SHOCK ABSORBER FOR COSMETIC COMPACT

Inventors: Herve F. BOUIX, New York, NY (US); Jonathan T. Thayer, Nutley, NJ (US); William A. Jaremko, Warwick, NY (US); Daniel J. Lewis, Ridgewood, NJ (US)

Correspondence Address:
THE ESTEE LAUDER COS, INC
155 PINELAWN ROAD, STE 345 S
MELVILLE, NY 11747

Appl. No.: 11/773,252
Filed: Jul. 3, 2007

Related U.S. Application Data
Provisional application No. 60/807,261, filed on Jul. 13, 2006.

ABSTRACT
A shock absorber member is provided in a cosmetic compact to isolate a pan containing cosmetic product such as a pressed powder foundation, from impacts and vibration that might cause the product to crack or crumble. The shock absorber has at least two arched portions suspending the pan in a clearance in a base of the cosmetic compact. The arched portions are sufficiently resilient to allow the pan to move within the clearance relative to the base. The arched portions prevent shocks, impacts or vibrations from being transmitted to the pan from the base.
SHOCK ABSORBER FOR COSMETIC COMPACT

[0001] This application claims priority/benefit of provisional application U.S. 60/807,261, filed Jul. 13, 2006

FIELD OF THE INVENTION

[0002] The present invention relates to cosmetic product packages that include shock absorbing means. In particular, the present invention is directed to compact cases with solid or semi-solid cosmetic products pressed or cast in a support pan. More particularly, the invention is directed to the means for isolating the product containing pan from external shock.

DESCRIPTION OF THE PRIOR ART

[0003] Compacts for solid or semi-solid cosmetic products generally comprise a base and a corresponding cover. The base has at least one cavity dimensioned to receive the cosmetic. A shallow plastic or metal pan containing the solid or semi-solid cosmetic product is secured in the cavity. The solid or semi-solid cosmetic product may be, for example, a pressed or caste powder, a semi-solid paste, or a cake-like consistency. The category of cosmetic may be, for example, a powder (e.g., blush), a skin foundation, an eye shadow, a lip cosmetic, etc.

[0004] During shipping or during the normal lifespan of the product, the compact may be subjected to shocks or impacts, for example, when the compact is accidentally dropped. Some formulations of solid and semi-solid cosmetics provided in shallow trays are susceptible to cracking and/or crumbling when the cosmetic case is subjected to external shock, vibration or impact. This is particularly true for higher quality pressed powders manufactured with less compression to provide a softer ‘feel’ to the user and better product payoff onto the fingers or an applicator. Clearly, a cracked or crumbled cosmetic product is undesirable as it presents a negative impression to a consumer. Furthermore, the cracked or crumbled cosmetic may negatively impact the performance of the product. For example, cracked or crumbled product may load unevenly onto an applicator (e.g., a brush or a pad). This in turn may lead to an undesirable and unattractive distribution of product on the user’s skin.

[0005] Some attempts have been made to rectify the problem. For example, Japanese publication No. 2006061189 discloses a cosmetic compact with a cosmetic tray detachably fixed in a recess by a collar such that the bottom wall of the tray and the bottom wall of the recess are separated by an air layer.

[0006] Japanese publication No. 2005304850 discloses a cosmetics container for storing, e.g., foundation and eye shadow. The container includes inner plates that form cosmetic storage chambers. The plates are selectively mounted at the bottom of the container by way of cushion members.

[0007] Japanese publication number 9-191928 discloses a shock absorbing and thin walled inner plate formed from a thin synthetic sheet. A second inner plate (presumably non-shock absorbing) is laid in the shock absorbing inner plate. The shock absorbing inner plate includes projections for coming in contact with the inner surface of the housing bottom.

[0008] U.S. Pat. No. 5,713,471 discloses a packaging unit including a supporting element with a cavity for receiving a pan containing cosmetic. The pan is secured in the cavity by elastic holding means (e.g., an o-ring). In addition, compressible means in the form of flexible foam or flexible spikes may be provided beneath the pan to compensate for play and/or protect against vibration.

[0009] Japanese publication No. 2002-177044 discloses a container body with clearance for receiving an inner tray for cosmetics. Elastic arms provided in opposite sides of the clearance have protrusions to detachably engage recesses in the sides of the inner tray. The elastic arms are said to provide properties against a shock to the inner tray.

