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Woods et al.

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[45] **Reissued Date of Patent: Mar. 7, 2000**

[54] **METHOD FOR MAKING MULTILAYER PAD**

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[73] Assignee: **M.J. Woods, Inc.**, Hendersonville, N.C.

[21] Appl. No.: **09/059,479**

[22] Filed: **Apr. 13, 1998**

Related U.S. Patent Documents

Reissue of:

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Issued: **Apr. 16, 1996**
Appl. No.: **08/285,183**
Filed: **Aug. 3, 1994**

U.S. Applications:

[63] Continuation of application No. 08/097,274, Jul. 26, 1993, abandoned, which is a continuation-in-part of application No. 07/954,688, Sep. 30, 1992, Pat. No. 5,230,119, which is a continuation of application No. 07/684,593, Apr. 12, 1991, abandoned, which is a continuation-in-part of application No. 07/508,967, Apr. 13, 1990, abandoned.

[51] **Int. Cl.**[7] **B32B 31/12**; B32B 31/18

[52] **U.S. Cl.** **156/271**; 156/250; 156/268; 156/269; 156/291; 156/324; 156/548; 156/578; 15/209.1

[58] **Field of Search** 156/250, 268, 156/269, 270, 290, 291, 320, 324, 548, 578; 15/209.1

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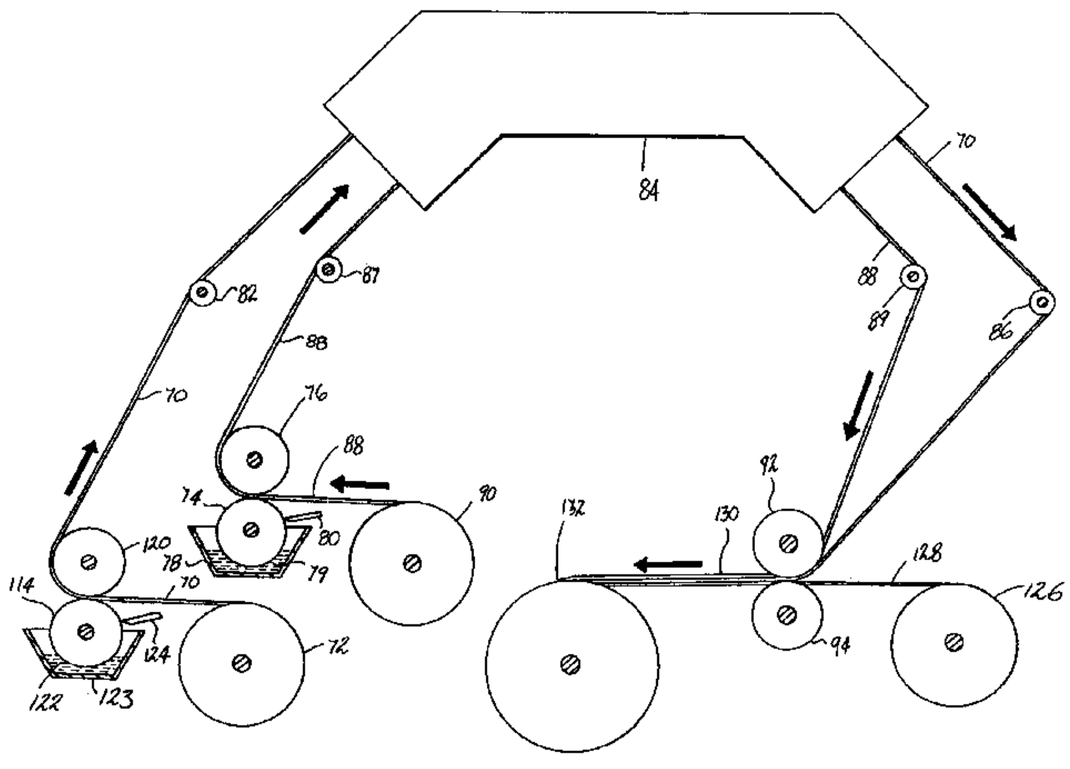
Primary Examiner—Curtis Mayes

[57] **ABSTRACT**

The invention comprises a method for manufacturing a laminated pad in a cost-efficient manner. In one embodiment, the method comprises the steps of applying strips of adhesive to a first substrate and mounting the first substrate to a second substrate. Next, adhesive is applied to the entire width of a third substrate which is in turn mounted to the laminated first and second substrates to create a laminated sheet. The laminated sheet can be slit and then die cut into individual laminated pads. The pads which result from this process have a base pad, an intermediate layer which is adhered to the base pad and a top layer in which only a portion of the top layer is mounted to the intermediate layer.

7 Claims, 12 Drawing Sheets



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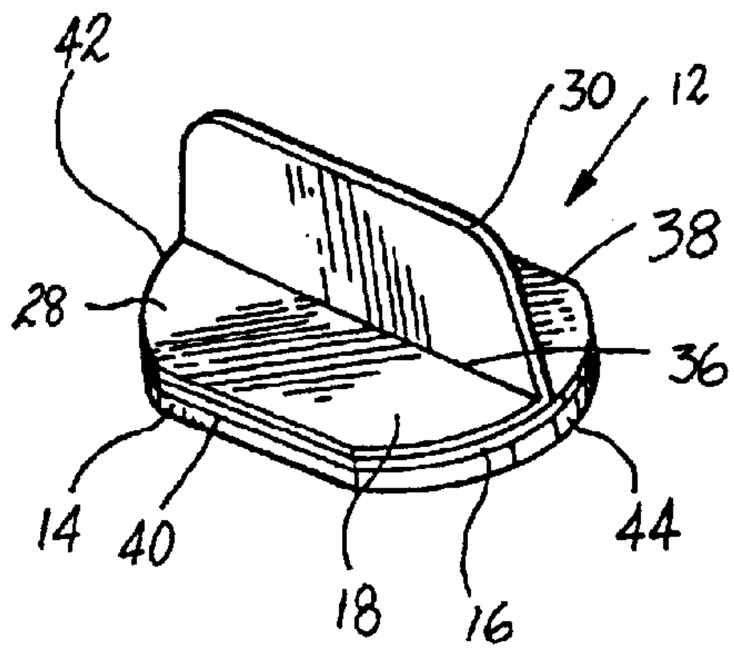

