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(54) Title: FLEXIBLE MAGNETIC SHEET SYSTEMS

(57) Abstract: Flexible magnetic sheets made with high-energy strontium ferrite, such as to decrease thickness with maintaining a strong magnetic energy (over one Megagause-Oersted) as well as flexibility.

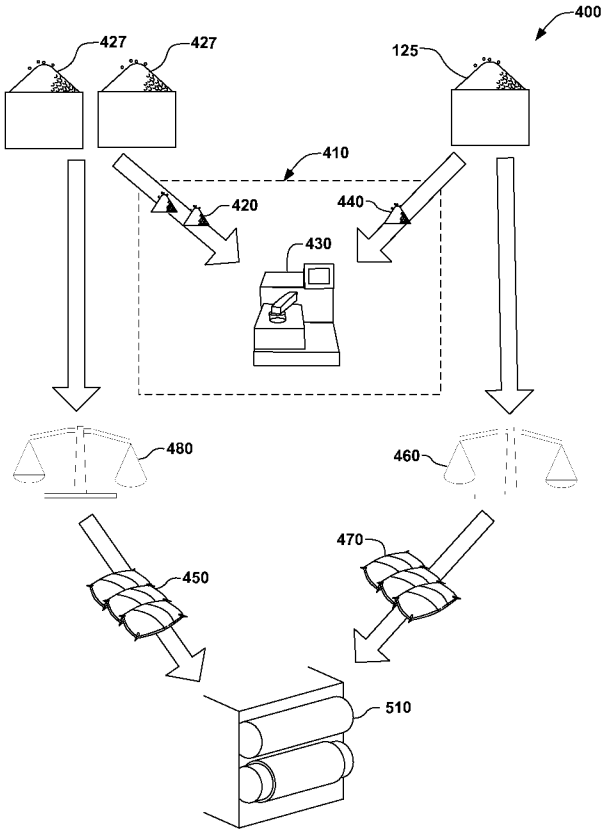

FIG. 4

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FLEXIBLE MAGNETIC SHEET SYSTEMS

BACKGROUND

This invention relates to providing a system for improved flexible magnetic sheets. More particularly, this invention relates to providing a system for making thin flexible magnetic sheets.

Typically, flexible magnetic sheets, if made thinner, lose a significant amount of their magnetic energy to the point where they may not even hold their own weight against a vertical magnetically-compatible surface. Additionally, if such thinner flexible magnetic sheets have increased magnetic particles to overcome the deficiency of magnetic energy, they become brittle and no longer function as “flexible”.

Thus, there is a need for improved providing of thin flexible sheets having higher potential for magnetic energy.

OBJECTS AND FEATURES OF THE INVENTION

A primary object and feature of the present invention is to provide a flexible magnetic sheet system overcoming the above-mentioned problems.

It is a further object and feature of the present invention to provide such a flexible magnetic sheet system making flexible magnetic sheets thinner than 15 mils.

It is yet a further object and feature of the present invention to provide such a flexible magnetic sheet system making flexible magnetic sheets with high-energy strontium ferrite.

A further primary object and feature of the present invention is to provide such a system that is efficient, inexpensive, and handy.

Other objects and features of this invention will become apparent with reference to the following descriptions.

SUMMARY OF THE INVENTION

In accordance with a preferred embodiment hereof, this invention provides a magnetizable-sheet laminate system comprising: at least one magnetizable laminate layer; at least one printable laminate layer; and at least one attacher laminate layer structured and arranged to attach such at least one magnetizable laminate layer with such at least one printable laminate layer; wherein such magnetizable-sheet laminate system comprises at least one laminate less than about 20 mil thick. Moreover, it provides such a magnetizable-sheet laminate system wherein such at least one magnetizable laminate layer comprises at least one thickness less than about 15 mils thick.

Additionally, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one matte finish. Also, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one high-gloss finish. In addition, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one gloss finish. And, it provides such a magnetizable-sheet laminate system wherein such at least

one printable laminate layer comprises at least one wipe-off finish.

Further, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises vinyl. Even further, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one matte finish. Moreover, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one high-gloss finish. Additionally, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one gloss finish. Also, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one wipe-off finish.

In addition, it provides such a magnetizable-sheet laminate system wherein such at least one laminate comprises at least one width of about two feet. And, it provides such a magnetizable-sheet laminate system wherein such at least one laminate comprises at least one roll. Further, it provides such a magnetizable-sheet laminate system wherein such at least one magnetizable laminate layer comprises strontium ferrite. Even further, it provides such a magnetizable-sheet laminate system wherein such at least one magnetizable laminate layer, by weight, comprises about 91% strontium ferrite.

Moreover, it provides such a magnetizable-sheet laminate system wherein such at least one magnetizable laminate layer comprises at least one binder material structured and arranged to bind together components of such at least one magnetizable laminate layer. Additionally, it provides such a magnetizable-sheet laminate system wherein such at least one binder material comprises: chlorosulfonated polyethylene rubber; polyisobutylene; and ethylene vinyl acetate. Also, it provides such a magnetizable-sheet laminate system wherein such at least one binder material, by weight of such at least one magnetizable laminate layer, comprises: about 3.6% chlorosulfonated polyethylene rubber; about 3 % polyisobutylene; and about 2.2% ethylene vinyl acetate.

In accordance with another preferred embodiment hereof, this invention provides a magnetizable-sheet system comprising: at least one homogenous sheet comprising at least one binder material structured and arranged to bind together components of such at least one homogenous sheet, and at least one plurality of magnetizable particles held by such at least one binder material, wherein such at least one plurality of magnetizable particles consist essentially of strontium ferrite, and wherein such at least one plurality of magnetizable particles when magnetized comprise a magnetic energy of greater than one Megagauss-Oersted. In addition, it provides such a magnetizable-sheet system wherein such at least one homogenous

sheet comprises at least one thickness less than about 15 mils thick.

And, it provides such a magnetizable-sheet system wherein such at least one binder material comprises: chlorosulfonated polyethylene rubber; polyisobutylene; and ethylene vinyl acetate. Further, it provides such a magnetizable-sheet system wherein such at least one binder material, by weight of such at least one homogeneous sheet, comprises: about 3.6% chlorosulfonated polyethylene rubber; about 3 % polyisobutylene; and about 2.2% ethylene vinyl acetate. Even further, it provides such a magnetizable-sheet system wherein such at least one homogeneous sheet, by weight, comprises about 91% strontium ferrite. Moreover, it provides such a magnetizable-sheet system wherein such at least one homogenous sheet comprises at least one width of about two feet. Additionally, it provides such a magnetizable-sheet system wherein such at least one homogenous sheet comprises at least one roll.

In accordance with another preferred embodiment hereof, this invention provides a magnetizable-sheet laminate system comprising: at least one magnetizable laminate layer comprising at least one binder material structured and arranged to bind together components of such at least one magnetizable laminate layer, at least one plurality of magnetizable particles held by such at least one binder material, wherein such at least one plurality of magnetizable particles consist essentially of strontium ferrite, and wherein such at least one plurality of

magnetizable particles when magnetized comprise a magnetic energy of greater than one Megagauss-Oersted; at least one printable laminate layer; and at least one attacher laminate layer structured and arranged to attach such at least one magnetizable laminate layer with such at least one printable laminate layer; wherein such magnetizable-sheet laminate system comprises at least one laminate less than about 20 mils thick. Also, it provides such a magnetizable-sheet laminate system wherein such at least one magnetizable laminate layer comprises at least one thickness less than about 15 mils thick.