[0010] U.S. Pat. No. 1,552,173 discloses a powder box in which resilient means are provided beneath a false bottom to press powder on the false bottom up through a perforated dispensing partition.

[0011] French patent number 2691339 discloses a compact with a pan supported on springs provided to eject the pan from the base to effect a change of pans.

[0012] U.S. Pat. No. 1,194,187 discloses a rouge box with a rouge holding pad yieldably held at the top of the box by a supporting spring such that when the box is opened the rouge is readily accessible at all times. The rouge pad is snugly received in the box. Accordingly, there does not appear to be a gap of sufficient dimension to provide for lateral movement of the pad in the box.

[0013] U.S. Pat. No. 2,054,004 discloses a vanity case for loose powder with springs that push a powder receptacle (a pan) upwardly such that an upper edge of the receptacle maintains contact with the underside of a cover when the case is closed, thus preventing leakage or spilling of the powder.

[0014] Japanese publication number 09-299138 discloses an inner tray for a cosmetic with protrusions formed on the outside. The protrusions match a groove on the inside of the compact base. The inner tray with the protrusions is said to give good shock resistance.

[0015] Japanese publication number 06-180821 discloses a cosmetic compact with a rubber gasket in an annular form between a lower lid and the cosmetic tray such that a space is formed between the lower lid and the cosmetic tray.

[0016] None of the foregoing references disclose a cosmetic compact for pressed powder with a pan received in a clearance in the base of the compact such that a gap is defined between the pan and the base, and wherein the pan is suspended by arcuate members across the gap and positioned along transverse axes. Accordingly, there is a need for a cost effective, mass produce-able cosmetic case having shock absorber means that effectively prevents pressed powder cosmetics from fracturing.

SUMMARY OF THE INVENTION

[0017] The present invention is directed to means for dampening shocks, impacts and vibration transmitted from the base of a cosmetic compact to a pan supported within the compact. The pan is adapted to contain solid or semi-solid cosmetic, e.g., a pressed powder, which is susceptible to damage in the form of cracking or crumbling, or in the worst case, release from the pan. The shock absorbing means minimizes or eliminates damage to the cosmetic product caused by external shock, impact or vibration. The pan is positioned in a clearance in the base large enough to provide for an air gap about the pan. The shock absorbing means
comprises at least two arcuate, resilient portions extending across the gap to connect the pan to the base. One arcuate portion is directed along a first axis, and the second arcuate member is directed along a second axis transverse to the first. The arcuated portions are sufficiently resilient to allow the pan to move relative to the base to a degree that prevents shock, impact or vibration from being transmitted from the base to the pan.

[0018] In a first embodiment, the arcuate portions are part of a continuous arched web that connects the pan to the base of the compact. Alternatively, the arched web may include discontinuities, such as, for example, cuts or openings, adapted to provide more reactive and resilient shock absorbing characteristics.

[0019] In a second embodiment, the shock absorbing device comprises a space-saving planar configuration, i.e., a plate within a plate, inserted between the pan and the base of the compact. An outer plate has a central clearance, and an inner plate is suspended in the central clearance such that a gap is defined between an outer edge of the inner plate and an inner edge of the outer plate. The inner plate is suspended in the clearance by at least two arcuate members. The outer plate is adapted to connect to one of the base or the pan, and the inner plate is adapted to connect to the other of the base or the pan.

[0020] Thus, two embodiments of a cost effective, mass produce-able shock absorbing means are provided for a cosmetic compact case. Either embodiment can readily be adapted for installation in existing compact case designs. The shock absorbing means effectively prevent pressed powder cosmetics from fracturing.