FIG. 1

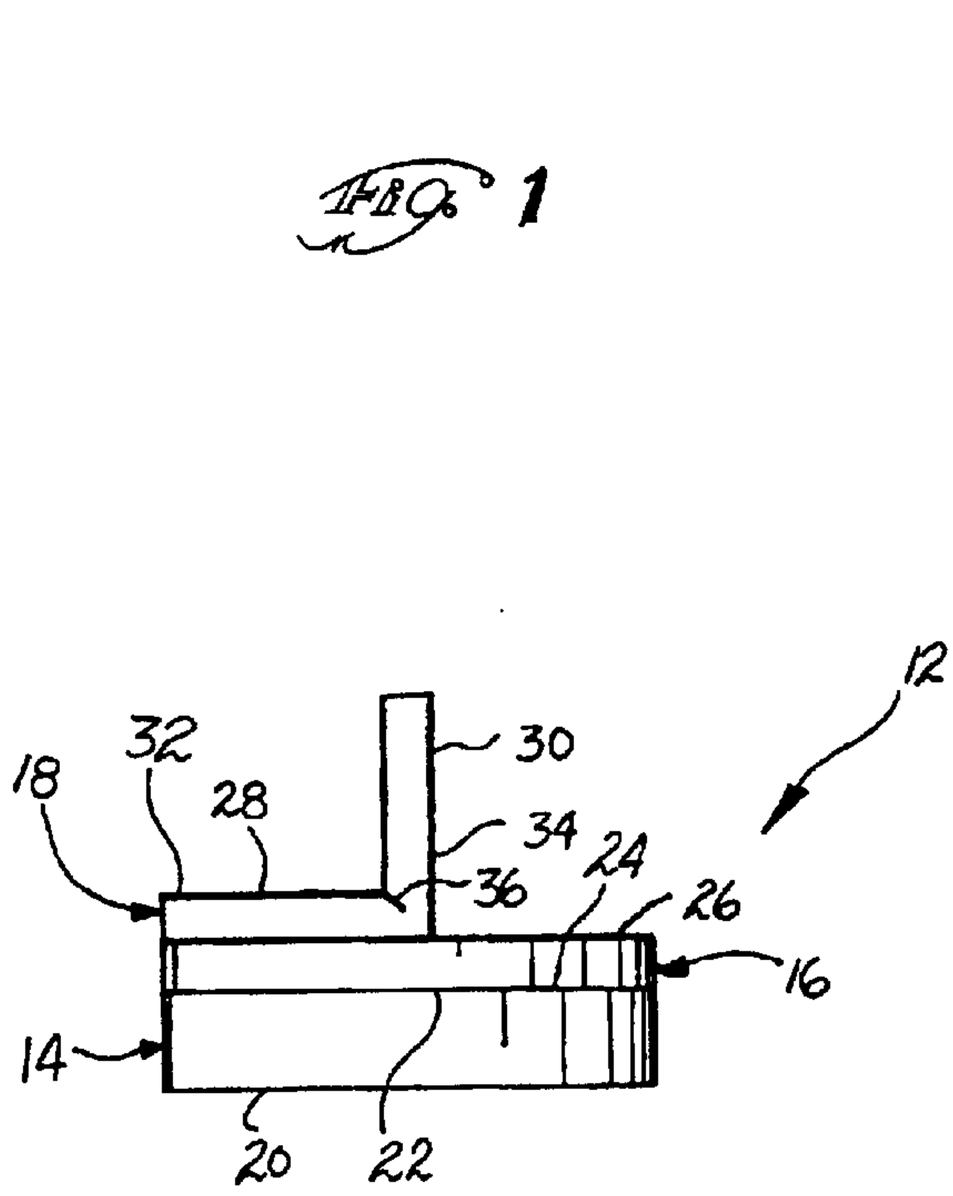

FIG. 2

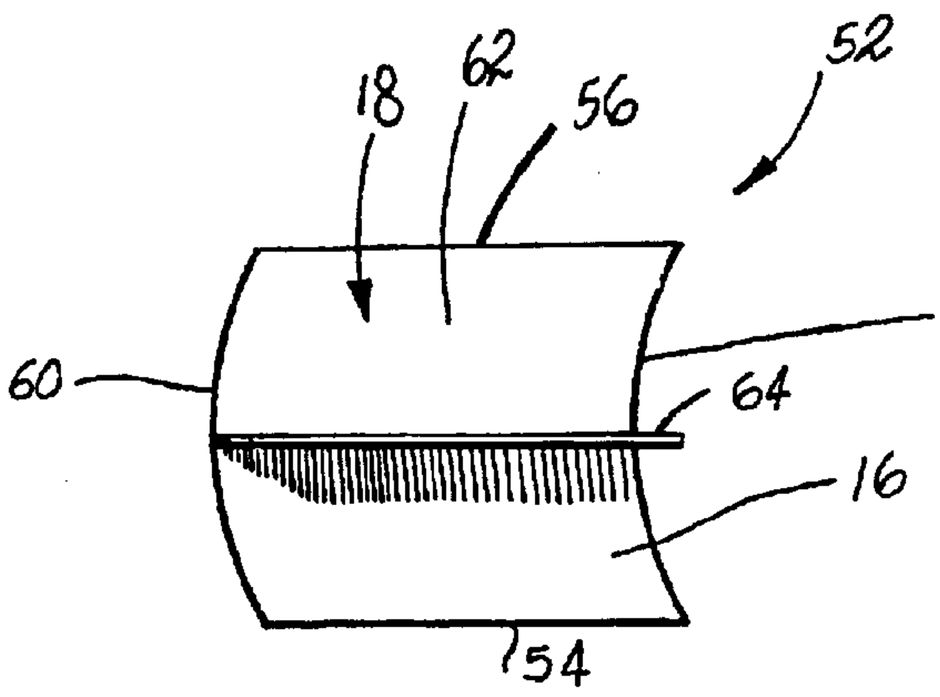

FIG. 3

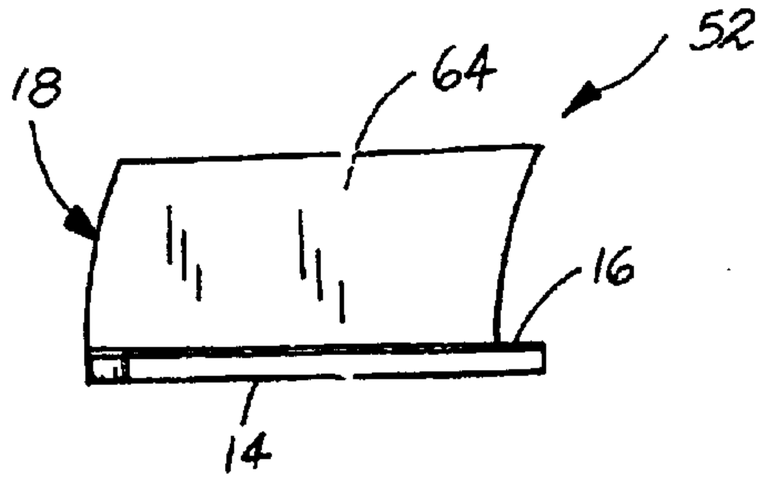

FIG. 4

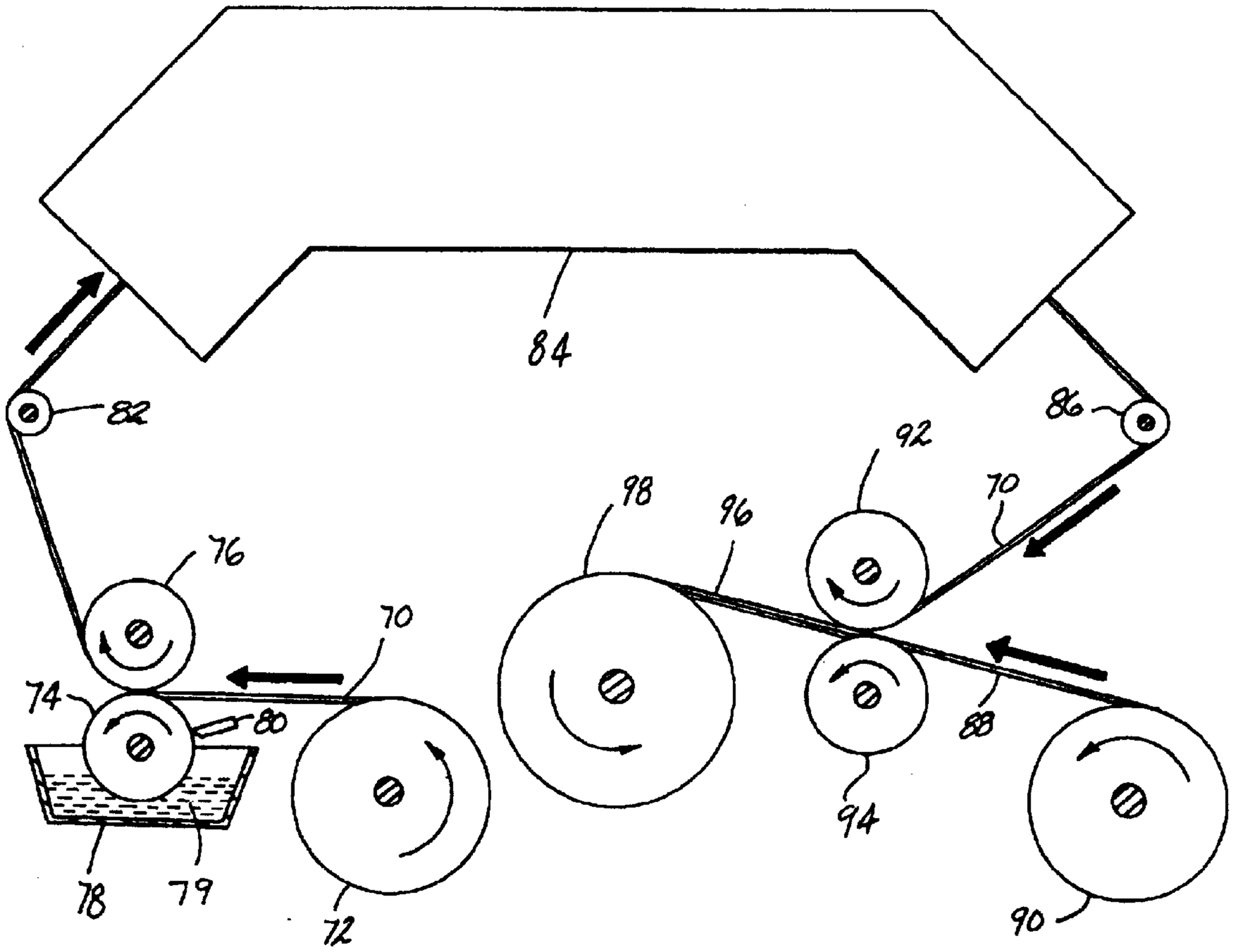

FIG. 5

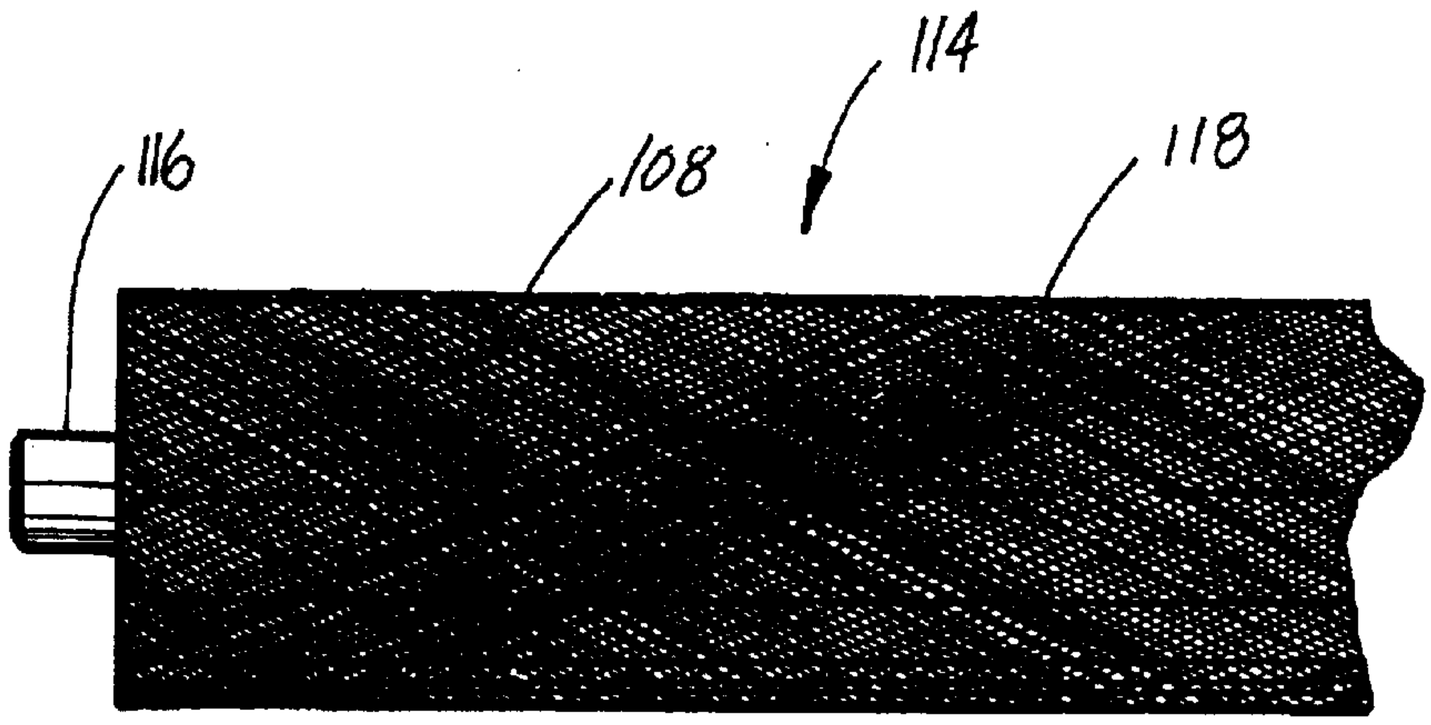

FIG. 11

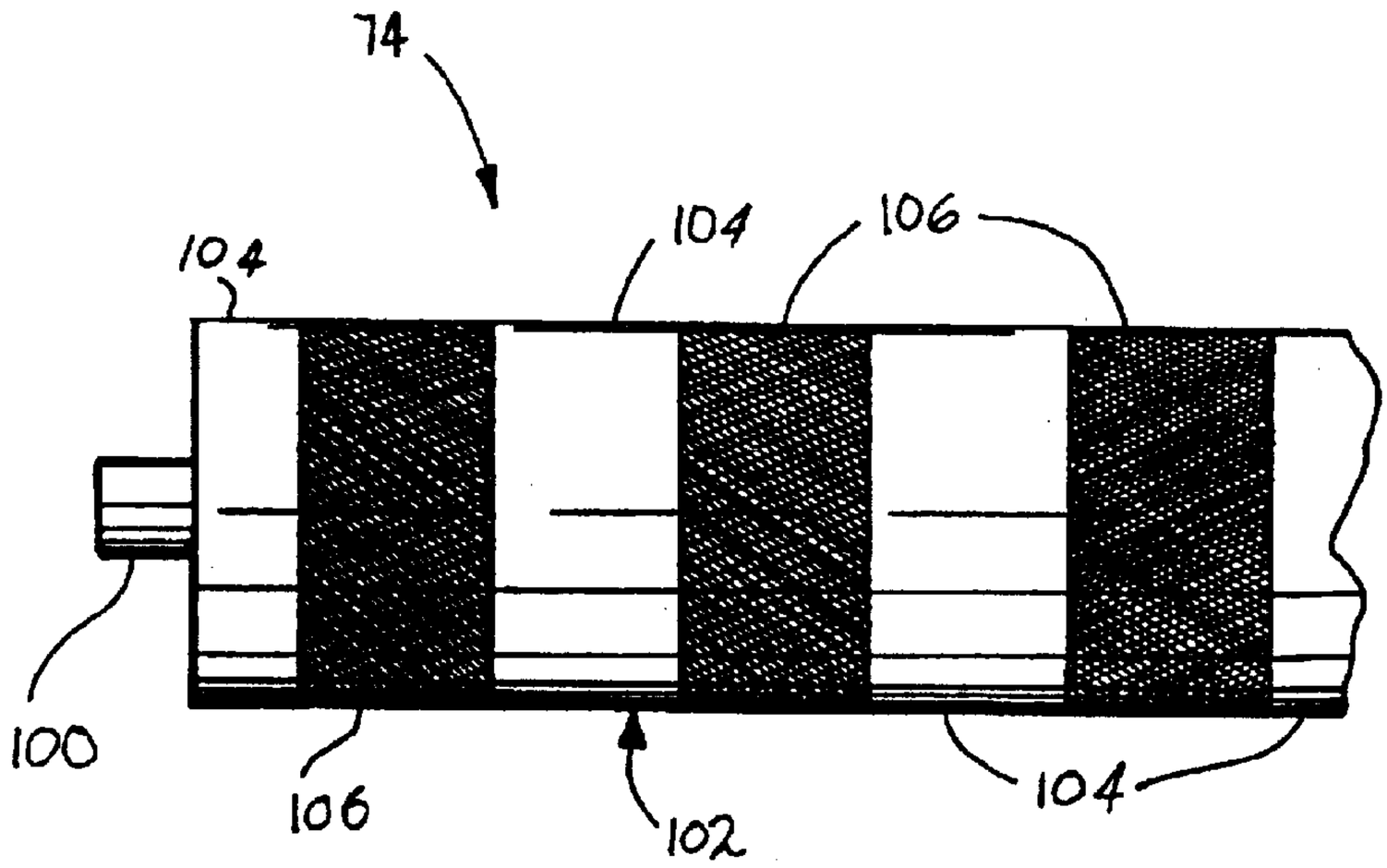

FIG. 6