In addition, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one matte finish. And, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one high-gloss finish. Further, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one gloss finish. Even further, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one wipe-off finish.

Moreover, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises vinyl. Additionally, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one matte finish. Also, it

provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one high-gloss finish. In addition, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one gloss finish. And, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one wipe-off finish.

Further, it provides such a magnetizable-sheet laminate system wherein such at least one laminate comprises at least one width of about two feet. Even further, it provides such a magnetizable-sheet laminate system wherein such at least one laminate comprises at least one roll. Moreover, it provides such a magnetizable-sheet laminate system wherein such at least one magnetizable laminate layer, by weight, comprises about 91% strontium ferrite.

Additionally, it provides such a magnetizable-sheet laminate system wherein such at least one binder material comprises: chlorosulfonated polyethylene rubber; polyisobutylene; and ethylene vinyl acetate. Also, it provides such a magnetizable-sheet laminate system wherein such at least one binder material, by weight of such at least one magnetizable laminate layer, comprises: about 3.6% chlorosulfonated polyethylene rubber; about 3 % polyisobutylene; and about 2.2% ethylene vinyl acetate. In addition, it provides such a magnetizable-sheet laminate system wherein such at least one

magnetizable laminate layer, by weight, comprises about 91% strontium ferrite.

And, it provides such a magnetizable-sheet laminate system wherein such at least one magnetizable laminate layer comprises at least one thickness less than about 15 mils thick. Further, it provides such a magnetizable-sheet laminate system wherein such at least one laminate comprises at least one width of about two feet. Even further, it provides such a magnetizable-sheet laminate system wherein such at least one laminate comprises at least one roll. Even further, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises vinyl.

Even further, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one matte finish. Even further, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one high-gloss finish. Even further, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one gloss finish. Even further, it provides such a magnetizable-sheet laminate system wherein such at least one printable laminate layer comprises at least one wipe-off finish.

In accordance with another preferred embodiment hereof, this invention provides a magnetizable-sheet laminate system comprising: magnetizable-layer means for providing at least one

magnetizable laminate layer; printable layer means for providing at least one printable layer; and attacher layer means for attaching such magnetizable-layer means with such printable layer means; wherein such magnetizable-sheet laminate system comprises at least one laminate less than about 20 mils thick. And, it provides for each and every novel feature, element, combination, step and/or method disclosed or suggested by this patent application.

BRIEF DESCRIPTION OF THE FIGURES

FIG. 1 shows a diagram, illustrating a preferred magnetic laminate system, according to a preferred embodiment of the present invention.

FIG. 2 shows a perspective view, illustrating at least one preferred roll of preferred magnetic laminate, according to the preferred embodiment of FIG. 1.

FIG. 3 shows an enlarged edge view of magnetic laminate, illustrating the preferred layers of the preferred magnetic laminate, according to the preferred embodiment of FIG. 1.

FIG. 4 shows a diagram, illustrating a preferred batching process, according to the preferred embodiment of FIG. 1.

FIG. 5 shows a diagrammatic front perspective view, illustrating a preferred mixing process using at least one mill, according to the preferred embodiment of FIG. 1.

FIG. 6 shows a side diagrammatic view, illustrating a preferred granulating process in at least one granulator, according to the preferred embodiment of FIG. 1.

FIG. 7 shows a diagrammatic perspective view, illustrating a preferred calendering process, according to the preferred embodiment of FIG. 1.

FIG. 8 shows a diagrammatic side view, illustrating a preferred flexible magnet laminating process, according to the preferred embodiment of FIG. 1.

DETAILED DESCRIPTION OF THE BEST MODES AND PREFERRED EMBODIMENTS OF THE INVENTION

FIG. 1 shows a diagram, illustrating a magnetic laminate system **100**, according to a preferred embodiment **101** of the present invention. In preferred embodiment **101** of magnetic laminate system **100** preferably comprises manufacturing and preferably printing of at least one magnetic laminate **105**, as shown in FIG. 2 and FIG. 3. Manufacture process **110** (see FIGS. 2-8) of magnetic laminate **105** requires strontium ferrite powder **125** and at least one binder **127**, as shown. Magnetic laminate **105** is preferably manufactured non-magnetized. At least one magnetization process **130** preferably occurs to magnetize magnetic laminate **105** after manufacture, as shown.

Some printing processes **140**, usually due to hardware limitations, are inhibited in the presence of a magnetic field. When magnetic laminate **105** is printed by printing processes **140**, preferably, non-magnetized magnetic laminate **113**, comprising magnetic laminate **105** that is not magnetized, is used and magnetization process **130** occurs after printing processes **140**, as shown. Magnet-friendly printing processes **150**, however, are

preferably capable of accepting magnetized magnetic laminate **115**, comprising magnetic laminate **105** that is magnetized, and, therefore, magnetization process **130** may preferably occur before magnet-friendly printing processes **150**, as shown.

As shown, cutting of magnetic laminate **105** in preprinting cutting process **160** preferably sizes magnetic laminate **105** to accommodate printing processes **140** and magnet-friendly printing processes **150**, preferably with acceptable media sizes. Such acceptable media sizes may preferably include letter, legal, A4, 25-foot roll, etc. Post-printing cutting processes **170** preferably cut magnetic laminate **105** into at least one final size of at least one finished magnetic laminate product **175**, as shown. Finished magnetic laminate product **175** preferably comprises magnetic business cards, alternately preferably signs, alternately preferably banners, alternately preferably logos, alternately preferably accessories, alternately preferably figures, alternately preferably labels. Upon reading this specification, those with skill in the art will now appreciate that, under appropriate circumstances, considering such issues as future indicia displays, use of magnetically attractive surfaces, etc., other finished magnetic laminate products, such as, for example, vehicle wraps, appliance décor, advertising billboards, etc., may suffice.

FIG. 2 shows a perspective view, illustrating at least one roll **210** of magnetic laminate **105**, according to the preferred embodiment of FIG. 1. As shown, roll **210** preferably comprises

at least one length of magnetic laminate **105** preferably between about 25 feet and about 1800 feet. Width of roll **210** preferably comprises about 2 feet.

FIG. 3 shows an enlarged edge view of magnetic laminate **105**, illustrating the layers of magnetic laminate **105**, according to the preferred embodiment of FIG. 1. Magnetic laminate **105** preferably comprises at least one flexible magnet **310** and preferably at least one printable material **320**, as shown. Flexible magnet **310** and printable material **320** are preferably laminated together to form magnetic laminate **105**, preferably using at least one adhesive **305**, as shown. In order to pass through most printers, overall thickness of magnetic laminate **105** preferably comprises less than about 20 mils (about 0.020 inches), preferably less than about 15 mils (about 0.015 inches). Flexible magnet **310** preferably comprises a thickness of less than 15 mils (this arrangement at least embodying herein wherein such at least one homogenous sheet comprises at least one thickness less than about 15 mils thick; and this arrangement at least embodying herein wherein said at least one magnetizable laminate layer comprises at least one thickness less than about 15 mils thick).