**BRIEF DESCRIPTION OF THE DRAWINGS**

[0021] FIG. 1 is a perspective view of a pressed powder cosmetic compact of the type that can incorporate either embodiment of the present invention;

[0022] FIG. 2 is a perspective view of the compact of FIG. 1 illustrating the first embodiment of the invention;

[0023] FIG. 3 is an exploded perspective view of the compact of FIG. 2;

[0024] FIG. 4 is a sectional view taken along line 4-4 in FIG. 2 illustrating the first embodiment;

[0025] FIG. 5 is a detail view taken from the area indicated by 5 in FIG. 3;

[0026] FIG. 6 is a plan view illustrating a second embodiment of the invention, a planar shock absorbing member;

[0027] FIG. 7 is a perspective view of the second embodiment shown in FIG. 6;

[0028] FIG. 8 is an exploded view of a compact base incorporating the second embodiment;

[0029] FIG. 9 is a plan view of the second embodiment in a compact base;

[0030] FIG. 10 is a sectional view taken along line 10-10 in FIG. 9;

[0031] FIG. 11 is a sectional view of the second embodiment including the compact cover, the pan and the product; and

[0032] FIG. 12 is a plan view showing variations on the arcuate member for illustrative purposes.

**DETAILED DESCRIPTION OF THE INVENTION**

[0033] Referring now to FIGS. 1-3, a cosmetic compact is shown generally at reference number 2. The compact 2 has a cover 12 and a base 14. A button 16 on the base is provided to release a catch 18 from hook 20. The cover 12 is pivotal between a closed position (FIG. 1) and an open position (FIG. 2) by way of a hinge shown generally at 22. As best shown in the exploded view in FIG. 3, the compact 2 comprises a pan 6 containing a solid or semi-solid cosmetic product P. The pan 6 has a bottom wall 8 and a perimeter wall 10. The base 14 has a clearance 24 dimensioned to receive the pan 6 such that a gap 26, 28 (see FIG. 4) is defined between at least one of the pan bottom and the base of the compact, and the perimeter wall of the pan and the base of the compact, respectively. In other words, the outer dimensions of the pan 6 are sufficiently less than the dimension of the clearance 24 to define at least one gap 28 or 26.

[0034] A shock absorbing member 30 is provided to connect the base to the pan. In the embodiment illustrated in FIGS. 1-4, positioned along a first axis 34 the shock absorbing member 30 has a first arcuate portion 32 extending across the gap 13 to connect the base to the pan. A second arcuate portion 36, positioned along a second axis 38 transverse to the first axis, extends across the gap 26 at another location to connect the base to the pan. A third arcuate portion 40 extends across the gap 26 to connect the base to the pan along the first axis 34 on a side of the pan 6 opposite from the first arcuate portion 32. A fourth arcuate portion 42 extends across the gap 26 along the second axis 38 on an opposite side of the pan 6 from the second arcuate portion 36. The arcuate portions 32, 36, 40, 42 each comprise the area referenced between the broken lines 31 in FIGS. 2 and 3. Each of the first, second, third, and fourth arcuate portions is sufficiently resilient to permit movement of the pan 6 relative to the base 14 within the clearance 26, thereby reducing transmission of shock or vibration from the base to the pan. The arcuate portions 32, 36, 40, 42 work individually or in concert to dampen and minimize the transmission of shock and/or vibration from the base 14 to the pan 6, thus, substantially eliminating damage to the cosmetic product P in the form of cracking or crumbling.

[0035] While four arcuate portions are illustrated by the broken lines 31, it will be understood that the number of arcuate portions may vary from a minimum of two to any suitable number necessary to prevent damage to the contents of the pan. Preferably, at least two arcuate portions are provided, one directed along first axis 34 and another directed along second axis 38 transverse to the first axis. More preferably, as illustrated, a pair of arcuate portions, 32 and 40 is provided along axis 34, and a pair of arcuate portions 36 and 42 is provided along axis 38, each one of a pair on opposite sides of the pan 6.

[0036] The arcuate portions 32, 36, 40, 42 may form part of a continuous arcuate web 44, as illustrated in FIGS. 2 and 3, that connects the perimeter wall 10 of the pan 6 to the edge of the clearance 24 in the base 14. Alternatively, the arcuate portions may comprise individual portions or members spaced apart about the perimeter of the pan 6. The individual portions or members may be separately formed, or may be
formed by isolating parts from the rest of the web by slits (e.g., along the broken lines 31) or by removing portions of the continuous web between adjacent arcuate portions such that each arcuate portion is defined between openings in the web. Depending on the resilient material chosen for the arcuate portions, the latter arrangement may provide greater flexibility and shock absorbing capability, particularly in a compact containing a pan with relatively acute corners (e.g., a square, triangular or rectangular pan). It has been found that the continuous web arrangement works particularly well with pans that are substantially round or oval in plan view (as illustrated). For pans with acute corners (square, triangular or rectangular pans) the preferred arrangement has individual arcuate portions along each flat side of the pan (not shown), with clearances in the arched web at the acute corners of the pan.