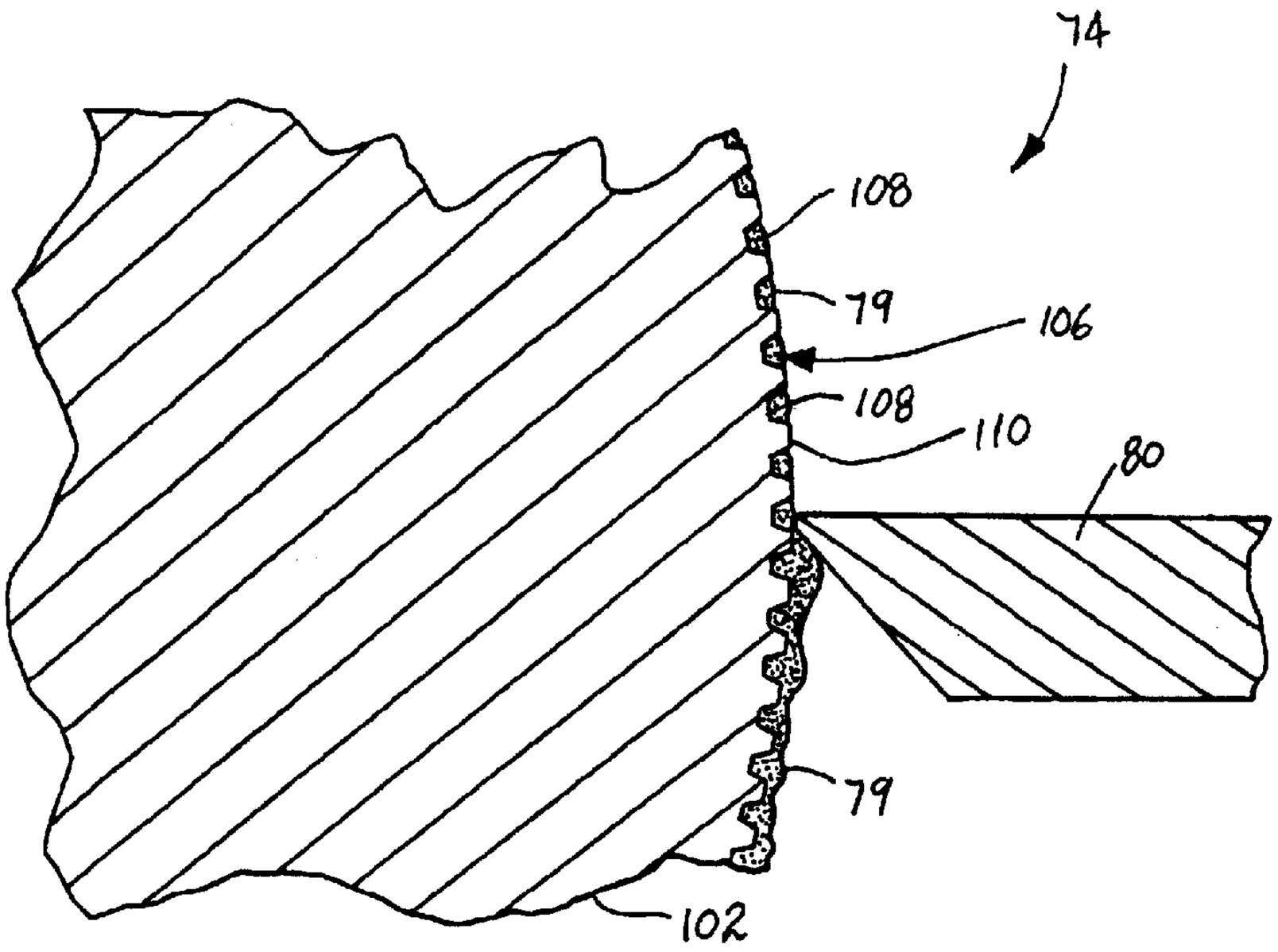

Fig. 7

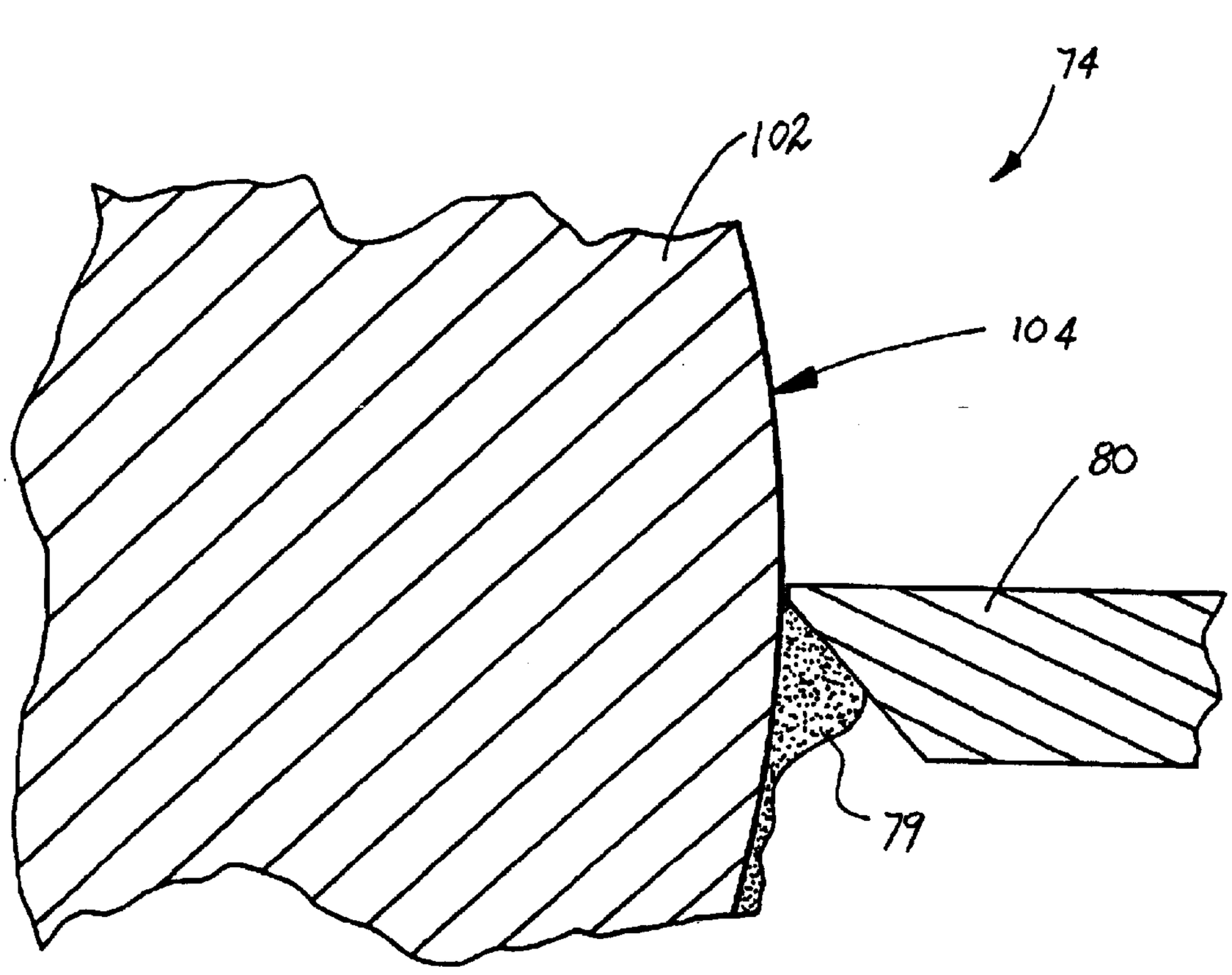

Fig. 8

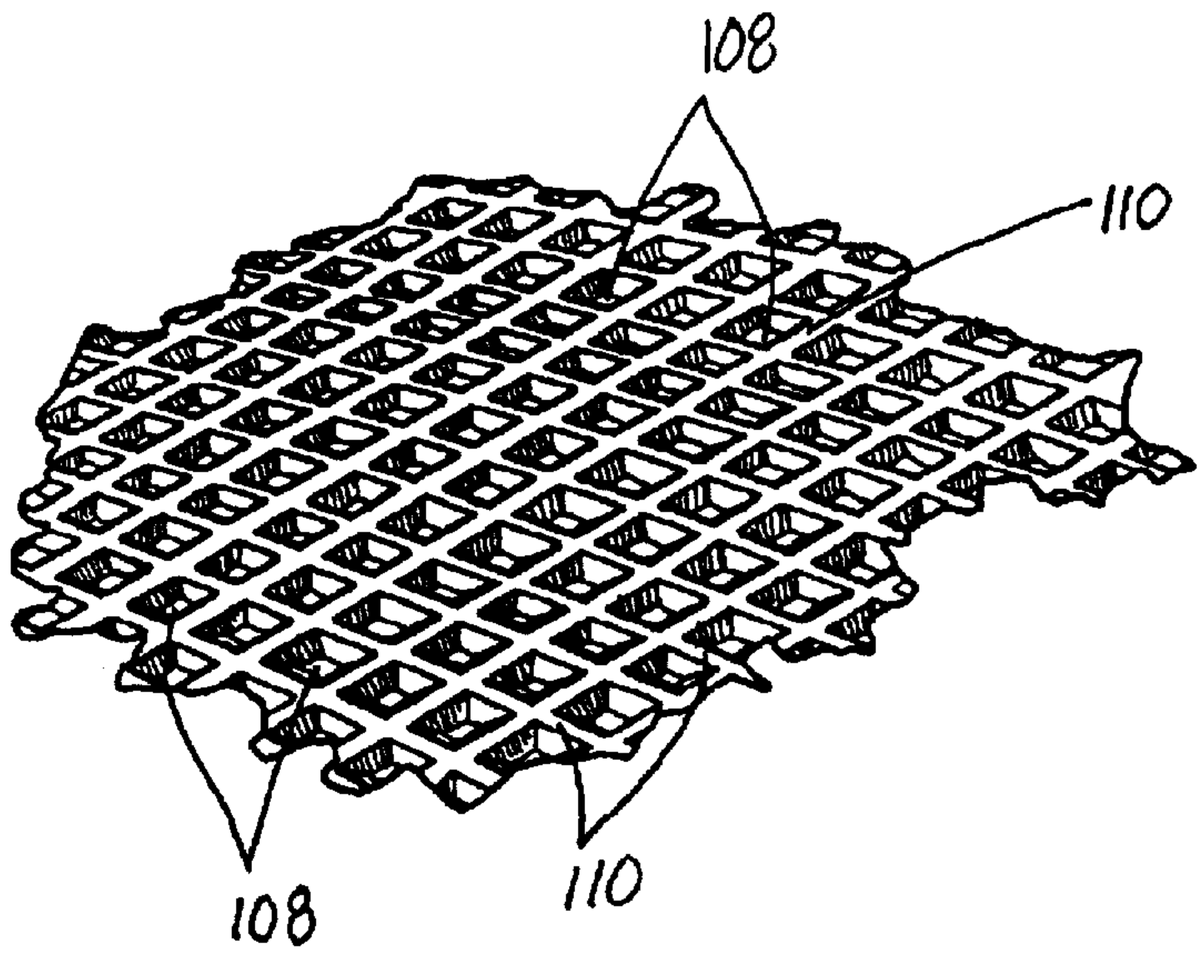

Fig. 9

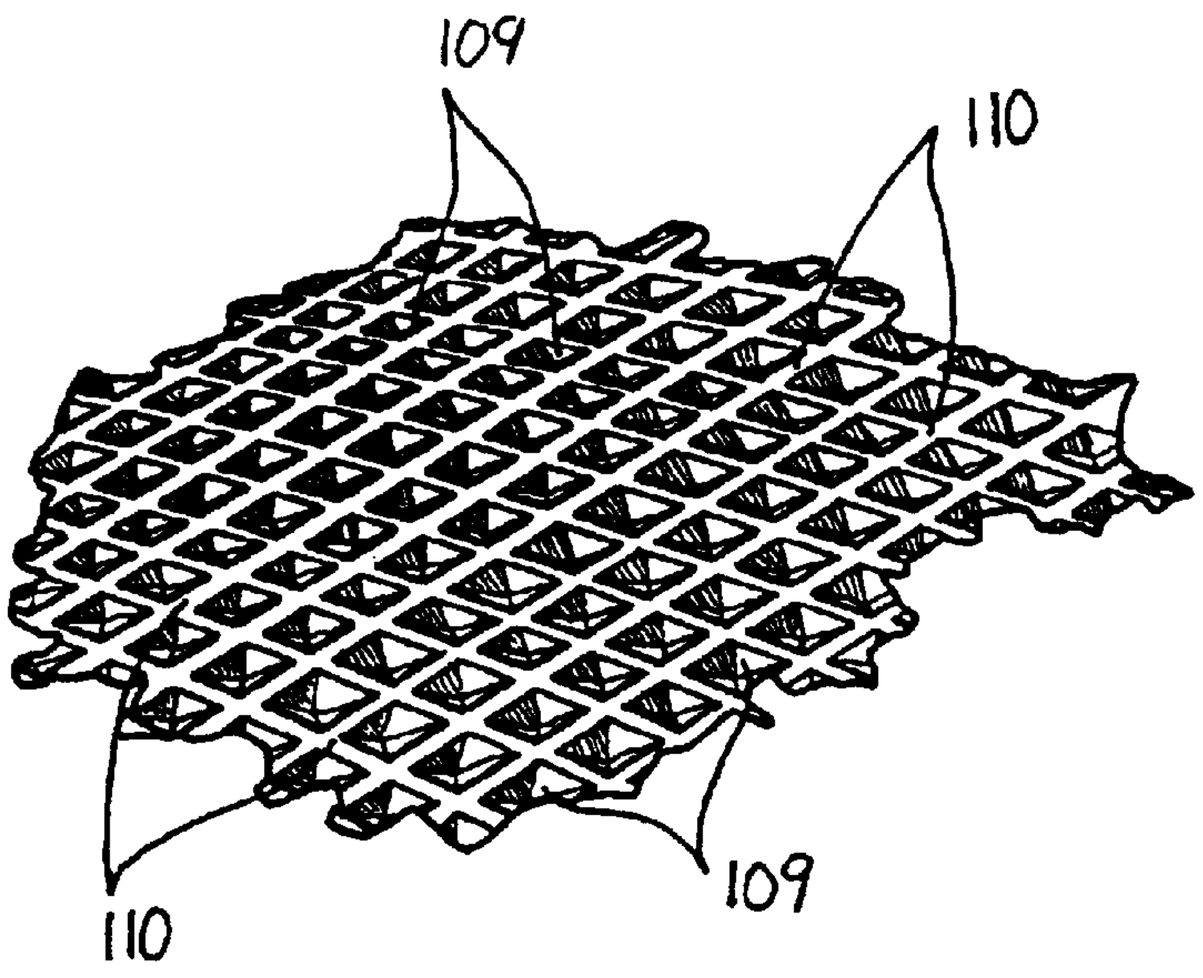

Fig. 10

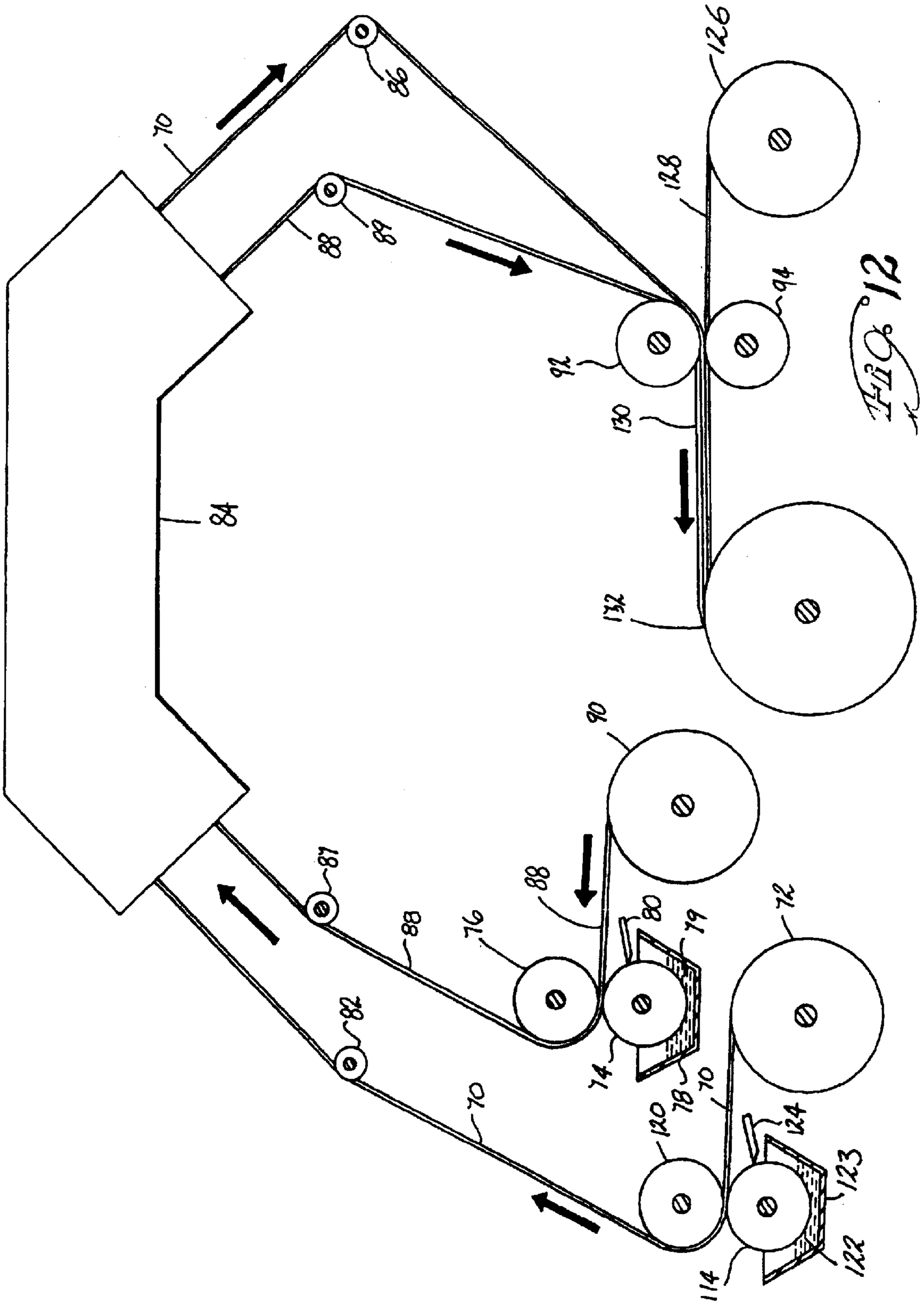
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FIG. 12

