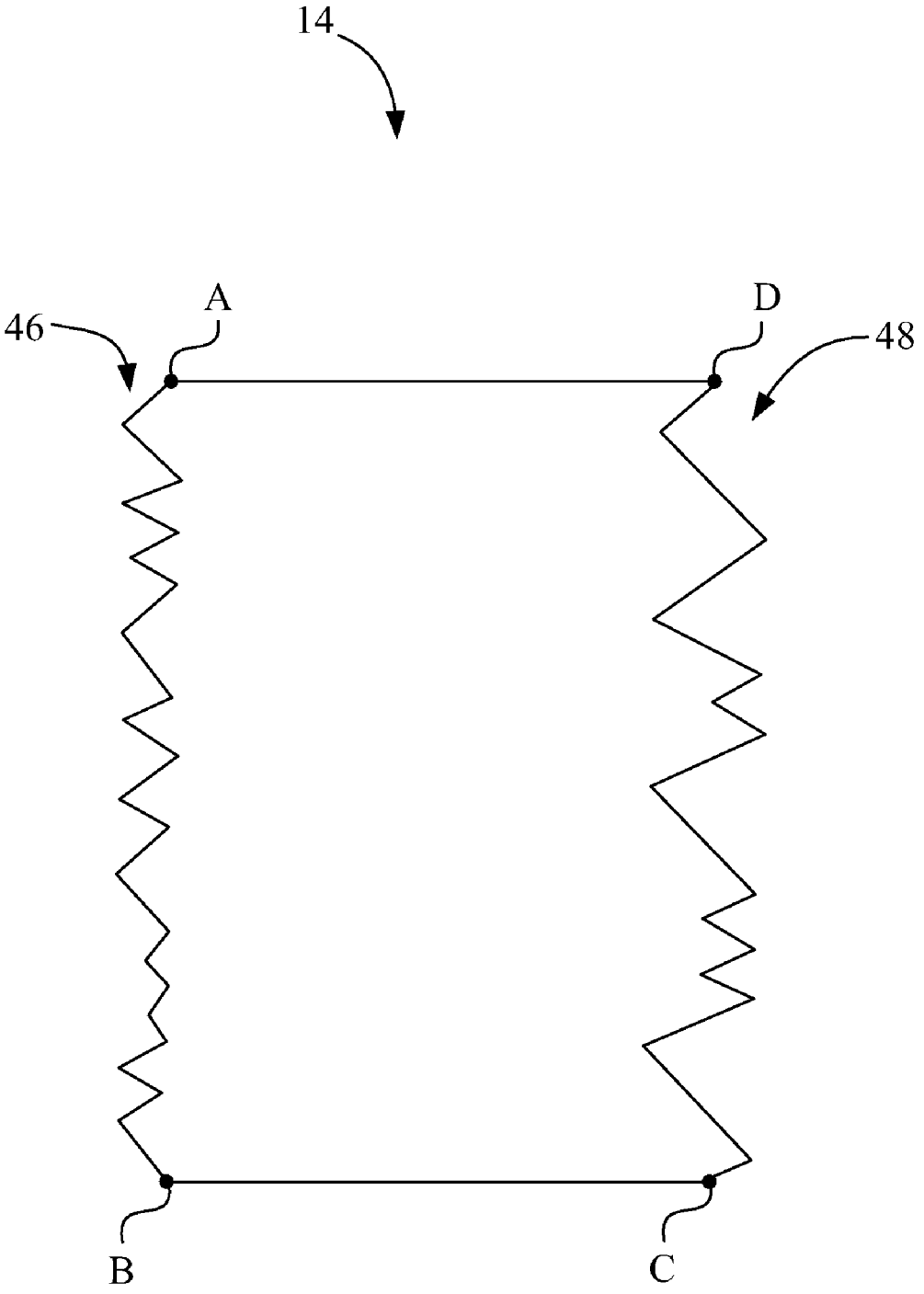


Fig. 7

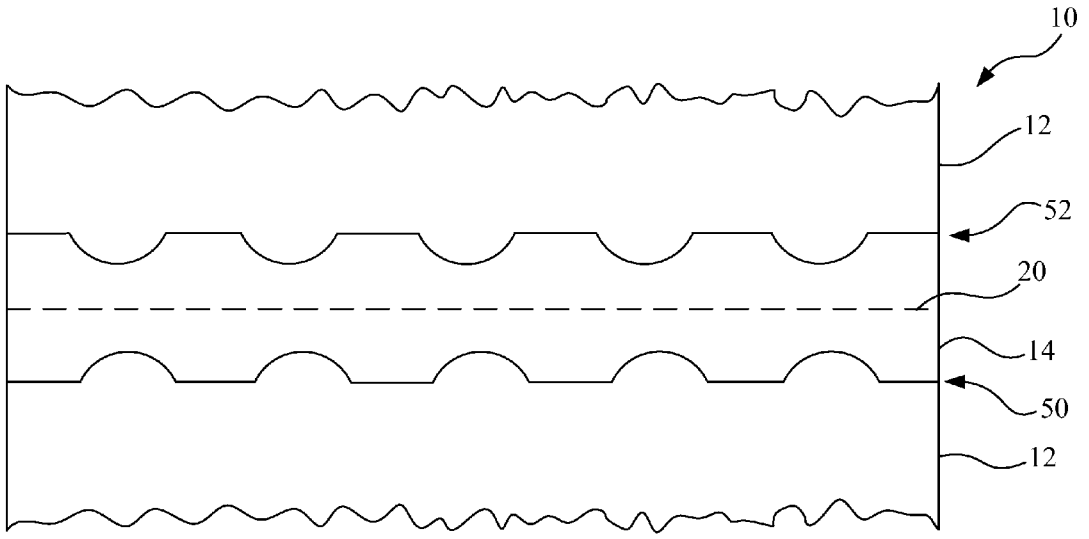


Fig. 8

SCRIM FOR SEAMS AND JOINS OF PAPERMAKING FABRIC

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This is a non-provisional application based upon U.S. provisional patent application Ser. No. 60/752,069, entitled "IMPROVED SCRIM FOR SEAMS AND JOINS", filed Dec. 20, 2005.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] The present invention relates to a scrim, and, more particularly, to a scrim used to cover a join or seam of a papermaking fabric.

[0004] 2. Description of the Related Art

[0005] Scrims are known to reinforce joins and seams in press fabric applications. Scrims provide, for example, fiber bonding adhesion, extra strength, and extra wear resistance. U.S. Pat. No. 6,712,100 describes the use of a scrim referred to as a strip of flow resistant material that is disposed over a seam regions, straddling it by an amount in the range from 0.5 to 2.0 inches and is attached thereto by sewing or by an adhesive.

[0006] A fibrous web is formed upon a papermaking forming fabric by the deposition of a fibrous slurry, which includes an aqueous dispersion of cellulose fibers on the forming fabric. A significant amount of water is removed from the aqueous fiber web by the drainage from the slurry through the forming fabric, leaving the fibrous web on the surface of the forming fabric. The web is directed through press sections, which may include press nips and shoe presses often between two press fabrics. The web then proceeds to a dryer section, where the web is directed in a circuitous path around a series of drums that provide heat to the forming web for the removal of water therefrom.

[0007] The fabrics utilized in the papermaking include forming fabrics, press fabrics and dryer fabrics, all of which are in the form of endless loops in the papermaking machine, and they function as a conveyor of the web.

[0008] A seam or join, which is used to close the ends of a fabric into an endless construct during installation on the papermaking machine, represents a discontinuity in an otherwise uniform construct of the press fabric. The presence of the seam substantially increases the marking that occur on the forming paper sheet, particularly as it is conveyed through a press nip.

[0009] A disadvantage of scrims include that there is locally added mass and caliper to the seam area of the fabric. This results in different performance of the fabric proximate to the scrim, for example, sheet marking, bounce in the press nip.

[0010] What is needed in the art is a scrim that reduces or eliminates sheet marking and/or press nip bounce.

SUMMARY OF THE INVENTION

[0011] The present invention provides a scrim for covering a join or seam in a papermaking fabric.

[0012] The invention in one form is directed to a paper machine fabric, including a base fabric having a join or a seam, and a strip of material covering the join or seam. The strip of material has an edge with a plurality of crenulations.

[0013] An advantage of the present invention is that the scrim is less likely to cause performance issues with the papermaking fabric.