[0037] In the first embodiment, preferably, the each arcuate portion 32, 36, 40, 42 comprises at least one upwardly directed arch 45 (see FIG. 5). Alternatively, each arcuate portion comprises at least one inverted arch 47, a wave 49, a Z curve 51 or S curve 53 configuration (see FIGS. 5A-5D).

[0038] As illustrated in the cross-sectional view in FIG. 4, the shock absorbing member 30 has a bottom wall 46 to support the pan 6 (not shown in FIG. 4). Alternatively, a shock absorbing member could be provided with a partial bottom wall or no bottom wall. Instead, an inner side wall 48 of the member 30 could be attached directly to the perimeter wall 10 of the pan 6 by, for example, mechanical or other fastening means, e.g., glue, sonic welding, etc. An outer side wall 50 of the shock absorbing member 30 has an annular ridge 52 for engaging an inner edge 54 of the clearance 24 in the base 14. The member 30 may be fastened to the base 14 by, for example, interference fit, adhesive, sonic welding, or other known means.

[0039] The shock absorbing member 30 may be made from any suitable plastic or elastomer material, such as, for example, rubber, styrene, acetal, polyethylene, polypropylene. The member may be made by any suitable method, such as, for example, injection molding, die-cutting, etc.

[0040] In another embodiment, the shock absorbing member 30 comprises a planar shock absorbing device 130 (FIG. 6) with arcuate members defining horizontally oriented arches, a configuration that occupies less height in the compact. The planar shock absorbing device 130 is adapted for insertion in the cosmetic compact 2 between the base 14 of the compact 2 and the pan 6 received in the clearance 24 in the base. The planar device 130 comprises an outer plate 133 with a central clearance 135, and an inner plate 137 suspended in the central clearance by at least two arcuate portions 132, 136. The outer plate 133, the inner plate 137 and the at least two arcuate portions 132, 136 all lie within the same plane. To further minimize the height occupied by the device 130, the arch of each of the at least two arcuate portions also lies within the same plane as the components 133 and 137, i.e., each arch is horizontally oriented within the plane as if lying on its side. The central clearance 135 is defined by an inner edge 139 of the outer plate. The inner plate 137 has an outer edge 141 and is dimensioned to be received in the central clearance 135 such that a gap 126 is defined between the outer edge 141 of the inner plate 137 and the inner edge 139 of the outer plate 133. The outer plate is adapted to connect to one of the base or the pan, and the inner plate is adapted to connect to the other of the base or the pan. The base and/or the pan may be connected to the device by any suitable mechanical or other fastening means. For example, the base may be connected to the inner plate by adhering, welding (e.g., sonic), riveting or by way of studs or lugs 163 in cooperative openings 165 (e.g., compression fit or heat staking). The pan may be connected to the outer plate by, for example, glue or similar means.

[0041] First, second, third and fourth arcuate portions, 132, 136, 140, 142, respectively, each horizontally oriented with an arch within the plane-occupied by the inner plate 137 and outer plate 133, extend across the gap to connect the outer plate 133 to the inner plate 137. The first and third arcuate portions, 132, 140, are positioned along a first axis 134 on opposite sides of the inner plate. The second and fourth arcuate portions, 136, 142, are positioned on opposite sides of the inner plate along a second axis 138 that is transverse to the first axis 134. Each of the arcuate portions, 132, 136, 140, 142, is sufficiently resilient to permit movement of the inner plate 137 relative to the outer plate 133 thereby reducing transmission of shock or vibration from the base 14 to the pan 6. The arcuate portions work individually or in concert to dampen and minimize the transmission of shock and/or vibration from the base to the pan, thus, substantially eliminating damage to the cosmetic product P in the form of cracking or crumbling.

[0042] It will be understood that the number of arcuate portions provided in the planar shock absorbing device 130 may vary from a minimum of two to any suitable number necessary to prevent damage to the contents of a pan attached to the device. Preferably, at least two arcuate portions are provided, one directed along a first axis 134 and another directed along second axis 138 transverse to the first axis. More preferably, pairs of arcuate portions are provided along each axis, one on each side of the inner plate 137. However, any reasonable number of arcuate portions may be provided.