Flexible magnet **310** preferably comprises at least one homogenous material **515**, as shown, preferably comprising at least one binder **127** and preferably at least one plurality of ferrous particles **350**. Ferrous particles **350** comprise preferably ferrite particles, preferably strontium ferrite

particles, preferably high-energy strontium ferrite particles ($SrFe_{12}O_{19}$). High-energy refers to the potential of a magnetizable material to exceed about one million Gauss-Oersted, commonly referred to as Megagauss Oersted ("MGOe"), in magnetic energy, once magnetized (this arrangement at least embodying herein wherein such at least one plurality of magnetizable particles when magnetized comprise a magnetic energy of greater than one Megagauss Oersted). Upon reading this specification, those skilled in the art will now appreciate that, under appropriate circumstances, considering such issues as cost, available materials, etc., other than ferrous particles exhibiting magnetic qualities, such as, for example, non-ferrous magnetic metals, non-ferrous magnetic metal alloys, non-ferrous magnetic compounds, etc., may suffice.

Ferrous particles **350** preferably comprise less than about 20 nanometers each in diameter. Ferrous particles **350** preferably comprise about 91%, by weight, of homogeneous material **515**.

Binder **127** comprises preferably Hypalon 45 (chlorosulfonated polyethylene rubber), preferably polyisobutylene ($-(CH_2-C_3H_6)n-$), and preferably ethylene vinyl acetate ($CH_3COOCH=CH_2$). By weight of homogeneous material **515**: Hypalon 45 preferably comprises about 3.6%; polyisobutylene preferably comprises about 3%; and ethylene vinyl acetate preferably comprises about 2.2%. Upon reading this specification, those skilled in the art will now appreciate

that, under appropriate circumstances, considering such issues as cost, future technology, etc., other binder materials, such as, for example, resins, other plastics, etc., may suffice.

When magnetized, flexible magnet **310** preferably comprises a magnetic energy of at least 1.0 MGOe (Megagauss Oersted), preferably about 1.7 MGOe. When magnetized, flexible magnet **310** preferably comprises through-width magnetization, alternately preferably through-thickness magnetization. Upon reading this specification, those skilled in the art will now appreciate that, under appropriate circumstances, considering such issues as, application, magnetization methods, cost, etc., other magnetizations, such as, for example, multi-pole magnetization, double-sided magnetization, match-pole magnetization, two poles on each face magnetization, etc., may suffice.

Printable material **320** preferably comprises plastic, preferably vinyl. Upon reading this specification, those skilled in the art will now appreciate that, under appropriate circumstances, considering such issues as application, cost, available materials, etc., other printable materials, such as for example, cloth, paper, other plastics, etc., may suffice.

Printable material **320** comprises preferably a matte finish, alternately preferably a gloss finish, alternately preferably a high-gloss finish, alternately preferably a wipe-off finish. For best printing quality, the finish is chosen to preferably compliment the printer in which magnetic laminate **105** is printed. Upon reading this specification, those skilled in the

art will now appreciate that, under appropriate circumstances, considering such issues as application, cost, available materials, etc., other finishes, such as for example, textured, patterned, antique, etc., may suffice.

FIG. 4 shows a diagram, illustrating a batching process **400**, according to the preferred embodiment of FIG. 1. Flexible magnet **310** preferably is a careful balance of flexibility and magnetic strength. To achieve flexibility, at least one binder component **427** is preferably bound with ferrous particles **350** to form flexible magnet **310**, as shown in FIG. 3. Flexible magnet **310** is preferably smooth, preferably flat, preferably flexible and preferably easily cut. To achieve this, each binder component **427** is preferably weighed for an optimal blend to make flexible magnet **310**. If the weight of each binder component **427** is not correct, it can cause the sheet to be brittle, magnetically weak, or hard to cut or process.

At the beginning of batching process **400**, preferably, at least one incoming quality inspection process **410** occurs, as shown. In incoming quality inspection process **410**, preferably, at least one sample **420** of each binder component **427** and, preferably, at least one sample **440** of strontium ferrite powder **125** are scanned through a Differential Scanning Calorimeter **430**, as shown, preferably to ensure that the molecular characteristics of the materials are consistent with established standards. The molecular characteristics from binder materials used in the past with a proven performance curve are preferably

used as a benchmark for the new incoming binder materials to meet or exceed. Additionally, sample **440** of strontium ferrite powder **125** is preferably checked for particle size, to assure proper magnetic characteristics, using Differential Scanning Calorimeter **430**, as shown.

After incoming quality inspection process **410**, binder components **427** preferably undergo a weighing and bagging process **480** preferably resulting in at least one bag of binder mix **450**, as shown. A plurality of bags of binder mix **450** is then preferably transported to at least one mill **510**, as shown, for mixing with strontium ferrite powder **125**.

Likewise, strontium ferrite powder **125** preferably undergoes a weighing and bagging process **460** resulting in at least one 50-pound bag **470**, as shown. A plurality of 50-pound bags **470** are then preferably transported to mill **510**, as shown.

FIG. 5 shows a diagrammatic front perspective view, illustrating mixing process **500** using mill **510**, according to the preferred embodiment of FIG. 1. Preferably, mill **510** mechanically mixes binder **127** and strontium ferrite powder **125** together into a homogeneous material **515**. Using pressure, friction and heat, mill **510** preferably creates a consistent blend throughout homogeneous material **515**.

Mixing process **500** preferably begins with loading binder mix **450** onto at least two cylindrical rolls **520** of mill **510**. Cylindrical rolls **520** preferably transfer heat to binder mix **450** through at least one roll face **550** and preferably through

pressure at the nip **525**, as shown, where such at least two cylindrical rolls are closest. The pressure and heat at nip **525** preferably cause binder mix **450** to break down and form binder **127** (at least embodying herein wherein such at least one magnetizable laminate layer comprises at least one binder material structured and arranged to bind together components of such at least one magnetizable laminate layer). Binder **127** preferably melts and preferably adheres to such at least one roll face **550** in a semi-smooth coating **555**, as shown.

At this point, binder **127** is preferably ready to receive ferrous particles **350**. Strontium ferrite powder **125**, preferably comprising ferrous particles **350** (at least embodying herein wherein such at least one plurality of magnetizable particles consist essentially of strontium ferrite), is preferably added to mill **510** and ferrous particles **350** (at least embodying herein at least one plurality of magnetizable particles held by such at least one binder material) preferably embed into binder **127** (at least embodying herein at least one binder material structured and arranged to bind together components of such at least one homogenous sheet). Mill **510** preferably mixes binder **127** and ferrous particles **350**, preferably forming homogeneous material **515**.

Once ferrous particles **350** are properly dispersed, homogeneous material **515** is preferably removed from mill **510** in small rolls of homogeneous material **515**, commonly known as pigs

530 in the art, which are preferably fed to at least one granulator **610**, as shown in FIG. 6.