[0014] Another advantage of the present invention is that even if a relatively wide scrim material is used there are minimal performance issues associated therewith.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] The above-mentioned and other features and advantages of this invention, and the manner of attaining them, will become more apparent and the invention will be better understood by reference to the following description of embodiments of the invention taken in conjunction with the accompanying drawings, wherein:

[0016] FIG. **1** is a perspective partially sectioned view of a papermaking fabric using an embodiment of the scrim of the present invention;

[0017] FIG. **2** is an illustration of another embodiment of a scrim of the present invention;

[0018] FIG. **3** is an illustration of yet another embodiment of a scrim of the present invention;

[0019] FIG. **4** is an illustration of yet another embodiment of a scrim of the present invention;

[0020] FIG. **5** is an illustration of yet another embodiment of a scrim of the present invention;

[0021] FIG. **6** illustrates still yet another embodiment of a scrim of the present invention;

[0022] FIG. **7** is an illustration of a further embodiment of a scrim of the present invention; and

[0023] FIG. **8** is an illustration of still yet another embodiment of a scrim of the present invention.

[0024] Corresponding reference characters indicate corresponding parts throughout the several views. The exemplifications set out herein illustrate embodiments of the invention and such exemplifications are not to be construed as limiting the scope of the invention in any manner.

DETAILED DESCRIPTION OF THE INVENTION

[0025] Referring now to the drawings, and more particularly to FIG. **1**, there is shown a fabric assembly **10** including a base fabric **12** and a strip of material **14** also known as a scrim **14**. For ease of illustration, layers of fabric assembly **10** that may be added to that which has been illustrated have not been shown and could include woven and non-woven fabrics and fibers that are attached to base fabric **12** and/or scrim **14**. An end **16** of base fabric **12** and an end **18** are joined together at **20** to form join **20** or seam **20**. Seam **20** is formed by any manner known in the joining of end **16** and end **18** of fabric **12**. Scrim **14** is connected to base fabric **12** mechanically by needling, sewing, adhesives and/or a melting operation.

[0026] Scrim **14** has edges that are not straight, narrow, rectangular strips as those used in the prior art. A relatively wide scrim is used and the sides are crenulated, for example crenulations **22** and **24**. The crenulations may be circular, semi-circular, sinusoidal, square, triangular, trapezoidal and/or angular in shape. The crenulations occur in a repeating or in a random/irregular fashion. Scrim **14** should be more than approximately 1 inch wide, but less than approximately 24 inches wide. Preferably, scrim **14** should be approximately 2 inches wide to 16 inches wide. The indentions of the crenulations are approximately 5% to 30% in depth as compared to the total width of scrim **14** or at least a minimum of 0.10 inch. An advantage of these indentations is that it minimizes the caliper/mass transition as the scrim passes through the nip resulting in a more uniform performance of the joined fabric. The crenulations also break up the border of the scrim so there is less chance that the eye can detect its presence in the resulting web. This is ultimately reflected in the formed paper web resulting in less visible marking.

[0027] Now, additionally referring to FIGS. **2-8** there are illustrated some of the numerous crenulation possibilities. For example, in FIG. **2** there is depicted a scrim **14** having a crenluation **26** and a straight side **28**. Crenulations **26** are regularly spaced between end A and end B. Side **28**, defined as an edge CD is not crenulated. An imaginary line connecting AB is generally parallel to CD. Lines AD and BC may or may not be parallel. The result is a shape ABCD that is a polygon, which can be substantially rectangular, substantially trapezoidal, and if AD is sufficiently narrow substantially triangular.

[0028] FIG. **3** depicts a portion of a scrim where both side edges are crenulated as shown as crenulation **30** and crenulation **32**. Both crenulation **30** and **32** are regularly spaced and may be substantially a mirror image of each other.

[0029] FIG. **4** depicts a scrim **14** where crenulations **34** and **36** are curved crenulations. Crenulations **34** and **36** are illustrated as being in phase with each other contrary to those illustrated in FIG. **3**. FIGS. **3** and **4** each illustrate crenulations that are a pattern having regular spacing of the repeated pattern.

[0030] FIG. **5** depicts a scrim **14** having crenulations **38** and **40** that are irregular in spacing as well as irregular in shape. There is no symmetry between crenulation **38** and **40** and seemingly no pattern of repetition.

[0031] FIG. **6** depicts a scrim **14** having crenulations **42** and **44**, similar to FIG. **3**. However, the crenulations of FIG. **6** extend in both directions relative to imaginary lines AB and DC. In a similar fashion crenulations **46** and **48** of FIG. **7** illustrate a repeating shape of irregular spacing of crenulations entirely on one side of imaginary line AB and extending outside of imaginary line AB, while crenulations **48** extend in both directions of an imaginary line CD.

