A powder dispensing pad comprises a bottom barrier layer, a top barrier layer, a seal circumferentially sealing the top and the bottom barrier layers, a storage layer between the top and bottom barrier layers, and a metering layer between the storage layer and the top barrier layer.
Figure 6
Figure 9

900  Apply powder to bottom barrier layer

910  Apply storage layer to bottom barrier layer on powder

920  Apply metering layer to storage layer

930  Apply top barrier layer containing holes to metering layer

940  Form seal by heating and pressing together top and bottom barrier layers

950  Apply adhesive layer to sealing layer

960  Apply sealing layer with adhesive layer to top barrier layer

970  Seal completed powder dispenser into container
POWDER DISPENSING PAD

BACKGROUND

[0001] Powders have traditionally been dispensed in a variety of ways. For example, baby powder and medicated powders have typically been dispensed from a bottle, where the top of the bottle contains holes. The bottle contains enough powder to be dispensed many times.

[0002] Cosmetic powders are typically dispensed from a compact, using a brush. The powder is compacted into a solid disk, placed into a plastic container with a lid that snaps shut. The brush is used to loosen a small amount of powder, which is then transferred from the brush to the skin. The compact contains enough powder to be dispensed many times.

SUMMARY

[0003] In a first aspect, the present invention is a powder dispensing pad, comprising (1) a bottom barrier layer, (2) a top barrier layer, (3) a seal, circumferentially sealing the top and the bottom barrier layers, (4) a storage layer, between the top and bottom barrier layers, and (5) a metering layer, having pores, between the storage layer and the top barrier layer.

[0004] In a second aspect, the present invention is a method of making a powder dispensing pad, comprising placing the powder on the bottom barrier layer, placing a storage layer on the bottom barrier layer, on the powder, placing the metering layer on the storage layer, placing the top barrier layer on the metering layer, forming the seal, by pressing the top barrier layer against the bottom barrier layer and applying heat; and sealing the holes in the top barrier layer by placing the sealing layer on the top barrier layer.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] FIG. 1 depicts a perspective view of a powder dispensing pad.
[0006] FIG. 2 depicts a cross sectional view of the powder dispensing pad of FIG. 1 taken along line 1-1.
[0007] FIG. 3A depicts a perspective view of the powder dispensing pad of FIG. 1 without the cover layer.
[0008] FIG. 3B depicts an enlarged perspective view of a portion of the powder dispensing pad of FIG. 3A.
[0009] FIG. 4 depicts a cross sectional view of a powder dispensing pad.
[0010] FIG. 5 depicts a perspective view of a powder dispensing pad.
[0011] FIG. 6 depicts a perspective view of a powder dispensing pad.
[0012] FIG. 7 depicts a perspective view of a powder dispensing pad in a pad dispenser.
[0013] FIG. 8 depicts a perspective view of a powder dispensing pad and a pad dispenser for dispensing the pad.

DETAILED DESCRIPTION

[0015] The present invention makes use of the discovery of a powder dispensing pad. The powder dispensing pad includes a bottom barrier layer, and a top barrier layer. The top and bottom barrier layers are sealed together, to maintain the powder between them before being dispensed. Inside the powder dispensing pad is a storage layer, with the powder present within the storage layer, or the powder being present between the storage layer and the bottom barrier layer. A metering layer having pores is present between the storage layer and the top barrier layer, to evenly meter out the powder to the top barrier layer. The top barrier layer includes holes, to dispense the powder. Other optional layers may be present, including a sealing layer having an adhesive layer, for covering the holes in the top barrier layer prior to use. The powder dispensing pad may also be in a container, such as a plastic bag, or a container for holding a plurality of the powder dispensing pads.

[0016] FIG. 1 illustrates a powder dispensing pad, 100, within a container, 190, for example a sealed clear plastic bag. The powder dispensing pad includes a top barrier layer, 140, and a bottom barrier layer, 110, which are sealed together, for example at seal 160. The top and bottom barrier layer are made of a material impervious to passage of the powder contained within the dispenser, and optionally are also a barrier to fluid but allow for the passage of air, or alternatively are gas tight. The top barrier layer includes dispensing holes (not illustrated) which are covered and sealed by a sealing layer, 150, on the top barrier layer.