FIG. 6 shows a side diagrammatic view, illustrating granulating process **600** in granulator **610**, according to the preferred embodiment of FIG. 1. Pigs **530** of homogeneous material **515**, coming from mill **510**, preferably are next granulated, as shown. Particle size is critical to maintaining smoothness in finished magnetic laminate product **175** and processability in calendering process **700**. At least one granulator **610** preferably cuts pigs **530** into granular particles **620** and preferably forces granular particles **620** through at least one sizing screen **630**, as shown. Granular particles **620** preferably are then ready for use in calendering process **700**.

FIG. 7 shows a diagrammatic perspective view, illustrating calendering process **700**, according to the preferred embodiment of FIG. 1. During calendering process **700**, homogeneous material **515** preferably becomes flexible magnet **310**, as shown. As shown, granular particles **620** are preferably forced through a calendering nip **725** of at least one calender **710** and preferably bound into a sheet with a predetermined thickness and width.

Granular particles **620** are preferably fed into calender **710** from granular particle bin **750**, as shown, preferably making sure the profile of flexible magnet **310** is consistent by evenly distributing granular particles **620** through calendering nip **725**. Any contaminants contained in granular particles are preferably removed before feeding into calendering nip **725**. At least one

quality-check preferably ensures the quality of flexible magnet **310** in terms of thickness, width, smoothness and cleanliness.

Flexible magnet **310** preferably comprises a smooth finish for optimal use in printing processes **140** and magnet-friendly printing processes **150**. Problems in quality may result in poor ink adhesion, poor ink coverage and voids where ink will not go down because of blisters, zits, or a generally grainy texture.

The profile of flexible magnet **310** is preferably flat. With inconsistencies in thickness, flexible magnet **310** will not lay flat when finished. Consistent thickness is preferably achieved by careful management of calendering nip **725**, the temperature of calender rolls **715** and the shape of calender rolls **715**. Calender rolls **715** preferably maintain an even temperature, preferably as well as a smooth circular-cylinder surface. Calendering nip **725** preferably maintains a consistent gap between calender rolls **715**.

The thickness of flexible magnet **310** is set and maintained preferably by managing calendering nip **725** between the calender rolls. While moving therethrough, flexible magnet **310** is preferably checked often to insure that the thickness is consistent, preferably both across the profile of flexible magnet **310** and throughout the length of the run.

The width of flexible magnet **310** is preferably controlled by at least one rotating cutter **730**, as shown, that is set up to preferably trim flexible magnet **310** to at least one precise width. As shown, at least one nylon rotary brush **740** is

preferably used to ensure that loose particles and other contaminants are preferably not wound up with flexible magnet **310** at the end of calendering process **700**.

During calendering process **700**, the magnetic characteristics, smoothness and thickness of flexible magnet **310** are preferably optimized and fixed and therefore cannot be modified later without destroying flexible magnet **310**.

FIG. 8 shows a diagrammatic side view, illustrating a preferred flexible magnet laminating process **800**, according to the preferred embodiment of FIG. 1.

At least one lamination process **880** preferably comprises at least one roll **810** of flexible magnet **310**, preferably at least one roll **805** of adhesive **305**, and preferably at least one roll **820** of printable material **320**, as shown.

Flexible magnet **310** is preferably fed into lamination process **800** where adhesive application roller **810** preferably applies adhesive **305** (at least embodying herein at least one attacher laminate layer structured and arranged to attach such at least one magnetizable laminate layer with such at least one printable laminate layer) to flexible magnet **310** (at least embodying herein at least one magnetizable laminate layer), as shown. Printable material **320** (at least embodying herein at least one printable laminate layer) preferably is then applied by at least one printable material application roller **830** onto adhesive **305**.

Adhesive **305** preferably is heated to activate adhesive qualities. After adhesive **305** cools and lamination is set, magnetic laminate **105** is preferably rolled up forming roll **210** (at least embodying herein wherein such at least one laminate comprises at least one roll), as shown.

Although applicant has described applicant's preferred embodiments of this invention, it will be understood that the broadest scope of this invention includes modifications such as diverse shapes, sizes, and materials. Such scope is limited only by the below claims as read in connection with the above specification. Further, many other advantages of applicant's invention will be apparent to those skilled in the art from the above descriptions and the below claims.

What is claimed is:

1) A magnetizable-sheet laminate system comprising:

   a) at least one magnetizable laminate layer;

   b) at least one printable laminate layer; and

   c) at least one attacher laminate layer structured and arranged to attach said at least one magnetizable laminate layer with said at least one printable laminate layer;

   d) wherein said magnetizable-sheet laminate system comprises at least one laminate less than about 20 mils thick.

2) The magnetizable-sheet laminate system according to Claim 1 wherein said at least one magnetizable laminate layer comprises at least one thickness less than about 15 mils thick.

3) The magnetizable-sheet laminate system according to Claim 1 wherein said at least one laminate comprises at least one width of about two feet.

4) The magnetizable-sheet laminate system according to Claim 1 wherein said at least one laminate comprises at least one roll.

5) The magnetizable-sheet laminate system according to Claim 1 wherein said at least one magnetizable laminate layer comprises strontium ferrite.

6) The magnetizable-sheet laminate system according to Claim 6 wherein said at least one magnetizable laminate layer, by weight, comprises about 91% strontium ferrite.

7) The magnetizable-sheet laminate system according to Claim 1 wherein said at least one magnetizable laminate layer comprises at least one binder material structured and arranged to bind together components of said at least one magnetizable laminate layer.

8) The magnetizable-sheet laminate system according to Claim 7 wherein said at least one binder material comprises:

a) chlorosulfonated polyethylene rubber;

b) polyisobutylene; and

c) ethylene vinyl acetate.

9) The magnetizable-sheet laminate system according to Claim 1 wherein said at least one printable laminate layer comprises vinyl.

10) The magnetizable-sheet laminate system according to Claim 1 wherein said at least one printable laminate layer comprises at least one matte finish.

11) The magnetizable-sheet laminate system according to Claim 1 wherein said at least one printable laminate layer comprises at least one high-gloss finish.

12) The magnetizable-sheet laminate system according to Claim 1 wherein said at least one printable laminate layer comprises at least one gloss finish.

13) The magnetizable-sheet laminate system according to Claim 1 wherein said at least one printable laminate layer comprises at least one wipe-off finish.

14) A magnetizable-sheet system comprising:

a) at least one homogenous sheet comprising

i) at least one binder material structured and arranged to bind together components of said at least one homogenous sheet, and

ii) at least one plurality of magnetizable particles held by said at least one binder material,

iii) wherein said at least one plurality of magnetizable particles consist essentially of strontium ferrite, and

iv) wherein said at least one plurality of magnetizable particles, when magnetized, comprise a magnetic energy of greater than about one Megagauss Oersted.

15) The magnetizable-sheet system according to Claim 14 wherein said at least one homogenous sheet comprises at least one thickness less than about 15 mils thick.

16) The magnetizable-sheet system according to Claim 14 wherein said at least one binder material comprises:

a) chlorosulfonated polyethylene rubber;

b) polyisobutylene; and

c) ethylene vinyl acetate.