[0032] In FIG. **8** a scrim **14** is illustrated as being used over a pin-seam **20** or other type of join that has approximately a 15% to 45% open area, and may be approximately 4 inches wide having a thickness of between 0.003 inches to 0.010 inches thick. The scrim is made of a high strength and wear resistant material, such as a high-density polyethylene, polyester or polyurethane. A low melt adhesive layer, like Ethylene Vinyl Acetate (EVA), may be coated on the scrim to improve fiber bonding of scrim **14** to fabric **12**. Crenulations **50** and **52** are a repeated pattern of semi-circular shape approximately 0.5 inches deep and spaced approximately 1 inch apart. The permeability of the finished fabric assembly **10** in the area of scrim **12** will typically be somewhat lower than base fabric **12** apart from scrim **14** by 3% to 15%.

[0033] Advantageously the use of scrim **14** prevents the cross-directional bar that is seen on fabrics with prior art scrims. The prior art scrims have caused problems like press bounce, faster rate of filling and sheet marking due to the added scrim material and also because of the abrupt transition caused by the shape of the scrim. The purpose of the indentions, which are shown as circular type shapes in FIG. **8**, which are advantageous because of the circular shapes, is that they distribute the compressive load more uniformly and are as such less prone to cause a visible mark. The circular shapes provide a better pressure uniformity and mass/caliper/permeability transition from the body of base fabric **12** to scrim **14** versus the prior art, straight, sudden boundary edge. This significantly reduces the risk of the above-noted problems.

[0034] Crenulations **22**, **24**, **26**, **30**, **32**, **34**, **36**, **38**, **40**, **42**, **44**, **46**, **48**, **50** and **52** each have a peak and a valley associated therewith. The difference between the peak and the valley is a distance that is from 5% to 30% of the total width of scrim **14**. The width of scrim **14** can be thought of as the length from A to D or from B to C.

[0035] While this invention has been described with respect to at least one embodiment, the present invention can be further modified within the spirit and scope of this disclosure. This application is therefore intended to cover any variations, uses, or adaptations of the invention using its general principles. Further, this application is intended to cover such departures from the present disclosure as come within known or customary practice in the art to which this invention pertains and which fall within the limits of the appended claims.

What is claimed is:

1. A papermachine fabric, comprising:

a base fabric having one of a join and a seam; and

a strip of material covering said join or said seam, said strip of material having an edge with a plurality of crenulations.

2. The papermachine fabric of claim 1, wherein said crenulations are at least one of regularly and irregularly spaced cutouts.

3. The papermachine fabric of claim 2, wherein said crenulations are at least one of regularly and irregularly shaped cutouts.

4. The papermachine fabric of claim 3, wherein each said crenulation has a peak and a valley, said peak and said valley being apart from each other by a distance of at least 0.1 inch.

5. The papermachine fabric of claim 4, wherein said distance is at least 0.5 inch.

6. The papermachine fabric of claim 3, wherein said strip material has a thickness of between approximately 0.003 inches and 0.010 inches.

7. The papermachine fabric of claim 3, wherein said crenulations have a shape being at least one of semi-circular, sinusoidal, square, triangular and trapezoidal.

8. The papermachine fabric of claim 3, wherein said strip material has a width of between approximately 1 inch and 24 inches.

9. The papermachine fabric of claim 8, wherein said width is between approximately 2 inches and 16 inches.

10. The papermachine fabric of claim 3, wherein said base fabric has a permeability and a combination of said base fabric and said strip of material have another permeability that is from approximately 3% to 15% less than said permeability.

11. The papermachine fabric of claim 4, wherein said strip material has a width, said distance being from approximately 5% to 30% of said width.

12. The papermachine fabric of claim 3, wherein said strip material has an other edge opposite of said edge, said other edge being one of crenulated and not crenulated.

13. The papermachine fabric of claim 12, wherein said edge is generally parallel to said other edge.

14. The papermachine fabric of claim 12, wherein said edge is generally not parallel to said other edge.

15. A scrim for covering one of a join and a seam of a papermachine fabric, the scrim comprising a strip of material having an edge with a plurality of crenulations.

16. The scrim of claim 15, wherein said crenulations are at least one of regularly and irregularly spaced cutouts.

17. The scrim of claim 16, wherein said crenulations are at least one of regularly and irregularly shaped cutouts.

18. The scrim of claim 17, wherein said crenulations have a shape being at least one of semi-circular, sinusoidal, square, triangular and trapezoidal.

19. The scrim of claim 17, wherein said base fabric has a permeability and a combination of said base fabric and said strip of material have another permeability that is from approximately 3% to 15% less than said permeability.

20. The scrim of claim 17, wherein said strip material has a width, said crenulations having a distance from a peak to a valley, said distance being from approximately 5% to 30% of said width.

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