[0017] FIG. 2 illustrates a cross-section of the powder dispensing pad, 100, taken along line 1-1 shown in FIG. 1. As illustrated, a powder, 170, is between the bottom sealing layer, 110, and a storage layer, 120. The storage layer is preferably a very porous non-woven material having loft. A metering layer, 130, separates the storage layer from the top barrier layer, 140. The storage layer helps hold the powder within the dispenser, delivering the powder slowly to the metering layer. The metering layer is preferably made of a material through which the powder cannot pass, except for the presence of pores through which the powder may pass. The density and size of the pores in the metering layer determines how much powder may be dispensed, and ensures that the powder is evenly dispersed across its surface.

[0018] Also illustrated in FIG. 2 are optional sublayers of the top and bottom barrier layers, 140 and 110, respectively. Preferably, the top barrier layer includes an outer fabric sublayer 144 on an inner membrane 142; similarly the bottom barrier layer includes an outer fabric sublayer 114 on an inner membrane 112. The outer fabric layers provide a cloth-like feel to the exterior of the dispenser 100, while the inner membranes, preferably formed from a thin membrane of a polymeric material, prevent the passage of powder and optionally prevent the passage of fluid, or further optionally prevent the passage of air. In the case where the membranes contain a thermoplastic polymer film, then the seal, 160, made be made by heating while pressing the two membranes together. Also shown in FIG. 2 is an adhesive layer, 152, for adhering the sealing layer, 150, on the top barrier layer, 140, and the container 190.

[0019] FIGS. 3A and 3B illustrates the powder dispensing pad, 100, of FIG. 1, with the sealing layer removed, to reveal more detail of the top barrier layer, 140, and the metering layer, 130. FIG. 3B is an expanded view of the subsection of FIG. 3A labeled "3B". As shown, the top barrier layer includes a plurality of holes, 146, through which the powder is dispensed. These holes are covered by the sealing layer in FIG. 1. Visible through the holes, 146, is the metering layer, 130, which includes pores, 132, which are smaller than the holes in the top barrier layer. Also illustrated is the seal, 160, and the bottom barrier layer, 110.

[0020] In a variation, the top barrier layer, bottom barrier layer and the seal between them, are all gas tight. Furthermore, the sealing layer and the adhesive layer are also gas
When the sealing layer is applied, or when the seal is formed, whichever is carried out last, the powder dispensing pad is either flattened using pressure or is placed under low pressure gas. This will effectively create a vacuum or low pressure within the powder dispensing pad, which is maintained until the sealing layer is removed. Once opened, the storage layer will act as a spring, and expand the powder dispensing pad when the full loft of the storage layer returns. In this way, the powder dispensing pad will be thinner during storage, and prior to use.

As illustrated in FIG. 1, the powder dispensing pad has an oval shape. Other shapes, such as a square or a circle, are also possible. The size of the dispenser may be any size convenient for the user to hold. For example, as shown in FIG. 2, the minor axis of the oval-shaped dispenser, W₁, may be for example 3 to 20 cm, more preferably 6 to 14 cm, and most preferably 8 to 10 cm, while the major axis (perpendicular to line 1-1 in FIG. 1) may be for example 4 to 27 cm, more preferably 8 to 19 cm, and most preferably 11 to 13 cm. The sealing layer covers the holes in the top barrier layer, and is appropriately shaped and sized. As illustrated in FIG. 1, the sealing layer has an oval shape. For example, as shown in FIG. 2, the minor axis of the oval-shaped sealing layer, W₂, may be for example 2.25 to 15 cm, more preferably 4.5 to 10.5 cm, and most preferably 6 to 7.5 cm, while the major axis (perpendicular to line 1-1 in FIG. 1) may be for example 3 to 20 cm, more preferably 6 to 14 cm, and most preferably 8 to 10 cm.

The thickness of the storage layer, illustrated in FIG. 2, as t₁, may be for example 1 to 5 mm, more preferably 2 to 4 mm. The total thickness of the dispenser, illustrated in FIG. 2, as t₂, may be for example 0.5 to 5 mm greater than the thickness of the storage layer, t₁. The diameter of the holes in the top barrier layer, illustrated in FIG. 3B as d₂, may be for example 2 to 10 mm, including 3, 4, 5, 6, 7, 8 and 9 mm. The diameter of the pores in the metering layer, illustrated in FIG. 3B as d₁, is always less than that of the holes in the top barrier layer, t₁, and may be for example 0.2 to 3 mm, including 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1, 1.25, 1.5, 2 and 2.5 mm. The edge-to-edge distance between the pores in the metering layer, illustrated in FIG. 3B as t₁₁₂, may be similar to the diameter of the pores, d₁, and may be for example 0.2 to 3 mm, including 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1, 1.25, 1.5, 2 and 2.5 mm.