17) The magnetizable-sheet system according to Claim 16 wherein said at least one binder material, by weight of said at least one homogeneous sheet, comprises:

a) about 3.6% chlorosulfonated polyethylene rubber;

b) about 3 % polyisobutylene; and

c) about 2.2% ethylene vinyl acetate.

18) The magnetizable-sheet system according to Claim 14 wherein said at least one homogeneous sheet, by weight, comprises about 91% strontium ferrite.

19) A magnetizable-sheet laminate system comprising:

a) at least one magnetizable laminate layer comprising

i) at least one binder material structured and arranged to bind together components of said at least one magnetizable laminate layer, and

ii) at least one plurality of magnetizable particles held by said at least one binder material,

iii) wherein said at least one plurality of magnetizable particles consist essentially of strontium ferrite, and

iv) wherein said at least one plurality of magnetizable particles, when magnetized, comprise a magnetic energy of greater than one Megagauss Oersted;

b) at least one printable laminate layer; and

c) at least one attacher laminate layer structured and arranged to attach said at least one magnetizable

laminate layer with said at least one printable laminate layer;

d) wherein said magnetizable-sheet laminate system comprises at least one laminate less than about 20 mils thick;

e) wherein said at least one magnetizable laminate layer comprises at least one thickness less than about 15 mils thick.

20) The magnetizable-sheet laminate system according to Claim 19 wherein said at least one magnetizable laminate layer, by weight, comprises:

a) about 3.6% chlorosulfonated polyethylene rubber;

b) about 3 % polyisobutylene;

c) about 2.2% ethylene vinyl acetate; and

d) about 91% strontium ferrite.

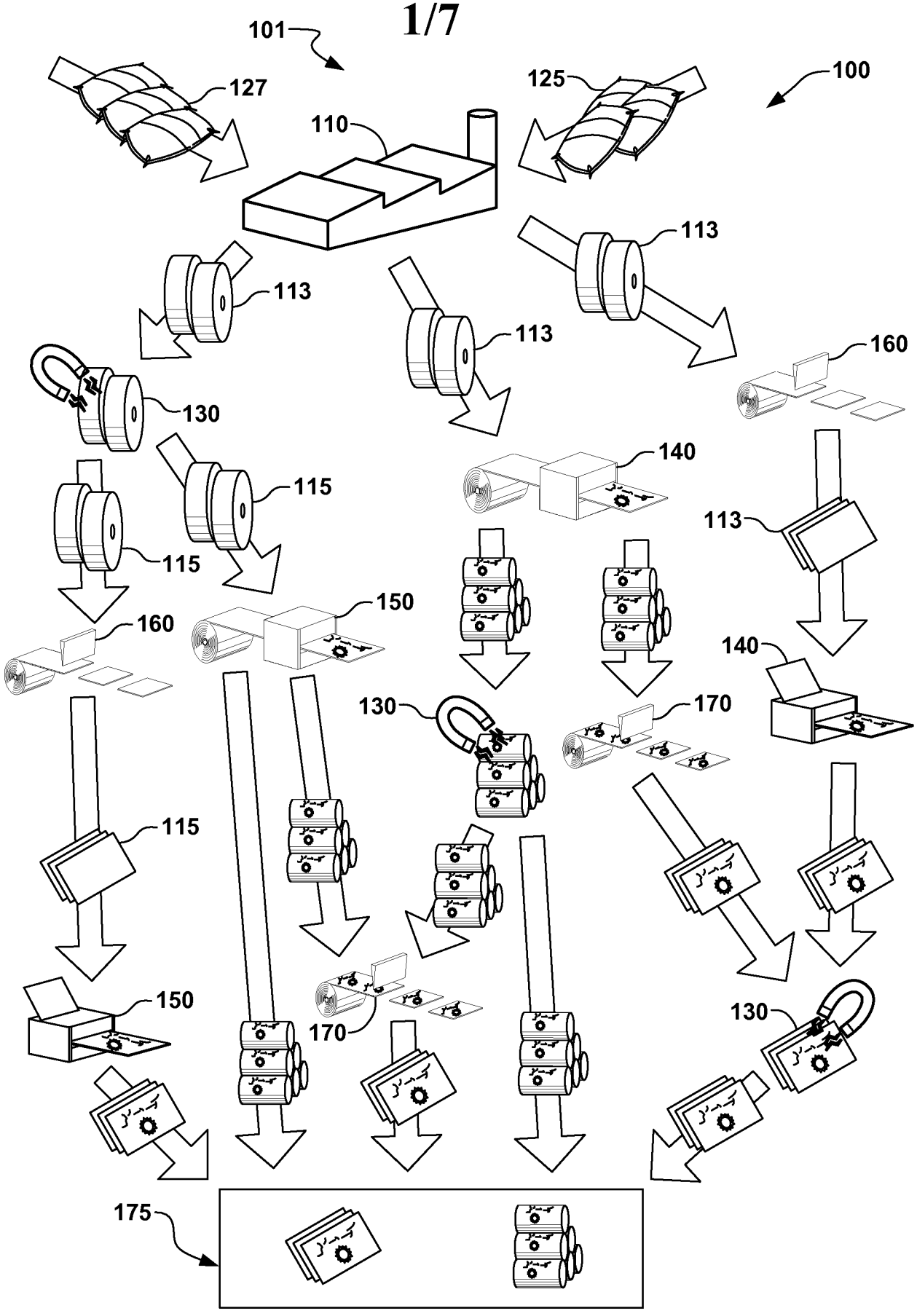
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FIG. 1