[0043] The outer plate 133 may further comprise an upwardly directed sidewall 153 extending upwardly from a perimeter 151 of the outer plate (FIG. 8). A collar 157 including a horizontal wall 155 and/or a depending decorative wall 159 may be provided adjacent the top of sidewall 153 to fill the space between the sidewall 153 and an outer wall 15 of the base 14. The side wall 153 defines a clearance 124 dimensioned to receive the pan 6 containing cosmetic product P. In a first configuration, the pan is attached to the outer plate and the inner plate is attached to the base 14 of the compact. The pan 6 may be attached to the outer plate by glue, as proposed above, or may be attached to the outer plate by way of an interference fit between the perimeter wall 10 of the pan and the upwardly directed side wall 153 of the outer plate. The inner plate 137 may be secured to the base 14 of the compact by glue, or preferably by studs or lugs 163 projecting from one of the plate 137 or the base 14 and secured in cooperative openings 165 in the other of the plate 137 or the base 14. The studs or lugs 163 may be secured in the openings 165 by, for example, compression fit, heat staking, sonic welding or glue. In this first embodiment, it will be understood that the outer plate 133 will move relative to the base 14, and therefore the inner edge 171 of collar 157 must be in a spaced relationship with the top of the upwardly directed side wall 153 of the outer plate 133. Accordingly, a gap 173 is provided between the inner edge 171 and the top of the side wall 153. In an alternative (not illustrated) to the foregoing configuration, the pan is attached to the inner plate and the base is attached to the
outer plate. In order to allow for movement of the pan relative to the base, the perimeter wall 10 of the pan must be in spaced relationship to the sidewall 153 of the outer plate.

A channel 160 may be provided in the outer plate 133 or the inner plate 137, or both, to accommodate each arcuate portion 132, 136, 140, 142. The channel 160 permits the arcuate portions to be relatively long and the inner and outer plates to have relatively larger surface areas for attachment to the compact base and/or pan bottom.

The arcuate portions 132, 136, 140, 142 may have varying configurations. For example, the arcuate portions may comprise a curved arc 181 (FIG. 12), an angular arc 183 (FIG. 12), a Z shape (FIG. 5), an S shape (FIG. 5), a wavy shape 185 (FIG. 12) or a zigzag shape (not shown), or any combination of the above. The shock absorbing member 30 in FIG. 12 is illustrated with four differently configured arcuate portions primarily to illustrate the various configurations. For purposes of this application, an arcuate portion shall include all of the above variations as well as any member or element providing resilience by way of structure that approximates a curve. The variations may be used in any combination desired and effective in achieving the shock absorbing result.

The plate-like shock absorbing device may be formed with all its parts as a unitary integral piece. The outer plate, the inner plate, and the arcuate portions can all be molded as one piece or cut from a single piece of base stock by, for example, injection molding or die-cutting, respectively. The unitary piece may comprise a part of the compact base, e.g., the bottom wall of an insert in the base (see FIG. 8).

In the above embodiments, the arcuate portions may also be adapted to provide progressive dampening by varying a thickness along a length of the respective arcuate portion as illustrated by arcuate portion 187 in FIG. 12.

Either of the above embodiments may be made from any suitable plastic, elastomer (natural or synthetic) or metal by conventional methods, such as, for example, molding or cutting. The material should be selected to provide appropriate levels of resilience to keep the product from cracking. Examples of suitable materials include acetal, polypropylene, polyethylene, styrene and elastomer. If the shock absorbing device 130 is made from a plastic material, the thickness of the plates and the arcuate members is preferably 0.5 to 2.5 mm.

It is understood that various modifications and changes in the specific form and construction of the various parts can be made without departing from the scope of the following claims.

What is claimed is:

1. A cosmetic compact comprising:
a pan adapted to contain a solid or semi-solid cosmetic product, the pan having a bottom wall and a perimeter wall;
a base with a clearance dimensioned to receive the pan such that a gap is defined between at least one of the pan bottom and the base and the perimeter wall and the base;
a shock absorbing member adapted to connect the base to the pan, the shock absorbing member having a first arcuate portion extending across the gap, the first arcuate portion positioned along a first axis, and a second arcuate portion extending across the gap, the second arcuate portion positioned along a second axis transverse to the first axis;
wherein each of the first arcuate portion and the second arcuate portion are sufficiently resilient to permit movement of the pan relative to the base within the clearance thereby reducing transmission of shock or vibration from the base to the pan.