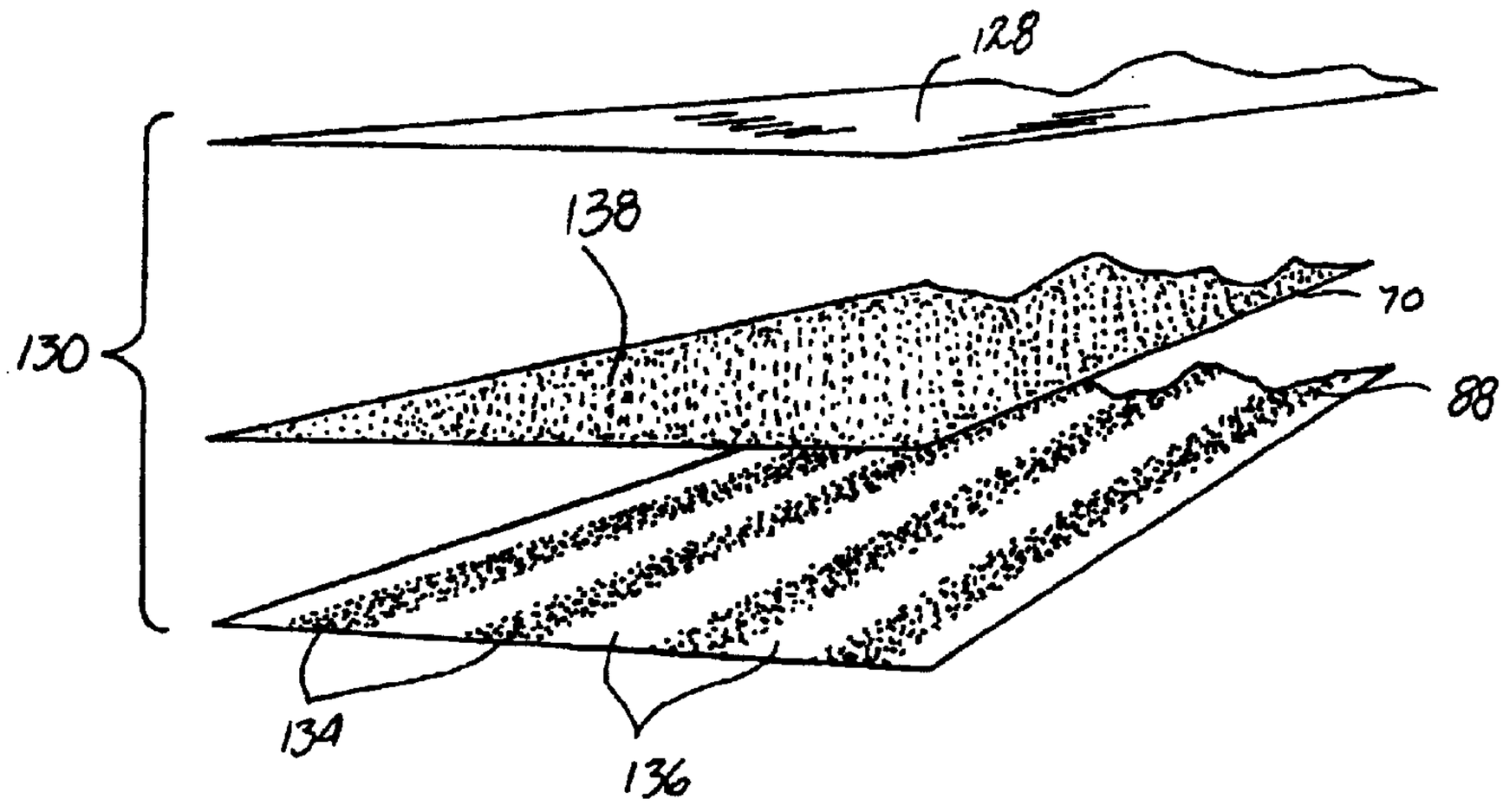
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FIG. 13

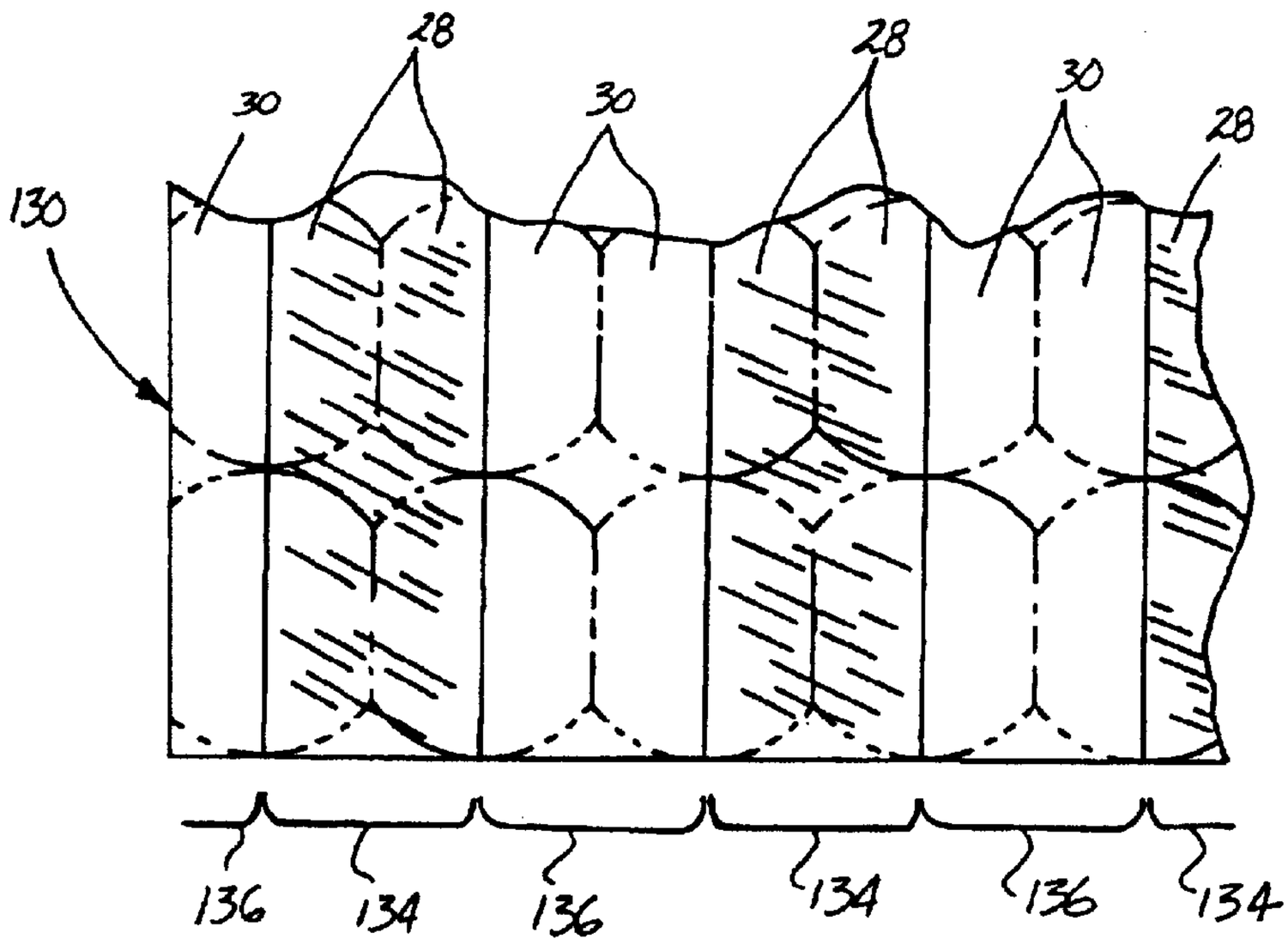
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FIG. 14

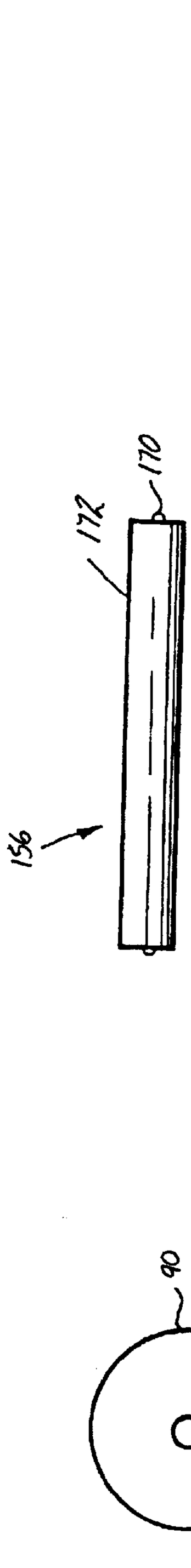

FIG. 17

FIG. 15

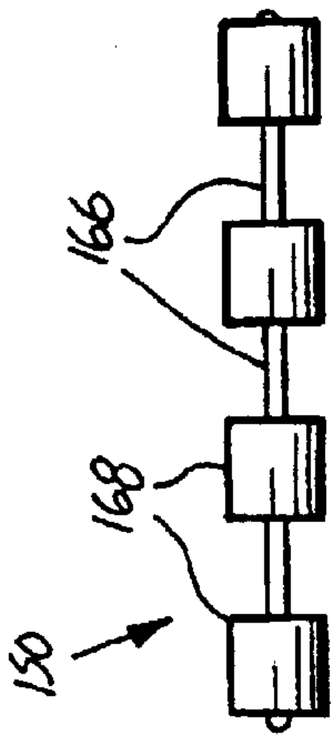

FIG. 16

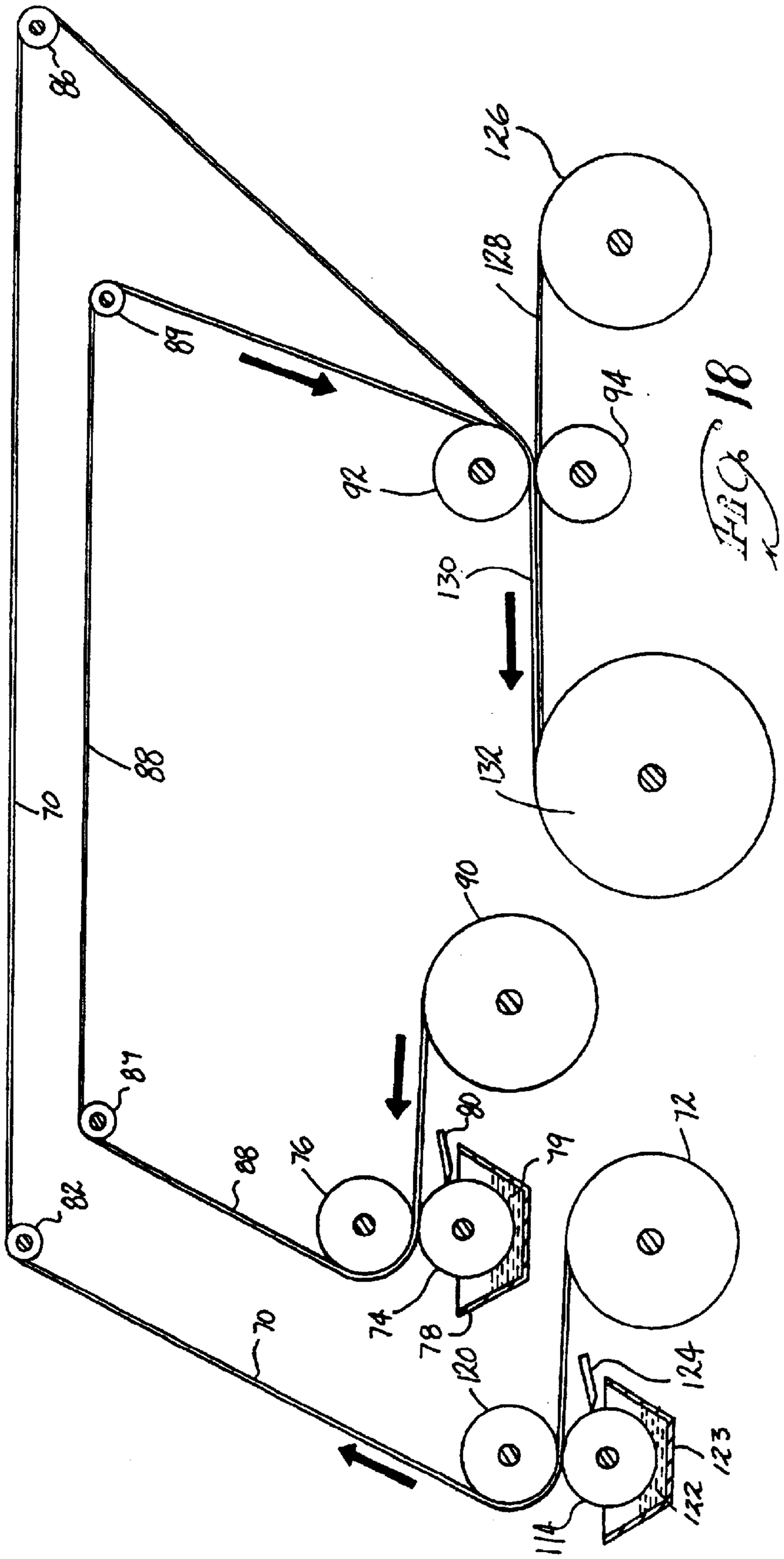
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FIG. 18