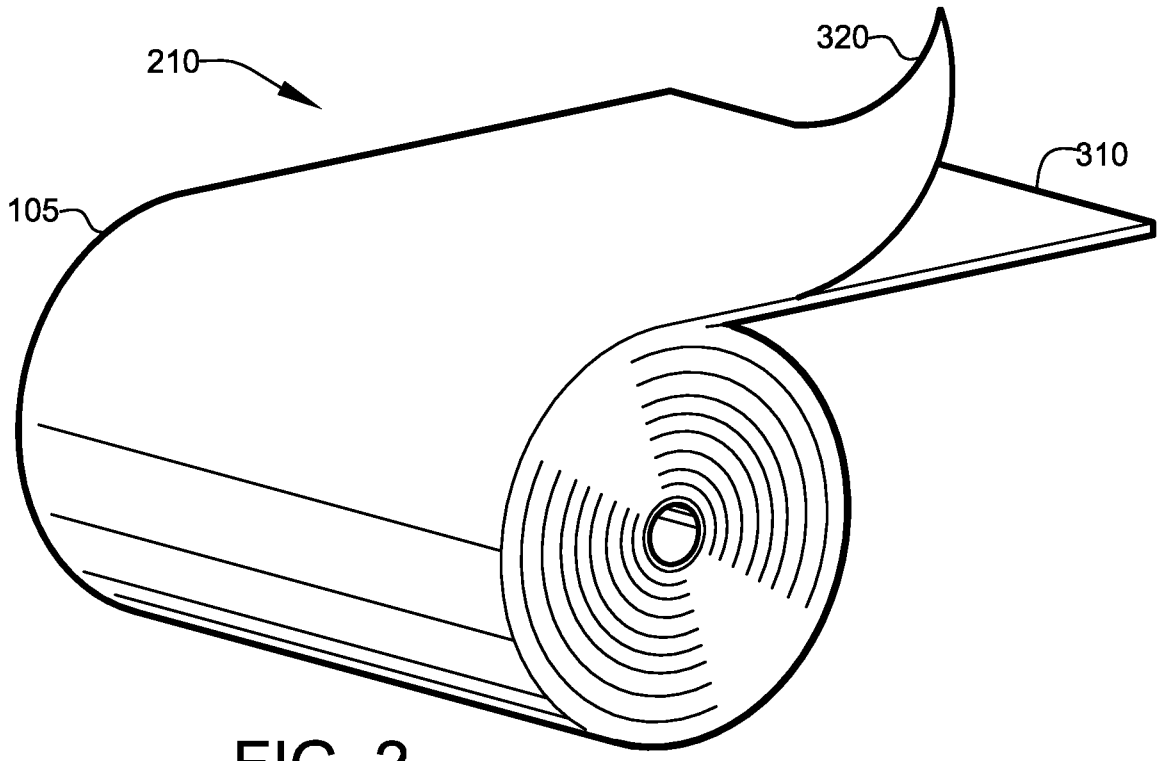

FIG. 2

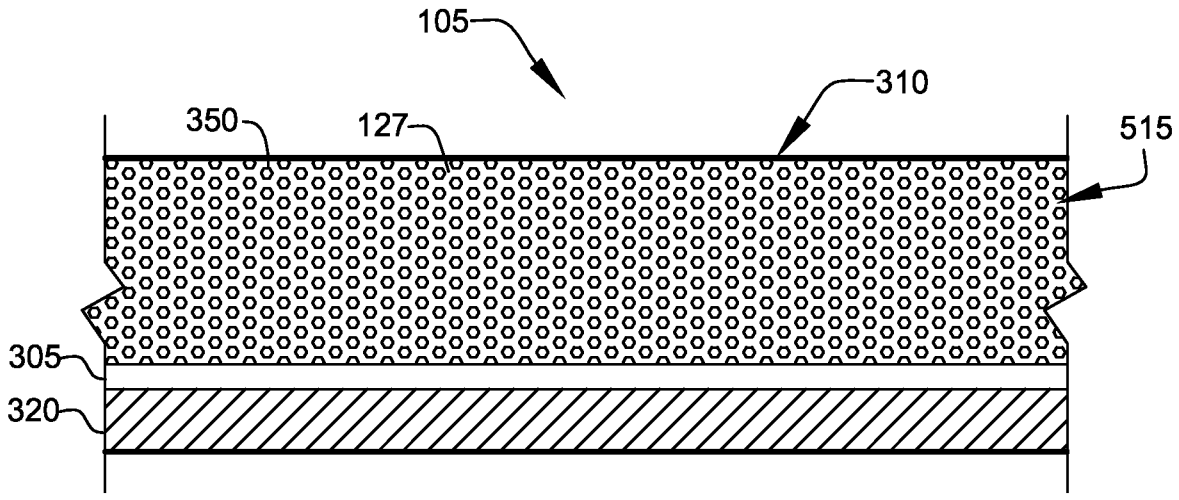

FIG. 3