FIG. 4 illustrates a cross-section of a variation of a powder dispensing pad, similar to powder dispensing pad 100 taken along line 1-1 shown in FIG. 1. In this variation, the powder, 170, is dispersed throughout the storage layer, 120. Other elements are the same as those illustrated in FIG. 2.

FIG. 5 illustrates another variation of a powder dispensing pad, 100, which does not include a sealing layer. Instead, the powder dispensing pad is folded so that one-half of the top barrier layer, 140, faces the other half of the top barrier layer. A seal, 180, is present on the top barrier layer, to maintain each half of the top barrier layer against each other, to prevent exposure of the holes, 146, and prevent escape of the powder. Prior to use, a user may break the seal and unfold the powder dispensing pad, exposing the holes, 146, to allow for application of the powder. Other elements of this variation of a powder dispensing pad are the same as that illustrated in FIGS. 1-4 (except for the absence of the sealing layer and adhesive layer). The seal, 180, may be made of the same adhesive as adhesive layer, 152, illustrated in FIG. 2.

FIG. 6 illustrates a cut-away view of another variation of a powder dispensing pad, 100, which does not include a sealing layer, but instead includes a cover layer, 350. The cover layer, 350, is on the top barrier layer, 140, and includes one or more lines of perforations, 380, such as a single line (illustrated), two parallel lines, or two perpendicular lines. The line or lines of perforations have a length which is less than a diameter of the top barrier layer, 140, and do not intersect an edge of the cover layer, 350. Prior to use, a user may tug apart the line or lines of perforations, separating the edges of the perforated line or lines, forming a gap in the cover layer. This gap will expose the underlying top barrier layer and holes, and the metering layer, to allow the user to dispense the powder.

FIG. 7 illustrates a cut-away view of a pad dispenser, 400, for containing a plurality of powder dispensing pads, 100 (although only a single powder dispensing pad is present in the illustration). The pad dispenser, 400, includes a body, 430, and a lid, 420, which is movably attached to the body. At the top of the body is a top surface, 412, of the body which includes an opening, 410, through which a powder dispensing pad may be removed. The opening may have any shape, including a slit, or cross-shaped slits, as illustrate. In a variation, each of the powder dispensing pads may be attached to each other by a weak attachment, so that as a first powder dispensing pad is pulled out of the pad dispenser and through the cross-shaped slits, the next powder dispensing pad to which it is attached is pulled part-way through the slits before the weak attachment is broken.

FIG. 8 illustrates a variation of a pad dispenser, 500, for containing a plurality of powder dispensing pads, 100 (although only a single dispenser is present in the illustration). The pad dispenser, 500, includes a body, 530. At the top of the body is a top surface, 512, of the body which includes an opening, 510, through which a powder dispensing pad may be removed. The opening as illustrated is a slit. In a variation, each of the powder dispensing pads may be attached to each other by a weak attachment, so that as a first powder dispensing pad is pulled out of the pad dispenser and through the slit, the next powder dispensing pad to which it is attached is pulled part-way through the slit before the weak attachment is broken. As illustrated, the powder dispensing pad is part-way through the slit.

FIG. 9 is a flow chart showing a method of making the powder dispensing pad of FIG. 1. In step 900, the powder is applied to the bottom barrier layer. Next, in step 910, the storage layer is applied onto the powder on the bottom barrier layer. Next, in step 920, the metering layer is applied to the storage layer. Next, in step 930, the bottom barrier layer containing holes is applied to the metering layer. Next, in step 940, the seal is formed by heating and applying pressure along the location for the seal. Next, in step 950, the adhesive layer is applied to the sealing layer. Next, in step 960, the sealing layer with the adhesive layer on it, is applied to the top barrier layer, covering the holes in the top barrier layer. Lastly, in step 970, optionally the now completed powder dispensing pad is sealed into a container, such as a plastic pouch.