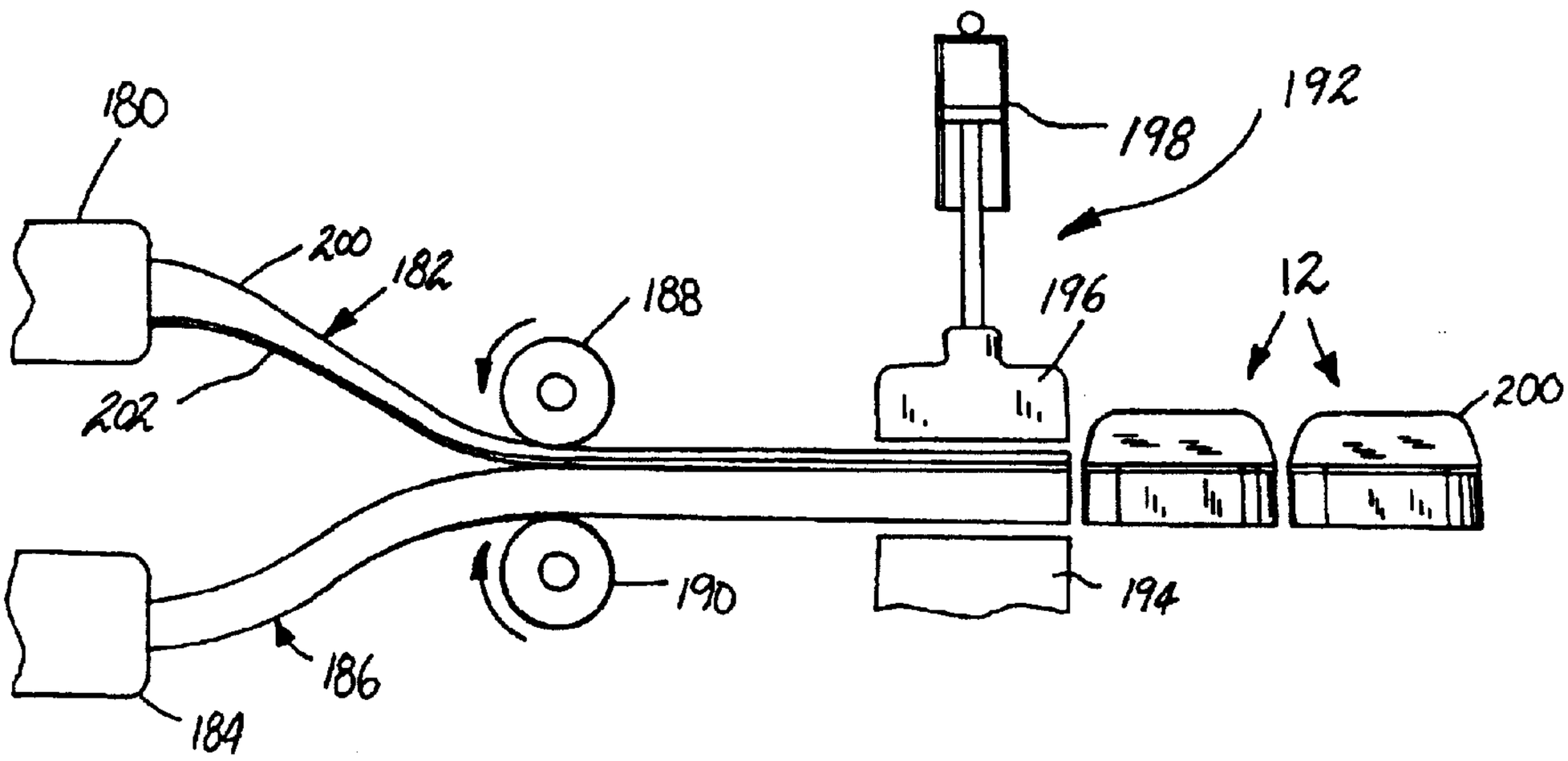
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Fig. 19

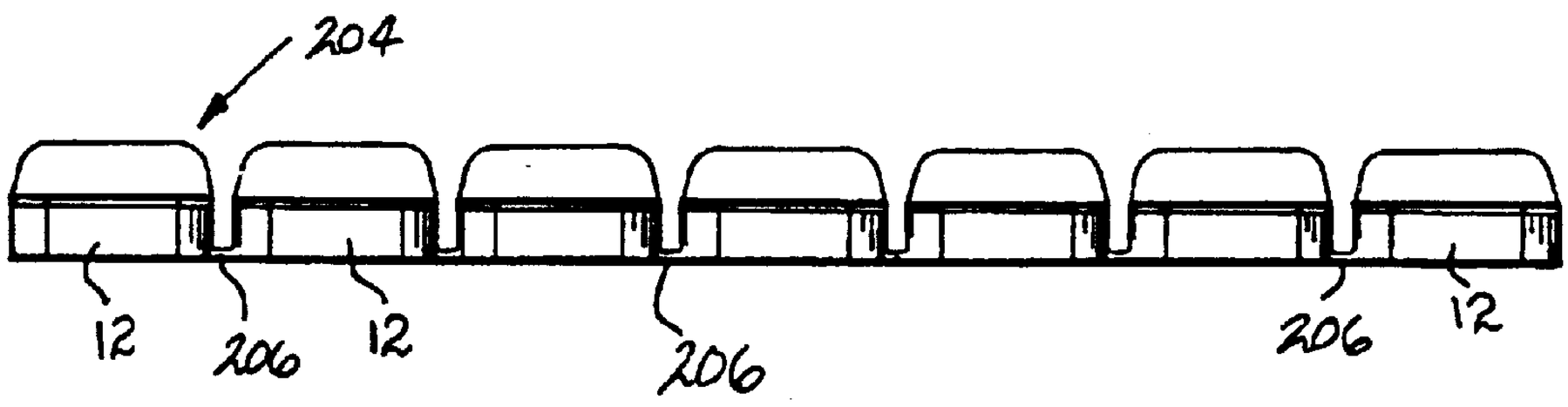
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Fig. 20

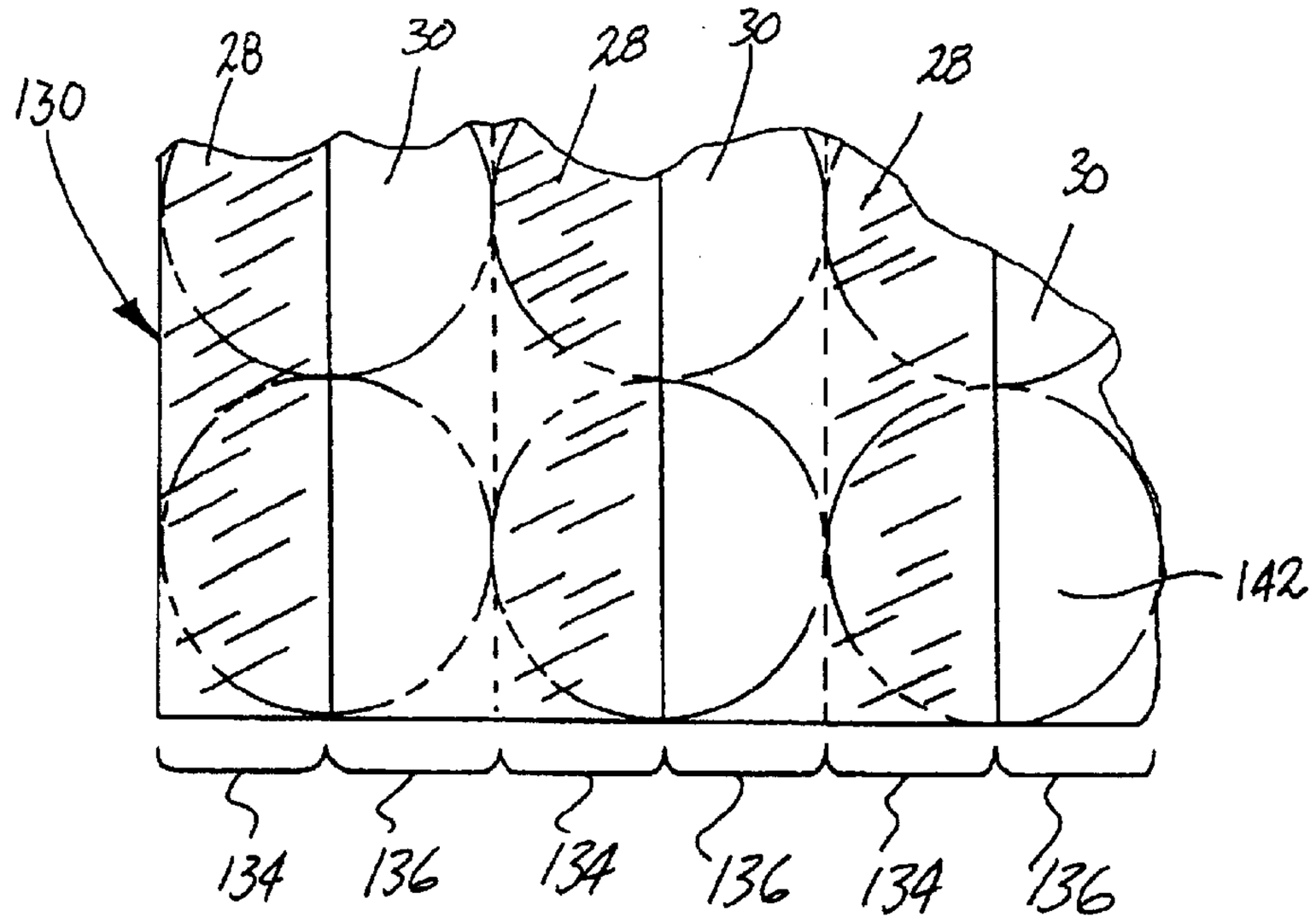
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FIG. 21

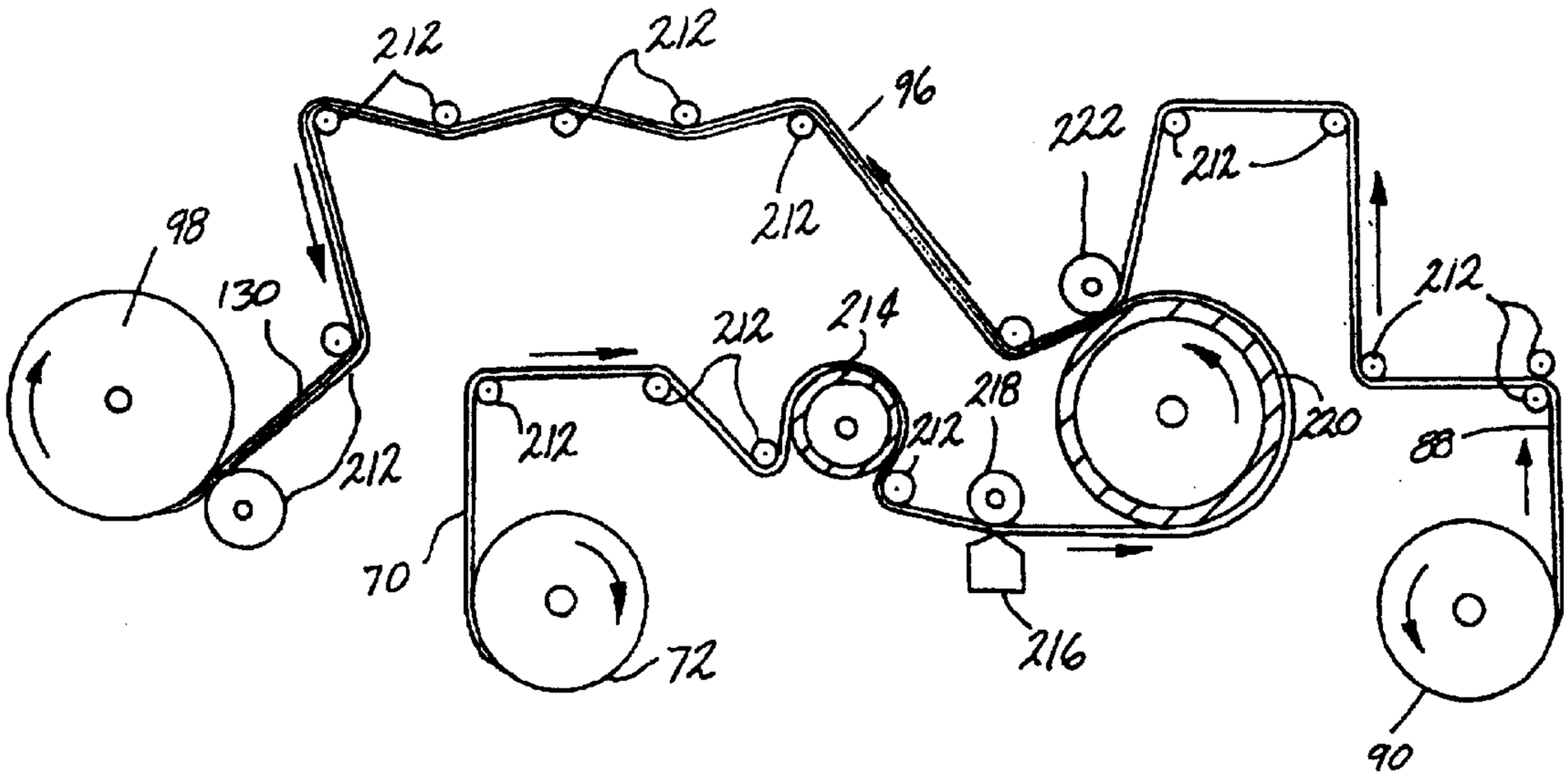
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FIG. 22