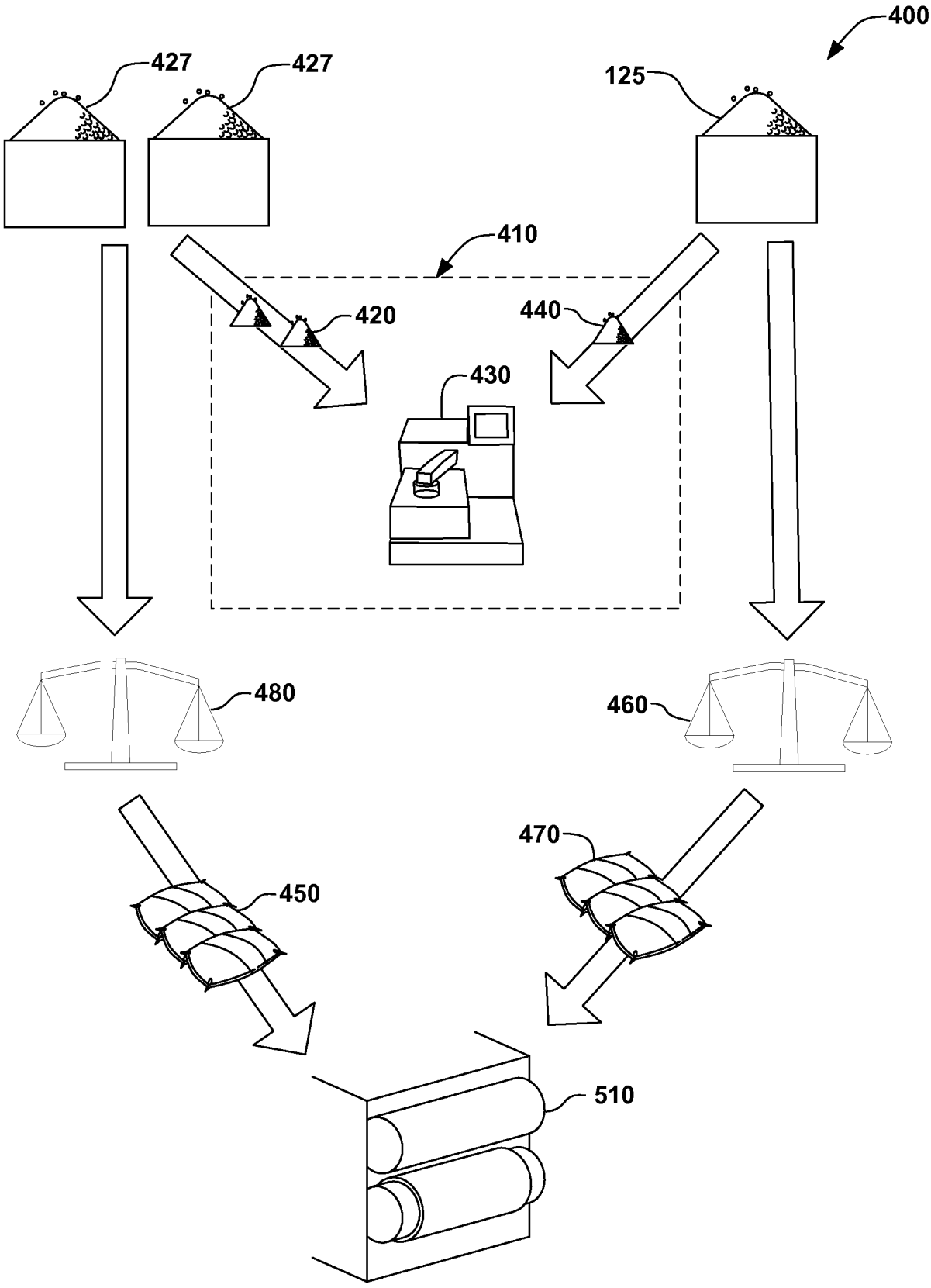

FIG. 4

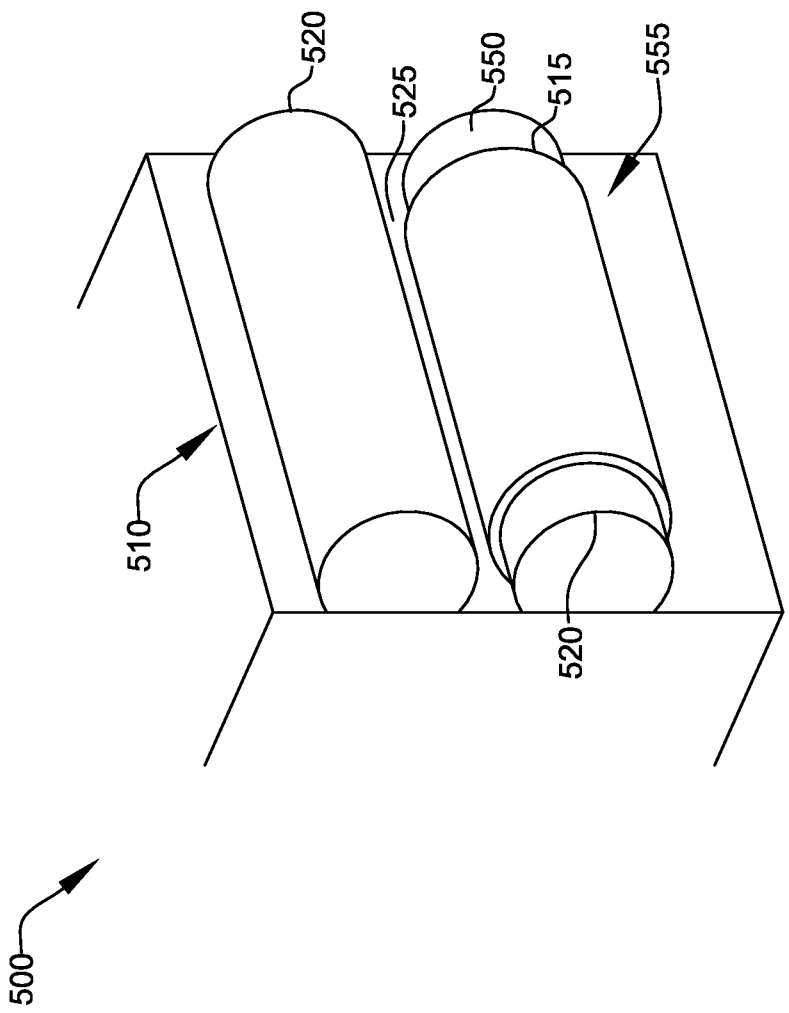

FIG. 5

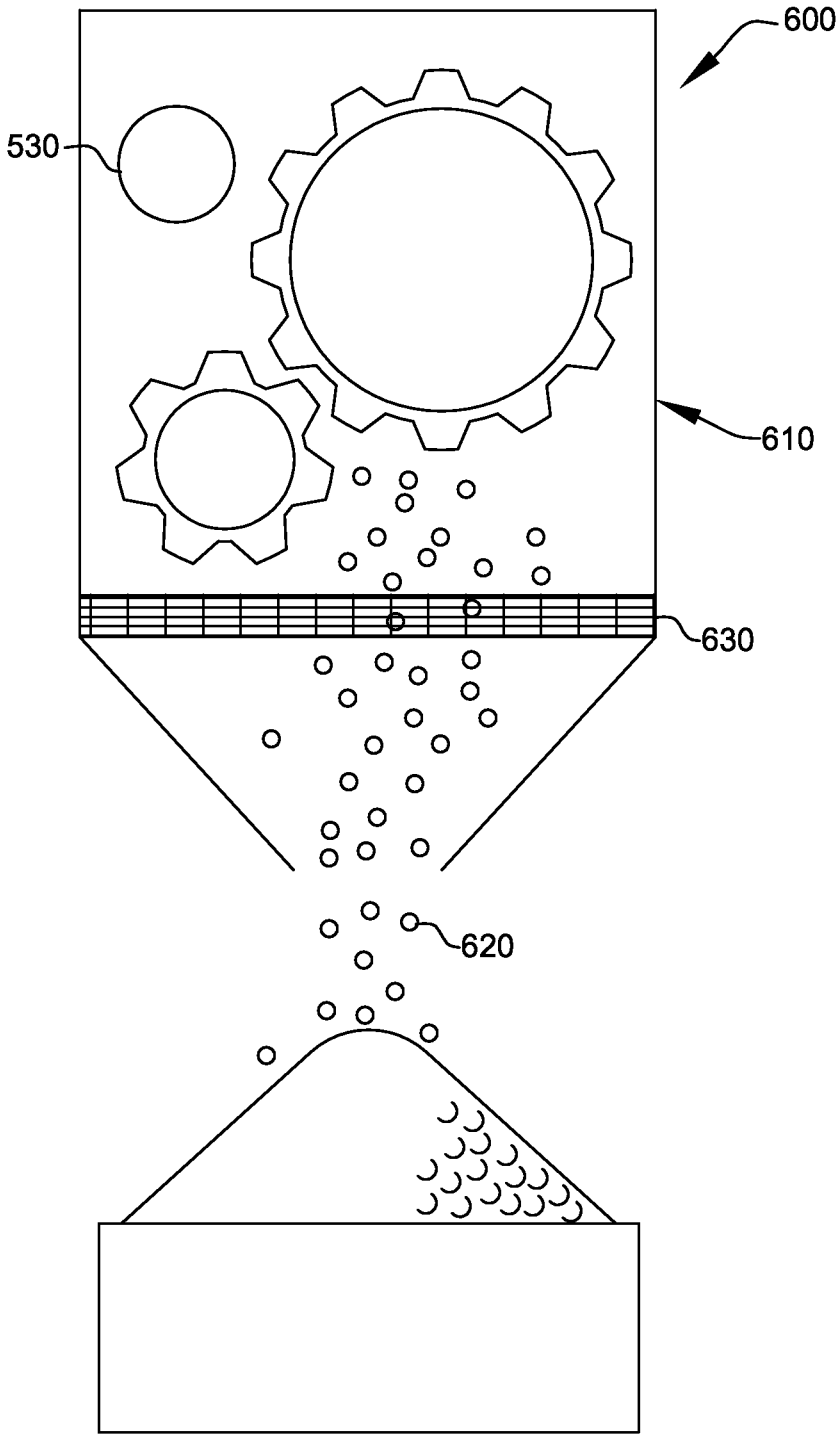