2. The cosmetic compact of claim 1 wherein the shock absorbing member further comprises a third arcuate portion extending across the gap, the third arcuate portion positioned along the first axis on an opposite side of the pan from the first arcuate portion, and a fourth arcuate portion extending across the gap, the fourth arcuate portion positioned along the second axis on an opposite side of the pan from the second arcuate portion; wherein each of the third arcuate portion and the fourth arcuate portion are sufficiently resilient to permit movement of the pan relative to the base thereby reducing transmission of shock or vibration from the base to the pan.

3. The cosmetic compact of claim 1 wherein the first arcuate portion and the second arcuate portion each form part of a continuous arcuate web that connects the perimeter wall of the pan to the base.

4. The cosmetic compact of claim 3 wherein each of the first arcuate portion and the second arcuate portion are defined within the continuous arcuate web by a pair of slits.

5. The cosmetic compact of claim 3 wherein each of the first arcuate portion and the second arcuate portion are defined between openings in the continuous arcuate web.

6. The cosmetic compact of claim 1 wherein each of the first arcuate portion and the second arcuate portion comprise an arch.

7. The cosmetic compact of claim 1 wherein each of the first arcuate portion and the second arcuate portion comprises an inverted arch.

8. The cosmetic compact of claim 1 wherein the cross section of each of the first arcuate portion and the second arcuate portion comprises an S curve.

9. A shock absorbing device for use in a cosmetic compact between a base of the compact and a pan received in the base, the pan adapted to contain a solid or semi-solid cosmetic product, the device comprising:
an outer plate having a central clearance defined by an inner edge, the outer plate adapted to connect to one of the base or the pan;
an inner plate having an outer edge, the inner plate dimensioned to be received in the central clearance such that a gap is defined between the outer edge of the inner plate and the inner edge of the outer plate, the inner plate adapted to connect to the other of the base or the pan;
a first arcuate portion extending across the gap to connect the outer plate to the inner plate, the first arcuate portion positioned along a first axis; and
a second arcuate portion extending across the gap to connect the outer plate to the inner plate, the second arcuate portion positioned along a second axis transverse to the first axis;
wherein each of the first arcuate portion and the second arcuate portion are sufficiently resilient to permit movement of the inner plate relative to the outer plate thereby reducing transmission of shock or vibration from the base to the pan.
10. The device of claim 9 further comprising a third arcuate portion extending across the gap to connect the outer plate to the inner plate, the third arcuate portion positioned along the first axis on an opposite side of the inner plate from the first arcuate portion, and a fourth arcuate portion extending across the gap to connect the outer plate to the inner plate, the fourth arcuate portion positioned along the second axis on an opposite side of the inner plate from the second arcuate portion; wherein each of the third arcuate portion and the fourth arcuate portion are sufficiently resilient to permit movement of the pan relative to the base thereby reducing transmission of shock or vibration from the base to the pan.

11. The device of claim 9 further comprising a sidewall extending upwardly from a perimeter of the outer plate, the side wall defining a clearance dimensioned to receive the pan containing cosmetic product.

12. The device of claim 11 wherein at least one of the outer plate and the side wall are adapted to be connected to the pan.

13. The device of claim 9 further comprising a channel in at least one of the outer plate or the inner plate, the channel dimensioned to accommodate at least a part of one of the first arcuate portion or the second arcuate portion.

14. The device of claim 9 wherein each of the first arcuate portion and the second arcuate portion comprise a configuration selected from one of a curved arch, an angular arch, a Z shape, an S shape, a wavy shape and a zigzag shape.

15. The device of claim 9 wherein at least one of the first arcuate portion and the second arcuate portion is adapted to provide progressive dampening by varying a thickness along a length of the respective arcuate portion.

16. The device of claim 9 wherein the outer plate, the inner plate, the first arcuate portion and the second arcuate portion are integrally formed as a single piece.

17. The device of claim 16 wherein the device is formed by molding.

18. The device of claim 16 wherein the device is formed by die cutting.

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