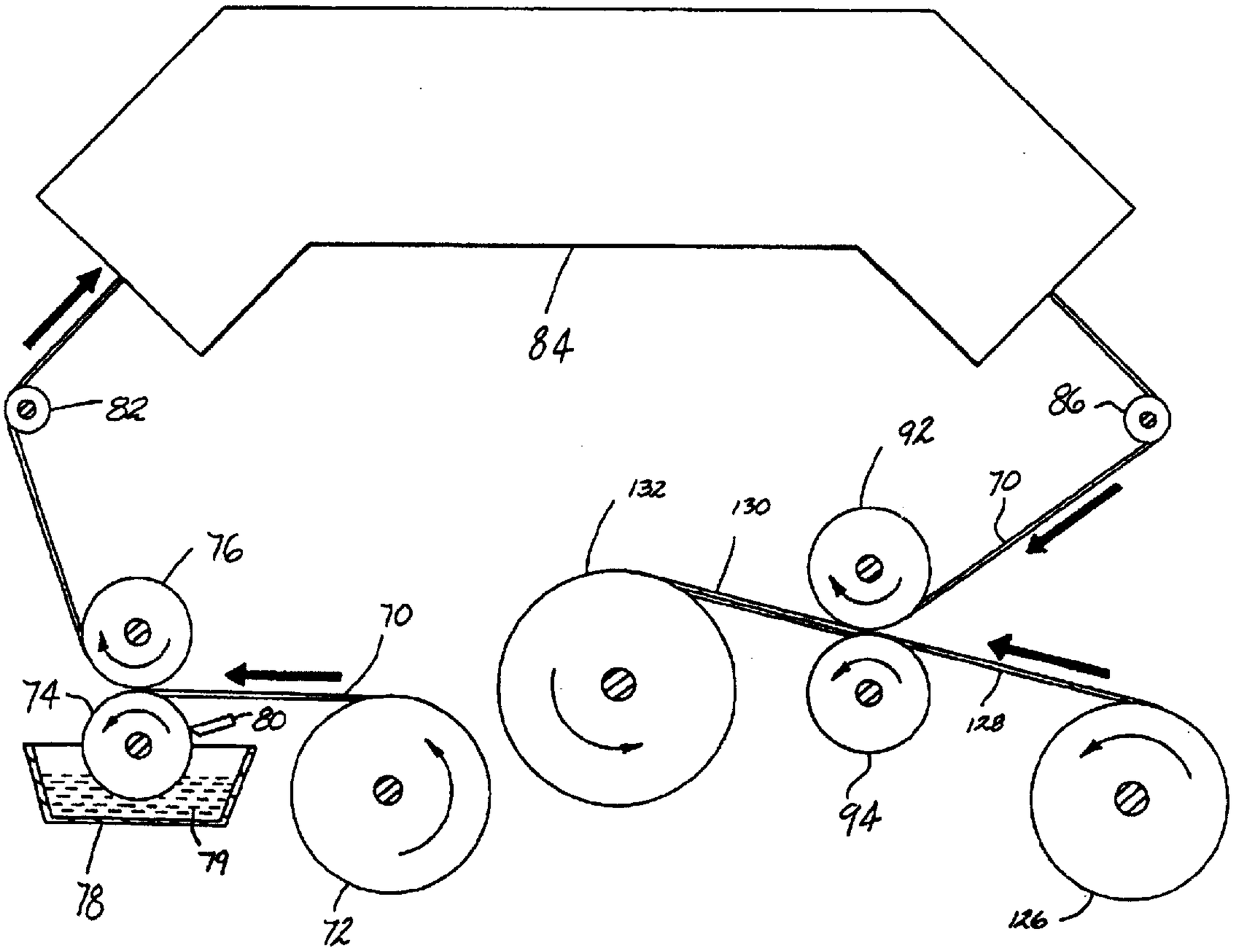

FIG. 23

METHOD FOR MAKING MULTILAYER PAD

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

CROSS-REFERENCE TO RELATED APPLICATIONS

This is a continuation of application Ser. No. 08/097,274 filed Jul. 26, 1993, now [abandoned. Now], which is a continuation-in-part of U.S. patent application Ser. No. 07/954,688, filed Sep. 30, [1991,] *1992*, now issued as U.S. Pat. No. 5,230,119, which is a continuation of U.S. patent application Ser. No. 07/684,593, filed Apr. 12, 1991, now abandoned, which was a continuation-in-part of U.S. patent application Ser. No. 07/508,967, filed Apr. 13, 1990, now abandoned.

FIELD OF THE INVENTION

The present invention relates to a method of making a disposable multilayer pad. In particular, the present invention relates to a method for making an improved hand held laminated pad suitable as a wipe and/or applicator. The laminated pad has a base pad, an impervious barrier shield that protects the user from contact with fluids and solids on the base pad and a flexible, adjustable handle.

BACKGROUND OF THE INVENTION

Many items are widely used as wipes and applicators for wiping or applying substances from or to surfaces such as those on a human, e.g., skin, finger nails, toe nails, or in a human, e.g., internal organs and bones during a surgical operation. These items are widely used in both medical and non-medical fields. Small cotton or rayon balls, pads or gauzes are perhaps the most widely used items for these purposes on the market today. Small sponges are also widely used items.

In the medical field, these items are used for cleaning the skin and other surfaces, such as the surfaces of internal organs, by the application of a disinfectant or solvent and/or the wiping away of blood and other fluids, including other body fluids, and other materials. The cotton balls, sponges and gauze pads are grasped between the fingers and applied to the area of concern to wipe away or apply fluids or other materials. One problem with this prior art approach is that the fingers can easily come into contact with the fluid being applied or wiped. In light of infectious diseases such as AIDS and hepatitis contact between a care provider and a patient should be avoided.

In the cosmetics and personal care fields, cotton balls and the like are widely used to apply and to remove makeup and to apply other personal care products such as lotions, creams and nail polish remover. Unfortunately, the item transfers the makeup or personal came product to the user's finger which is often undesirable. For example, when a nail polish remover, which is usually acetone or acetate based, is being used it can be transferred to the fingers of the hand holding the item. The nail polish remover can harm the fingers and remove the nail polish from the user's finger nails on the hand holding the item even if removal from these nails was not desired. Also, the nail polish remover can undesirably remove nail polish from a finger nail adjacent to the finger from which the nail polish is being removed. Also, the transfer can result in a waste of the makeup or personal care product.

These items are often amorphous in that they have no defined shape and therefore no defined edges. Thus, these items are not ideally suited to apply or wipe materials to or from surfaces that have an arcuate edge, e.g., finger nails, and from surfaces that have straight edges, e.g., the edge formed between the nose and cheek. Other items only have arcuate or straight edges and are not very effective when surfaces having a different shape are encountered.

One example of the prior art approach is disclosed in U.S. Pat. No. 4,053,242, entitled "Disposable Product Applicator and Dispensing Package Therefor", issued Oct. 11, 1977 to Mast, Jr. Another example of applicators is illustrated in the Jones, Sr. U.S. Pat. No. 3,784,998, entitled "Composition Applicator" and its companion case U.S. Pat. No. 3,737,939 having substantially identical disclosures. Other prior attempts include U.S. Pat. No. Re. 26,385, to Gilchrist issued May 7, 1968, which discloses a liquid and paste applicator formed by sheets of foam; and U.S. Pat. No. 4,506,404 to Clay which discloses a disposable sponge having a planar body portion and a pair of upstanding rib members spaced close enough that they may be grasped and squeezed against each other by the hand to form a handle or grip.

It is desirable to manufacture an improved laminated pad suitable for use as an applicator or wipe that overcomes at least some of the aforementioned shortcomings in a cost effective manner.

SUMMARY OF THE INVENTION

The invention comprises a method of manufacturing a multilayer pad comprising the steps of providing a base pad forming material having an attachment surface and an application surface, providing an intermediate layer forming material having an upper attachment surface and a lower attachment surface, and providing a handle forming material having a lower attachment surface and an exposed upper surface. The attachment surface of the base pad forming material is mounted to the lower attachment surface of the intermediate layer forming material such that substantially the entire lower attachment surface of the intermediate layer forming material is mounted to the upper attachment surface of the base forming material. A portion of the upper attachment surface of the intermediate layer forming material is mounted to the lower attachment surface of the handle forming material such that less than the entire upper attachment surface of the intermediate layer forming material is mounted to the lower attachment surface of the handle forming material. Finally, the laminated sheet is cut into individual pads having a mounted portion of the handle forming material and a pivotable portion of the handle forming material.

Preferably, the base pad material is mounted to the intermediate layer by adhesive which is applied by a cylinder having a plurality of recesses formed therein adapted to transfer adhesive from a reservoir to the material.

In another embodiment, the intermediate layer forming sheet is mounted to the handle forming sheet by adhesive which is applied in strips parallel to one another. Preferably, the parallel strips are applied to one of the intermediate layer forming sheet and the handle forming sheet by rolling one of the sheets over a zone cylinder adapted to apply adhesive to the sheet in the parallel strips.

In another embodiment, the method comprising the step of cutting the laminated sheet such that the mounted portion of two adjacent pads are cut from the same strip of adhesive coating of the laminated sheet.

In a further embodiment, the method comprises the step of cutting the sheet such that the pivotable portion of two adjacent pads are cut from the same strip of uncoated portions of the sheet.

In a further embodiment of the invention, the several layers are bonded to one another by co-extrusion of the several layers and passing the layers between a pair of opposed rolls immediately after extrusion such that the several layers are bonded to one another.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a first embodiment of the laminated pad manufactured according to the invention;

FIG. **2** is a front elevation view of the laminated pad of FIG. **1**;

FIG. **3** is a top plan view of a second embodiment of the laminated pad manufactured according to the invention;

FIG. **4** is a side elevational view of the laminated pad of FIG. **3**;

FIG. **5** is a schematic illustration of the first step of a first method of manufacturing the laminated pad according to the invention;

FIG. **6** is a front elevational view of a portion of a zone forming gravure cylinder for use in the first method of manufacturing a laminated pad according to the invention;

FIG. **7** is a partial sectional view of the adhesive coating zone, the zone forming gravure cylinder and doctor blade for use in the first method of manufacturing a laminated pad according to the invention;

FIG. **8** is a partial sectional view of the zone forming gravure cylinder and doctor blade showing the no-coating zone for use in the first method of manufacturing a laminated pad according to the invention;

FIG. **9** is a close-up perspective view of the detents of the adhesive coating zone of the first embodiment of the gravure cylinder for use according to the invention;

FIG. **10** is a close-up perspective view of the adhesive coating zone of a second embodiment of the detents of the gravure cylinder for use according to the invention;

FIG. **11** is a front elevational view of a portion of the full gravure cylinder for use according to the invention;

FIG. **12** is a schematic illustration of a portion of a second method of manufacturing the laminated pad according to the invention;

FIG. **13** is an exploded elevational view of the three sheets of material used to produce the laminated pad showing the adhesive coatings thereon;

FIG. **14** is a top elevational view of the laminated sheet of material prior to cutting of the individual pads according to the invention showing the outline of the pads cut from the sheet in phantom lines and the alternating zones of adhesive;

FIG. **15** is a schematic illustration of a third embodiment of a method for manufacturing a laminated pad according to the invention;

FIG. **16** is a front elevational view of a zone forming cylinder for use in the third method of manufacturing the laminated pad as seen in FIG. **15**;

FIG. **17** is a front elevational view of an adhesive coating cylinder for use in the third method of manufacturing the laminated pad as seen in FIG. **15**;

FIG. **18** is a schematic illustration of a fourth embodiment of a method for manufacturing the pad according to the invention;

FIG. **19** is a schematic illustration of a fifth method of manufacturing the laminated pad according to the invention;

FIG. **20** is a side elevational view of an array of laminated pads produced according to the sixth embodiment of the method of manufacturing as seen in FIG. **19**;

FIG. **21** is a top elevational view of the laminated sheet of material prior to cutting of the individual pads according to the invention showing the outline of the pads cut from the sheet in phantom lines and the alternating zones of adhesive;

FIG. **22** is a schematic illustration of a sixth embodiment of a method for manufacturing a laminated pad according to the invention.

FIG. **23** is a schematic illustration of a seventh embodiment of a method for manufacturing a laminated pad according to the invention.

DETAILED DESCRIPTION OF A PREFERRED EMBODIMENT

Referring to the drawings, and to FIGS. **1** and **2** in particular, a first embodiment **12** of a laminated pad produced according to the invention is illustrated. The pad **12** comprises a base pad **14**, an intermediate layer or impervious shield **16** mounted to the base pad **14** and a handle forming layer **18** mounted to the impervious shield **16**. The base pad **14** has an application surface **20** and an upper mounting surface **22** opposite the application surface **20**. Similarly, the impervious shield **16** has a lower mounting surface **24** and an upper mounting surface **26**. The lower mounting surface **24** of the impervious shield **16** is bonded to the upper mounting surface **22** of the base pad **14**.

The handle forming layer **18** comprises an upper surface **32** and a lower surface **34**. A portion of the lower surface **34** of the handle forming layer **18** is mounted to the upper mounting surface **26** of the impervious shield **16** to create a mounted portion **28** and a handle portion **30** pivotally mounted to the mounted portion **28** of the handle forming layer **18**. Preferably, a score line **36** is formed on the upper surface **32** of the handle forming layer **18** along the junction between the handle portion **30** and the mounted portion **28**. The score line **36** allows the handle portion **30** to freely pivot or rotate about the score line **36** relative to the mounting portion **28**.

In the preferred embodiment, the pad **12** comprises a pair of opposed parallel edges **38**, **40**, and a pair of opposed arcuate edges **42**, **44**. In addition, the base pad **14**, impervious shield **16** and handle forming layer **18** are coextensive with one another when the handle portion **30** of the second sheet is folded down, parallel to the base pad **14**.

The shield **16** is preferably formed of a pliable material which is impervious to fluids and solids to which the base pad **14** is exposed. Therefore, as the user grasps the handle portion **30** with his fingers, his fingers will be protected from the fluid or solid material by the impervious shield **16**. An example of a suitable material for the impervious shield is Kimdura™ manufactured by Kimberly-Clark of Roswell, Ga.

The impervious shield **16** and handle forming layer **18** can be made of the same material, such as a suitable impervious non-reactant material. The material is preferably flexible and has structural integrity such that it can be easily handled and yet support the base pad **14**. The shield **16** and handle forming layer **18** preferably have a thickness of approximately 2.5 mils. Other suitable materials for the impervious shield **16** and handle **18** include a plastic film or paper coated or impregnated with a plastic such as polyethylene or polypropylene, and the like.

The base pad **14** can be formed of a variety of absorbent or abrasive materials depending on the particular application for the pad **12**. For example, the pad can be made of a non-woven synthetic material, e.g. polyester, entangled cotton, woven fabric, dermabrasive, sanding materials, foam and the like. Preferably, the base pad is made of a non-woven material that is soft, pliable, and reversibly absorbent, that is, a dry pad is able to absorb liquid and a wet pad can be used to apply the solution to a surface. A lintless pad is suitable for most applications. Preferably, the base pad is approximately ⅛ inch in thickness.