Variations of the forming process are possible. For example, to form the powder dispensing pad shown in FIG. 4, steps 900 and 910 are replaced with two different steps: applying the powder into the storage layer, and then applying the storage layer to the bottom barrier layer. In another
example, to form the powder dispensing pad shown in FIG. 5, steps 950 and 960 are replaced with two different steps: applying an adhesive in a semicircle along the location of the seal on the top barrier layer, followed by folding the powder dispensing pad in half.

[0030] Any powder may be included in the powder dispensing pad. Examples include baby powder, cosmetic powders, and medicated powders, all of which may be applied to human skin. Preferably, the powder dispensing pad is intended for a single use, and preferably contains only enough powder for a single application, referred to as a unit dose. In the case of a cosmetic powder, the amount of powder is sufficient for a single application, also referred to as a unit dose. In the case of medicated powder, a single dosage of the medication is present in the powder, also referred to as a unit dose; when the powder dispensing pad contains a unit dose of medication, the powder dispensing pad may be referred to as a unit dosage form of the medication. In the case of a baby powder, the amount of powder is sufficient for a single application to a baby during a diaper change. Since not all the powder present in the powder dispensing pad will be dispensed during use, an excess of the powder may be included so that a unit dose of the powder is dispensed during use.

1. A powder dispensing pad, comprising:
   (1) a bottom barrier layer,
   (2) a top barrier layer,
   (3) a seal, circumferentially sealing the top and the bottom barrier layers,
   (4) a storage layer, between the top and bottom barrier layers,
   (5) a metering layer, having pores, between the storage layer and the top barrier layer, and
   (6) a powder, between the bottom barrier layer and the top barrier layer.
2. The powder dispensing pad of claim 1, further comprising holes in the top barrier layer, through which the powder may be dispensed.
3. The powder dispensing pad of claim 2, further comprising:
   (7) a sealing layer, on the top barrier layer and covering the holes, and
   (8) an adhesive layer, adhering the sealing layer to the top barrier layer.
4. The powder dispensing pad of claim 1, further comprising a container, within which is the powder dispensing pad.
5. The powder dispensing pad of claim 4, wherein the container is a plastic bag.
6. The powder dispensing pad of claim 2, wherein the powder dispensing pad is folded in half, so that each half of the top barrier layer face each other, and a seal on the top barrier layer, for holding each half of the top barrier layer together.
7. The powder dispensing pad of claim 1, further comprising a cover layer having a line of perforations.
8. The powder dispensing pad of claim 1, wherein the powder is between the bottom barrier layer and the metering layer.
9. The powder dispensing pad of claim 8, wherein the powder is between the storage layer and the bottom barrier layer.
10. The powder dispensing pad of claim 8, wherein the powder is within the storage layer.
11. The powder dispensing pad of claim 8, wherein an amount of the powder present is a unit dose.
12. The powder dispensing pad of claim 8, wherein the powder is a cosmetic powder.
13. The powder dispensing pad of claim 8, wherein the powder is a medicated powder.

14-19. (Canceled)
20. The powder dispensing pad of claim 3, wherein:
   an amount of the powder present is a unit dose,
   the holes have a diameter of 4 to 6 mm
   the pores have a diameter of 0.8 to 1.25 mm, and
   a thickness of the storage layer is 2 to 4 mm.
21. A packaged set of powder dispensing pads, comprising:
   a pad dispenser, and
   a plurality of the powder dispensing pads of claim 1, in the pad dispenser.
22. A method of applying powder, comprising:
   applying a single dose of the powder from the powder dispensing pad of claim 8, and
   discarding the powder dispensing pad.
23. A method of making the powder dispensing pad of claim 1, comprising:
   placing the powder on the bottom barrier layer;
   placing a storage layer on the bottom barrier layer, on the powder;
   placing the metering layer on the storage layer;
   placing the top barrier layer on the metering layer;
   forming the seal, by pressing the top barrier layer against the bottom barrier layer and applying heat; and
   sealing the holes in the top barrier layer by placing the sealing layer on the top barrier layer.
24. A powder dispensing pad containing a unit dose of powder,

25-26. (Canceled)
27. A packaged set of powder dispensing pads, comprising:
   a pad dispenser, and
   a plurality of the powder dispensing pads of claim 24, in the pad dispenser.
29-30. (Canceled)