FIG. 6

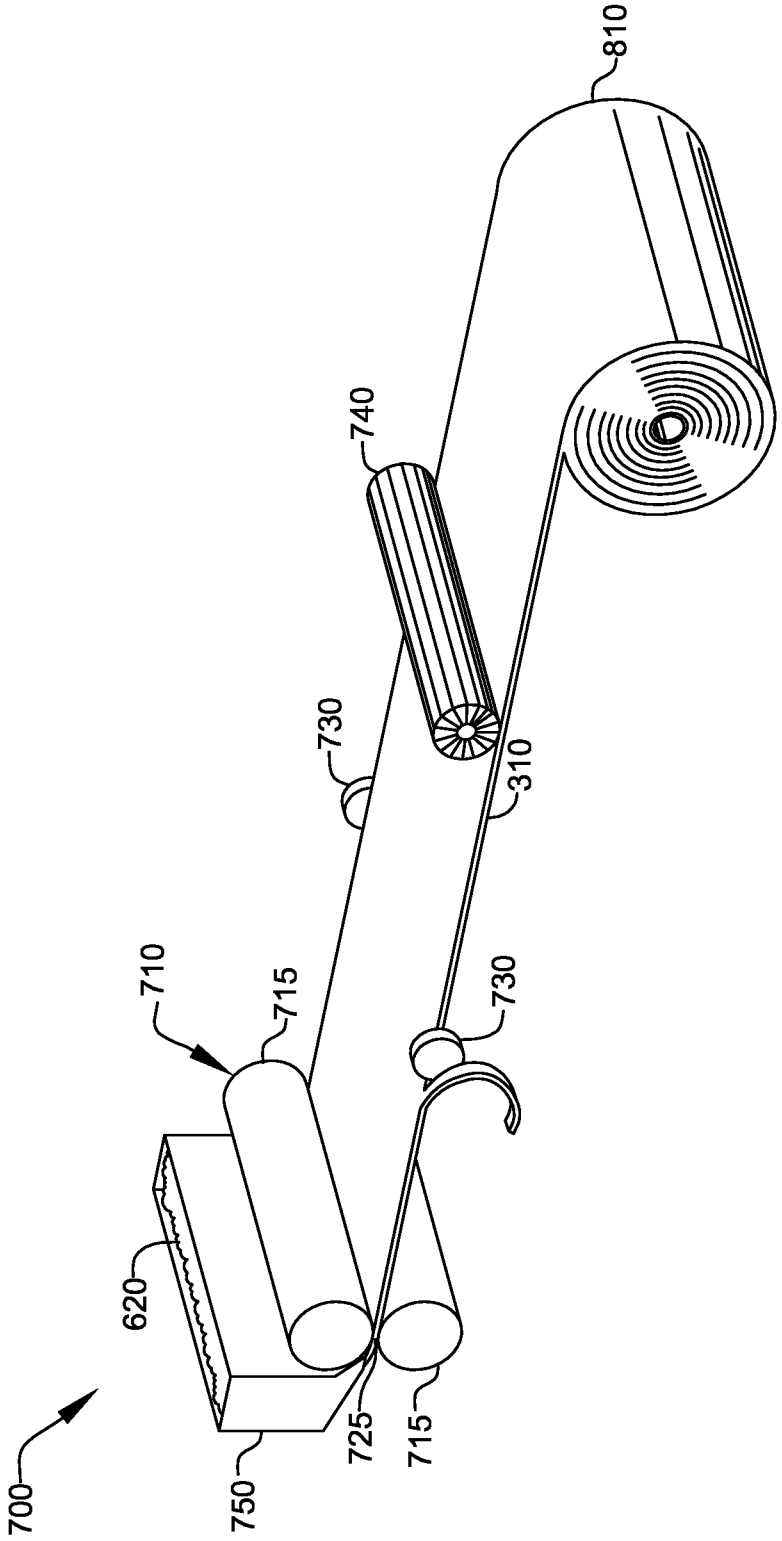

FIG. 7

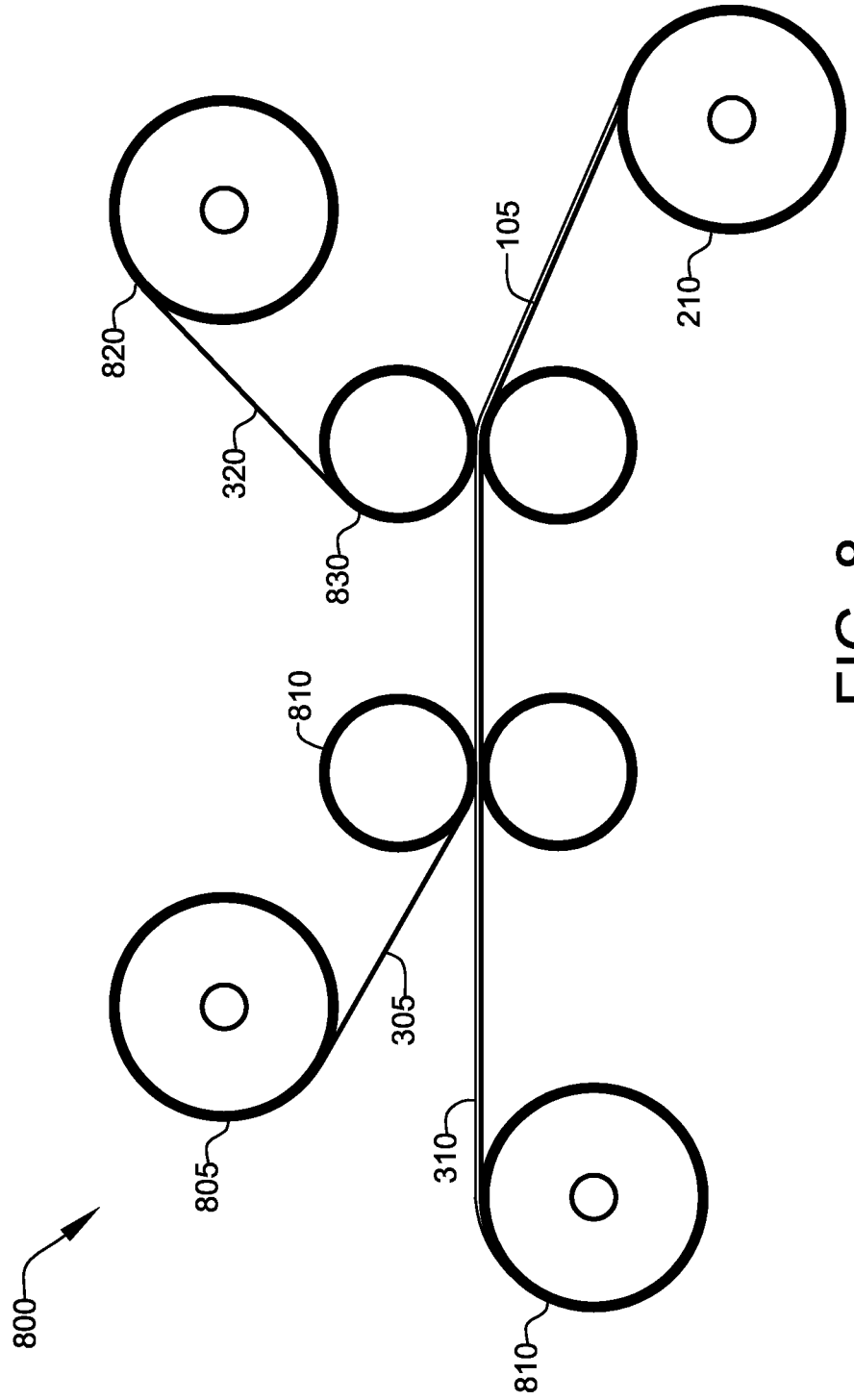

FIG. 8