Suitable mounting of the shield **16** to the base pad **14** and the shield **16** to the handle forming layer **18** can be accomplished by mechanical bonding between the materials through the use of adhesives or a co-extrusion process.

A conventional adhesive can be used to bind the several layers together provided that the adhesive has sufficient strength to bond the various laminated layers and which is substantially nonactive with the laminated materials. In addition, the adhesive should be resistant to the expected substances to which the laminated pad will be exposed during use. As described below, the adhesive can be mounted to the several laminated layers by a wet bonding, a dry bonding or a hot melt process.

FIGS. **3** and **4** illustrate a second embodiment of the laminated pad **52** comprising the base pad **14**, the impervious shield **16** and the handle forming layer **18** mounted thereto. The handle forming layer **18** has a mounted portion **62** and a handle portion **64**. In this embodiment, the pad **52** has two parallel edges **54**, **56**, a concave arcuate edge **58** and a convex arcuate edge **60**. The concave and convex edges **58**, **60** can be utilized to enhance the cleaning or wiping performance of be pad on contoured surfaces.

FIG. **5** is a schematic view of a portion of the first embodiment of the method for manufacturing the laminated pad **12** according to the invention and, more specifically, the method for adhering a sheet of handle material to a sheet of impervious shield material. A sheet of shield forming material **70** is supplied on a roll **72**. The shield material sheet **70** is discharged from the roll **72** and passes between a zone forming gravure cylinder **74** and a rubber impression cylinder **76**. The zone forming gravure cylinder **74** is in contact with a reservoir of liquid adhesive **78**. As the gravure cylinder **74** rotates in the counterclockwise direction as seen in FIG. **5**, adhesive adheres to the outer surface of the cylinder **74** and is ultimately applied to one side of the shield forming sheet **70** as it passes between the gravure cylinder **74** and the rubber impression cylinder **76**. A doctor blade **80** is mounted between the liquid adhesive reservoir **73** and the junction between the zone forming gravure cylinder **74** and the rubber impression cylinder **76**. The doctor blade **80** is mounted closely adjacent to or engages the zone forming gravure cylinder **74** to remove excess adhesive from the outer surface of the cylinder **74** to control the amount of adhesive applied to the sheet of shield forming material **70**. Next, the shield forming material **70** engages a guide roller **82** and enters a drying tunnel **84** where heat is applied to the adhesive coated sheet **70**. The sheet exits the drying tunnel **84** and engages yet another guide roller **86**.

A sheet of handle forming material **88** is supplied on a roll **90** and engages the adhesive coated side of the shield forming sheet **70** between a pair of opposed nip rollers **92** and **94**. The nip rollers **92**, **94** apply a controlled amount of pressure to the shield forming sheet **70** and handle forming sheet **88** as the sheets pass between the two rollers **92**, **94**. The pressure applied by the rollers **92**, **94** and the adhesive on the shield forming sheet **70** binds the two sheets together to create a laminated sheet **96**. The laminated sheet **96** is stored on a roll **98** for further processing.

The adhesive can be applied by a wet bonding or dry bonding process. In the wet bonding process, the two sheets are combined while the adhesive is still wet. The adhesives are typically water-based proteins, starches, silicates, rubber lattices and resin emulsions. The wet bonding process is typically limited to applications in which one of the materials being laminated is porous enough to allow the adhesive solvent to escape. A dry bonding process is typically used with two non-porous materials. In this procedure, the adhesive is applied to one of the materials and the solvent is evaporated in the drying tunnel leaving behind the adhesive. The dry bonding process is typically used in laminating two non-porous materials such as the handle forming sheet **88** and the shield forming sheet **70**.

As seen in FIG. **6**, the zone forming gravure cylinder **74** comprises a support axle **100** and a tubular shaped body **102**, which is divided into a plurality of smooth zones **104** and a plurality of gravure zones **106**. The smooth zones **104** have a smooth outer surface with a diameter equal to the largest diameter of the tubular body **102**. As seen in FIG. **9**, the gravure zones **106** comprise an interlocking web of depressions or recesses **108** with smooth ribs no separating each of the recesses **108**. The diameter of the rib portions **110** of the gravure zone **106** is substantially equal to the diameter of the smooth zones **104**. However, the diameter of the recesses **108** of the gravure zone **106** is less than the diameter of the smooth zones **104** or ribs **110**.

As seen in FIGS. **5**, **7** and **8**, the zone forming gravure cylinder **74** engages liquid adhesive **79** in the reservoir **78** and the adhesive **79** adheres to substantially the entire surface of the tubular body **102**. As the cylinder **74** rotates, the adhesive encounters the doctor blade **80** which engages or is mounted closely adjacent to the outside surface of the tubular body **102**. The doctor blade essentially scrapes or removes excess adhesive from the outer surface of the tubular body **102** of the cylinder **74**. Preferably, the doctor blade **80** is adjusted to remove all adhesive from the smooth zones **104** and the ribs no of the gravure zones **106** while leaving adhesive within the recesses **108** of the gravure zones **106**.

As the zone forming gravure cylinder **74** continues to rotate, the scraped surface of the tubular body **102** of the cylinder **74** engages one surface of the shield forming sheet **70**. The adhesive contained within each of the several recesses **108** is transferred from the gravure zones **106** of the zone forming gravure cylinder **74** to one side of the shield forming sheet **70**. In light of the removal of excess adhesive from the gravure zones **106**, a bead-like pattern of adhesive will be applied to the shield forming sheet **70**. In light of the alternating sequence of gravure zones **106** and smooth zones **104** along the length of the cylinder **74**, a series of strips of adhesive material arm applied to the shield forming sheet **70**. When the shield forming sheet **70** engages the handle forming sheet **88**, only portions of the sheets corresponding to the strips of adhesive will be bonded to one another.

As seen in FIG. **9**, a first embodiment of the recess **108** is a truncated inverted pyramid. An alternative embodiment of the grave recesses **109**, as seen in FIG. **10**, comprises an inverted pyramid. The spacing between the gravure recesses and the relative depth of each of the recesses will determine the amount of adhesive which is applied to the sheet of material according to the process described above. The recesses are formed in the cylinder by a conventional mechanical incising, chemical etching or laser etching process.

White the embodiment described above provides for application of the adhesive to the top surface of the shield forming sheet, it is to be understood that the same process could be used to apply adhesive to the attachment surface of the handle forming sheet **88**.

The laminated shield forming sheet **70** and handle forming sheet **88** can be mounted to the base forming material according to the same process as seen in FIG. **5**. Namely, a roll of one of the base forming material or laminated sheet **96** engages an adhesive coated gravure cylinder, passes through a drying tunnel, and then is rolled into contact with the other of the base forming material or laminated sheet **96**. However, in this step, a full gravure cylinder is used to apply adhesive to one of the base forming material or the laminated sheet **96**.

As seen in FIG. **11**, the full gravure cylinder **114** used to apply adhesive to one of the base forming material sheet or shield forming sheet comprises an axle **116**, a tubular shaped body **118** having gravure recesses **108** formed on substantially the entire surface of the tubular shaped body **118**. The gravure recesses **108** of the second gravure cylinder **114** are identical to the embodiments shown in FIGS. **9** and **10**. As described above, the depth and spacing of the gravure recesses controls the amount of adhesive applied to the sheet. Preferably, a second doctor blade (not shown) is used to remove excessive adhesive from the cylinder **114** after the cylinder engages an adhesive reservoir.

FIG. **12** shows a second method for manufacturing a laminated sheet from which the laminated pads **12**, according to the invention, are cut. In this embodiment, a sheet of handle forming material **88** is discharged from the roll **90** and engages the zone forming gravure cylinder **74** and rubber impression cylinder **76**. The adhesive **79** is supplied to the zone forming gravure cylinder **74** from the reservoir **78** and the excess adhesive is removed by the doctor blade **80**. The adhesive coated sheet engages a guide roller **87** and passes through the drying tunnel **84** where it is subjected to heat. After exiting the drying tunnel **84**, the adhesive coated sheet engages a guide roller **89**.

The sheet of shield forming material **70** is supplied from a roll **72** and passes between the full gravure cylinder **114** and a rubber impression cylinder **120**. The full gravure cylinder **114** applies adhesive to substantially the entire surface of one side of the shield forming material **70**. The adhesive **122** is supplied to the full gravure cylinder from the reservoir **123** and the excess adhesive is removed by the doctor blade **124**. Next, the sheet engages a guide roller **82** and enters the drying tunnel **84**. The shield forming sheet **70** exits the drying tunnel and engages guide rollers **86**. A sheet of base forming material **128** is supplied on a roll **126** and the shield forming sheet **70**, handle forming sheet **88**, and base material sheet in pass between the rubber roller **92** and master heated nip roller **94** to create the laminated sheet **130** which is stored on a roll **132** for future processing. Alternatively, the laminated sheet **130** can be transferred directly to a slitter **174** (FIG. **15**) and then a die cutter **165** (FIG. **15**) for slitting and cutting of the sheet into individual pads **12**.

The second method for manufacturing the laminated sheet according to the invention can be modified by applying the adhesive from the full gravure cylinder **114** to the attachment surface of the base forming sheet **128** and by applying the zones of adhesive to the upper attachment surface of the shield forming sheet **70**.

As seen in FIG. **13**, the laminated sheet **130** comprises the shield forming sheet **70** having adhesive **138** across substantially the entire surface, the handle forming sheet **88** having longitudinal strips of adhesive **134** separated by longitudinal strips of uncoated material **13** and the base forming sheet **128**. The particular orientation and spacing of the strips of adhesive **134** and strips of uncoated material **136** becomes important when the laminated sheet is cut into the individual pads as seen in FIG. **14**. This figure shows the outline of several pads **12** in phantom lines which are to be stamped from the laminated sheet **130** by a conventional die cutting operation. The strips of adhesive **134** and strips of uncoated material **136** are coordinated with the die cutting press to create the handle portion **30** and mounted portion **28** of each pad **12**. Preferably, the strips of adhesive **134** are aligned such that two mounting portions **28** for two adjacent pads **12** are created from each strip of adhesive **134**. In addition, each strip of uncoated material **136** is cut to create the handle portion **30** for two adjacent pads **12**. Therefore, the strips of adhesive **134** and strips of uncoated material **136** are coordinated with the dies to create the handle portion and mounted portion of the handle forming sheet **88**. After the laminated sheet **130** has been cut into individual pads, the pads can be packaged and in some cases sterilized for use by the end user.

The particular structure of the strips of adhesive **134** and strips of uncoated material **136** provide a significant advantage for the manufacturing method. Namely, if the sheet is slightly out of alignment with the cutting dies, then it is only the relative sizes of the handle portion or mounted portion of the adjacent pads which are affected. The pads will still be adequate for most purposes.

Alternatively, the strips of adhesive **134** can be equal to the width of the mounted portion **28** of a single pad **12**. In addition, the width of the uncoated portion **136** can be equal to the width of the handle portion **30** of a single pad **12**. This configuration is depicted in FIG. **21**. The pads **12** which are cut from the laminated sheet **130** are shown in phantom lines. FIG. **21** also depicts a third embodiment of the pads **142** in which the pads **142** are round and the outside perimeter of the base pad **14**, impervious shield **16** and handle forming sheet **18** are co-extensive.

FIGS. **5–17** show a third embodiment of the method for producing a laminated pad **12** according to the invention. In this embodiment, the sheet of handle forming material **88** is supplied from a roll **90** and passes between a rubber impression cylinder **76** and a zone forming cylinder **150**. The zone forming cylinder **10** picks up adhesive from the reservoir **152** and applies it to one side of the handle forming sheet **88**.

The sheet of shield forming material **70** is supplied on roll **72** and passes between a rubber impression cylinder **154** and a full coating cylinder **156**. The full coating cylinder **156** receives adhesive from a reservoir **158** and applies it to one side of the shield forming sheet **70**.

The base forming sheet **128** is supplied on a roll **126**. The base material **128**, handle forming material **88** and shield forming material **70** pass simultaneously through a pair of opposed nip rollers **162**, **164**. The rollers **162**, **164** apply pressure to the three sheets to create the laminated sheet **130**. Next, the laminated sheet **130** is slit to an appropriate width for the die cutter **165**. The slitter **174** comprises a support roller **175** and a circular slitting blade **176**. Finally, the laminated sheet **130** passes to the die cutter **165** comprising a reciprocating cutter **167** and a mandrel **169** which cuts the individual pads from the laminated sheet **130**.

As seen in FIG. **16**, the zone forming cylinder **150** of the third embodiment comprises an axle **166** and a plurality of adhesive coating sections **168**. The adhesive coating sec-

tions **168** are spaced from one another and have a width which results in the creation of a laminated sheet with a plurality of strips of adhesive **134** and strips of uncoated material **136** as seen in FIGS. **13** and **14**.

The full coating cylinder **156** of the third embodiment, as seen in FIG. **17** applies adhesive to substantially the entire surface of the sheet of shield forming material **70**. The full coating cylinder **156** comprises an axle **170** and a tubular shaped body **172**.

A fourth embodiment of the method for manufacturing a laminated pad according to the invention is seen in FIG. **18**. This method is identical to the third embodiment depicted in FIG. **15** except for the adhesive which is used to create the laminated sheet **130**. In this embodiment, a wet bonding adhesive is used which does not require a drying tunnel. The shield forming sheet **70** has a full coating of adhesive applied thereto and the handle forming sheet **88** has adhesive applied in zones as described above. The shield forming sheet **70**, handle forming sheet **88** and base material sheet **128** are rolled together to create the laminated sheet **130**. The sheet can be transferred to a roll **132**, transferred to a slitter **174** (FIG. **15**) or transferred directly to the die cutter **165** (FIG. **15**) for cutting the laminated sheet into individual laminated pads **12**.

The fourth embodiment of the method for manufacturing a laminated pad according to the invention as seen in FIG. **18** can be modified to use pressure sensitive adhesive. For example, a full coating of adhesive can be applied to the shield forming sheet **70** and strips for zones of pressure sensitive adhesive can be applied to the handle forming sheet **88**. The shield forming sheet **70**, handle forming sheet **88** and base material sheet **128** are then rolled together to create the laminated sheet **130**. As described above, the laminated sheet **130** can then be silt, rolled and die cut to create the individual laminated pads.

A fifth embodiment of the method for manufacturing a laminated pad according to the invention is seen in FIG. **19**. In this embodiment, a first extruder **180** extrudes a member **182** which has an inverted T-shaped cross section and can be formed of a thin flexible plastic material having a thickness of approximately 2.5 millimeters. An adjacent second extruder **184** or dispenser provides a continuous elongated member **186** of a suitable base pad material. The extruded members **182**, **186** are fed through a pair of opposed rollers **188**, **190** that are rotated in the dictions indicated by their respective arrows. The rollers **188**, **190** bring the two members **182**, **186** together at the meeting surfaces and bond them into a combined, unitary structure. This unitary structure proceeds forward toward a conventional die cutting apparatus **192**. The die cutter **192** comprises a back-up mandrel **194** which is disposed below a reciprocating cutter **196** powered by a suitable hydraulic or air cylinder **198**.

The upper roller **188** biases a central leg **200** of the T-shaped member **182** downward in a planar position parallel to the shield member **202** and the cutter **196** simultaneously cuts the members **182**, **186**. As the cuter **196** is removed, the centre leg or handle **200** will pop up to its upstanding position. The cutter **196** can be designed to cut the laminate into individual pads **12** or as illustrated in FIG. **20** can be aligned to only partially cut the array **204** of pads. In this case, the adjacent pads **12** are joined to one another by a web **206**. The array of pads can be rolled into a roll or the like and dispensed by tearing off individual laminated pads from the array **204**. In an embodiment that is not illustrated, the array **204** can have a number of rows and columns of laminated pads **12**. Alternatively, a number of arrays **204** can be stacked and boxed in a nest-like fashion. A laminated pad is selected for use and the web **206** is torn, separating the selected pad **12** from the array **204**. In an alternative embodiment that is not illustrated, the web **206** is formed from the shield or handle.

FIG. **22** depicts a sixth embodiment for manufacturing a laminated pad according to the invention. In this embodiment, the laminated sheet **130** is created by a hot melt adhesive bonding process. A sheet of shield forming material **70** is supplied on a roll **72** and the sheet **70** engages a plurality of guide rollers **212**. Next, the sheet **70** engages a pre-heating roller **214** which heats the sheet **70**. The sheet **70** then passes between a slot coater **216** and an opposed nip roller **218**. The slot coater **216** applies hot adhesive to one side of the sheet **70**. The adhesive is applied in longitudinal strips as depicted in FIGS. **13**, **14** and **21**. The coated sheet **70** then engages a chill drum **220** which cools both the sheet and the hot adhesive mounted thereto.

A sheet of handle forming material **88** is supplied from a roll **90**. The sheet **88** engages several guide rollers **212** and is mounted to the adhesive-coated surface of the shield-forming sheet **70** by passing between a nip roller **222** and the chill drum **220** resulting in the creation of the laminated sheet **96**. The laminated sheet **96** engages several guide rollers **212** and ultimately wound on a roll **98** for further processing. This same process can be used to mount the base-forming sheet **128** to the laminated sheet **96** by using a full coating gravure cylinder which applies adhesive along the full width of the base-forming sheet **128**.

FIG. **23** shows a seventh embodiment of the method for manufacturing a laminated pad according to the invention. In this embodiment, the laminated sheet **130** is formed solely from a sheet of handle forming material **70** and abase pad sheet **128** wherein only a portion of the handle forming sheet is adhered to the base pad sheet through the selective application of longitudinal strips as depicted in FIG. **14**. In this embodiment, the gravure roller **74** applies strips of adhesive to the attachment surface of the sheet of handle forming material **70** in the same manner as described above with respect to FIG. **5**. Ultimately, the strips of adhesive on the sheet of handle forming material **70** are brought into contact with the attachment surface of the sheet of base pad material **128** by passing through rollers **92**, **94**. The resulting structure is a laminated web **130** which can be cut into individual pads as described above. However, these pads will comprise only a base pad and a handle. The only difference between this embodiment and the earlier embodiments is that the shield of impervious material has been deleted from this embodiment of the laminated pad.

While the embodiment described shove provides for application of the adhesive to the attachment surface of the sheet of handle forming material, it is to be understood that base pad material.

The laminated pad produced according to the invention can be used for the application of various materials such as liquids, pastes, powders, and the like to various surfaces and may be utilized for the removal of such materials. In addition, the laminated pad can be impregnated with a material to be applied. The laminated pad has unlimited uses in the medical field such as an absorbent applicator pad or wipe and in the cosmetic field for removing nail polish by the application of acetone and other solvents. The pad may also be used for the application and/or removal of facial and other skin cleansers, moisturizers, make-up, and tanning cream. The pad can also be used in the medical field for the application of various medications, applying cleaning solu-

tions to a patient or absorbing fluids from a patient. The pad can be packaged and sterilized for these medical uses.

The method of manufacturing the pad according to the invention allows for the mass production of pads at a relatively low cost. Because the pads are produced from a single laminated sheet having zones of adhesive, the pads can be easily die cut and packaged.

While we have illustrated and described our invention by means of specific embodiments, it is to be understood that numerous changes and modifications may be made therein without departing from the spirit and scope of the invention as defined in the appended claims.

We claim:

1. A method of manufacturing a plurality of multilayer pads comprising the steps of:

providing a web of base pad forming material having a longitudinal axis, an attachment surface, an application surface and a prescribed **[**base pad**]** width; providing a web of intermediate layer forming material having a longitudinal axis, an upper attachment surface and a lower attachment surface;

providing a web of handle forming material having a longitudinal axis, a lower attachment surface, an exposed upper surface and a width substantially equal to the **[**base pad**]** *prescribed* width *of the web of base pad forming material*;

mounting the attachment surface of the base pad forming material to the lower attachment surface of the intermediate layer forming material so that substantially the entire lower attachment surface of the intermediate layer forming material is mounted **[**m**]** *to* the upper attachment surface of the base *pad* forming material;

applying **[**a strip**]** *strips* of adhesive to a portion of one of the upper attachment surface of the intermediate layer forming material and the lower attachment surface of the handle forming material along a longitudinal axis of said one surface;

mounting the upper attachment surface of the intermediate layer forming material to the lower attachment surface of the handle forming material so that the upper attachment surface of the intermediate layer forming material is adhered to the lower attachment at surface of the handle forming *material* along said strips of adhesive; and

simultaneously cutting the base pad forming material, intermediate layer forming material and handle forming material to create at least two laterally adjacent multilayer pads having a base pad, an intermediate layer and a handle, the handle comprising a mounted portion and a pivotable portion**[**, wherein the mounted portion of the two pads are cut from the same strip of adhesive applied to said one of the handle forming material and the intermediate layer forming material**]**.

2. A method of manufacturing a plurality of multilayer pads according to claim **1** and further comprising the step of scoring the web of the handle forming material between the mounted portion and the pivotable portion.

3. A method of manufacturing a plurality multilayer pads according to claim **1** wherein the base pad material is mounted to the intermediate layer by adhesive.

4. A method of manufacturing a plurality of multilayer pads according to claim **1** and further comprising the steps of providing a zone cylinder for applying the strip of adhesive to said one of the intermediate layer forming material and the handle forming material and rolling said one material over the zone cylinder, the zone cylinder having an adhesive applying portion and a smooth portion wherein the adhesive applying portion conveys adhesive from the cylinder to said one material and the smooth portion does not convey adhesive to said one material.

5. A method of manufacturing a plurality of multilayer pads according to claim **4** wherein said adhesive applying portion of the zone cylinder comprises a plurality of recesses formed thereon, the recesses conveying adhesive from a source of adhesive to the one material.

6. A method of manufacturing a plurality of multilayer pads according to claim **5** and further comprising the step of applying multiple strips of adhesive to a portion of one of the upper attachment surface of the intermediate layer forming material and the lower attachment, surface of the handle forming material along a longitudinal axis of said one surface wherein the surface of the zone cylinder further comprises an alternating sequence along the length of the cylinder of adhesive applying plurality of recesses and smooth portions resulting in the creation of said strips of adhesive on said one material corresponding to the recesses and smooth portions.

[7. A method of manufacturing a plurality of multilayer pads comprising the steps of:

providing a sheet of base pad forming material having a prescribed width, an attachment surface and an application surface;

providing a sheet of handle forming material having a width substantially equal to the base pad width, a lower attachment surface and an exposed upper surface;

applying at least two strips of adhesive to at least one of the attachment surface of the base pad and the lower attachment surface of the sheet of handle forming material;

selectively mounting a portion of the attachment surface of the base pad forming material to the lower attachment surface of the handle forming material such that less than the entire attachment surface of the base pad forming material is mounted to the lower attachment surface of the handle forming material; and

cutting the laminated sheet into at least four individual pads aligned linearly in a direction substantially normal to the at least two strips of adhesive such that two laterally adjacent pads are cut from each strip of adhesive and the handle forming material of each pad comprises a mounted portion which is mounted to the base pad material and a pivotable portion which is not mounted to the base pad material.**]**

[8. A method of manufacturing a plurality of multilayer pads according to claim **7** wherein said at least two strips of adhesive are applied to the lower attachment surface of the sheet of handle forming material and further comprising the steps of:

providing a sheet of an intermediate layer forming material having an upper attachment surface and a lower attachment surface;

mounting the attachment surface of the base pad sheet to the lower attachment surface of the intermediate layer sheet such that substantially the entire lower attachment surface of the intermediate layer sheet is mounted to the upper attachment surface of the base pad sheet;

selectively mounting a portion of the upper attachment surface of the intermediate layer sheet and the lower attachment surface of the handle forming sheet to the other of the upper attachment surface of the intermediate layer sheet and the lower attachment surface of the handle forming sheet creating a laminated sheet

such that less than the entire upper attachment surface of the intermediate layer forming sheet is mounted to the lower attachment surface of the handle forming sheet; and

cutting the laminated sheet into at least four individual pads aligned linearly in a direction substantially normal to the at least two strips of adhesive such that two laterally adjacent pads are cut from each strip of adhesive and the handle forming material of each pad comprises a mounted portion which is mounted to the intermediate layer and a pivotable portion which is not mounted to the intermediate layer.]

[**9**. A method of manufacturing a plurality of multilayer pads according to claim **8** and further comprising the step of scoring the handle forming sheet at the junction of the mounted portion and the pivotable portion.]

[**10**. A method of manufacturing a plurality of multilayer pads according to claim **8** wherein the at least two strips of adhesive are applied to one of the intermediate layer forming sheet and the handle forming sheet by rolling said one sheet over a zone cylinder adapted to apply adhesive to the one sheet in said at least two strips.]

[**11**. A method of manufacturing a plurality of multilayer pads according to claim **10** wherein at least a portion of the surface of the zone cylinder has a plurality of recesses formed thereon, the recesses being adapted to convey adhesive from a source of adhesive to the one sheet.]

[**12**. A method of manufacturing a plurality of multilayer pads according to claim **11** and further comprising the step of passing the handle forming sheet and the intermediate layer sheet between a pair of opposed rollers so that said strips of adhesive provided on said one sheet contacts the other of the attachment surface of the handle forming sheet and the upper attachment surface of the intermediate layer sheet as the sheets pass between the opposed rollers.]

[**13**. A method of manufacturing a plurality of multilayer pads according to claim **11** wherein the surface of the zone cylinder comprises an alternating sequence along the length of the cylinder of the portion of recesses and a smooth portion resulting in the creation of strips of adhesive coating on the laminated sheet corresponding to the portion of recesses and strips of uncoated portions on the laminated sheet corresponding to the smooth portions.]

[**14**. A method of manufacturing a plurality of multilayer pads according to claim **13** and further comprising the step of cutting the laminated sheet such that the pivotable portion of two adjacent pads are cut from the same strip of uncoated portions of the laminated sheet.]

[**15**. A method of manufacturing a plurality of multilayer to claim **11** wherein the base material sheet is mounted to the intermediate layer sheet by an adhesive coating which is applied to one of the attachment surface of the base material sheet and the lower attachment surface of the intermediate layer sheet by rolling said one sheet over a cylinder having a plurality of recesses formed on the surface of the cylinder, the recesses being adapted to receive adhesive from a source of adhesive and transfer the adhesive to the sheet upon contact with the sheet.]

[**16**. A method of manufacturing a plurality of multilayer pads according to claim **15** and further comprising the step of drying the adhesive by subjecting the adhesive to a source of heat.]

[**17**. A method of manufacturing a plurality of multilayer pads according to claim **15** and further comprising the step of passing the base pad sheet and the intermediate layer sheet between a pair of opposed rollers such that the adhesive coated surface of said one sheet contacts the other of the attachment surface of the base material sheet and the lower attachment surface of the intermediate layer sheet.]

[**18**. A method of manufacturing a plurality of multilayer pads according to claim **7** and further comprising the step of cutting the laminated sheet so that the laminated pad has at least one arcuate edge and at least one straight edge.]

19. A method of manufacturing a plurality of multilayer pads comprising the stems of:

providing a web of base pad forming material having a longitudinal axis, a width, an attachment surface and an application surface;

providing a web of intermediate layer forming material having a longitudinal axis, a width, an upper attachment surface and a lower attachment surface;

providing a web of handle forming material having a longitudinal axis, a width, a lower attachment surface and an exposed upper surface;

applying longitudinally continuous and laterally spaced strips of adhesive to portions of one of the upper attachment surface of the intermediate layer forming material and the lower attachment surface of the handle forming material along the longitudinal axis of the one surface;

mounting the attachment surface of the base pad forming material to the lower attachment surface of the intermediate layer forming material so that the lower attachment surface of the intermediate layer forming material is mounted to the upper attachment surface of the base pad forming material over the widths of the webs of base pad forming material and intermediate layer forming material, and mounting the upper attachment surface of the intermediate layer forming material to the lower attachment surface of the handle forming material so that the upper attachment surface of the intermediate layer forming material and the lower attachment surface of the handle forming material are adhered to each other along the laterally spaced strips of adhesive to produce a laminated sheet; and

cutting the laminated sheet to produce individual multilayer pads each having a base pad, an intermediate layer and a handle, the cutting being such that the handle of each multilayer pad has a mounted portion adhered to the intermediate layer where adhesive was applied and a pivotable portion.

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