COMPACT COMPRISING A COVER AND A BASE HAVING INTERACTING MAGNETS

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Appl. No.: 12/180,044

Filed: Jul. 25, 2008

Related U.S. Application Data

Provisional application No. 60/956,148, filed on Aug. 16, 2007.

ABSTRACT

The present invention relates to a compact comprising a base and a cover that slides relative to the base or that is hinged on the base, between a closed position and an open position, the base including at least a first permanent magnet that is stationary relative to the base, and the cover including at least a second permanent magnet that is stationary relative to the cover, the first and second magnets being disposed so as to repel each other while the cover is passing from the closed position to the open position and vice versa.
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[0001] This non provisional application claims the benefit of French Application No. 07 56810 filed on 30 juillet 2007 and U.S. Provisional Application No. 60/956,148 filed on Aug. 16, 2007.

[0002] The present invention provides a compact comprising a cover and a base, each having at least one permanent magnet.

BACKGROUND

[0003] Applications FR 2 867 361, US 2003/0167599, and US 2002/0153376, and U.S. Pat. Nos. 5,135,012 and 6,831,541 disclose compacts, each comprising a cover and a base, and each including a magnet, the magnets being arranged in such a manner that an attraction force is exerted between the base and the cover. Passage from a closed position to an open position is performed by overcoming the attraction force.

[0004] Application GB 2 264 975 discloses a compact comprising a cover and a base provided with a magnetic catch.

SUMMARY

[0005] There exists a need to improve still further compacts comprising a base and a cover that is movable relative to the base.

[0006] The invention seeks to satisfy this need.

[0007] In one of its aspects, the invention provides a compact comprising a base and a cover that is movable relative to the base, for example a cover that is hinged or that slides on the base, between a closed position and an open position, the base including at least a first magnet, and the cover including at least a second magnet, the first and second magnets being disposed in such a manner as to repel each other while the cover passes from its closed position to its open position and vice versa.

[0008] By means of the repulsion phenomenon of magnets, the invention makes it possible to assist the cover in opening and/or in closing once said cover has moved a certain distance, and it does so without unduly complicating the manufacture of the compact.

[0009] In exemplary embodiments, the first permanent magnet is stationary relative to the base, for example, and the second permanent magnet is stationary relative to the cover, for example.

[0010] By “stationary”, it is to be understood that in the absence of movement exerted on the hinge or the sliding mechanism in order to open or close the compact, the magnet does not move. The first magnet may be mounted without any possibility of displacement with respect to the base and the second magnet may be mounted without any possibility of displacement with respect to the cover, when the cover moves relative to the base.

[0011] In an embodiment of the invention, the polar axis of the first magnet and the polar axis of the second magnet are substantially parallel. This makes it possible to maximize the repulsion between the magnets when they are moved towards each other.

[0012] The polar axes of the magnets may be oriented perpendicularly to a direction in which the cover moves relative to the base, for example perpendicularly to a plane in which the movement takes place.

[0013] The magnets may be disposed in such a manner that the repulsion force is at its maximum when the cover is mid-way between its closed position and its open position.

[0014] The cover may slide relative to the base. The sliding may be obtained thanks to a mechanical link between the cover and the base, this link comprising at least one projection on one of the pieces engaged in at least one rail on the other piece, which guides the movement of the cover relative to the base. In a variant, the cover may be hinged on the base, in particular it may turn relative to the base. The movement of the cover relative to the base may also be more complex, the cover possibly being hinged to the base in a manner that corresponds to a connection between the base and the cover that enables turning to take place about an instantaneous axis that is not constant.

[0015] By way of example, the cover is hinged on the base about a swivel axis, and at least one of the base and of the cover can include at least two permanent magnets that are disposed optionally symmetrically on either side of a mid-plane for the base or the cover, the mid-plane containing the swivel axis.

[0016] The base may include at least a third magnet, the cover being arranged to pivot in two opposite directions relative to the base from the closed position, the second magnet being arranged to repel the first magnet while the cover is being pivoted in a first direction relative to the base, and the third magnet being arranged to repel the first magnet while the cover is being pivoted in a second direction, opposite to the first direction. This makes it possible to assist the opening and closing movement, regardless of the direction in which the cover is opened or closed.

[0017] At least one of the magnets may be disk shaped, but other shapes are possible, e.g. cylindrical, semi circular, or rectangular parallelepiped.

[0018] The cover may be made out of an optionally-transparent thermoplastic material.

[0019] The cover may comprise a closure portion having a guide portion that is assembled thereto or that is made integrally therewith, the guide portion sliding in a corresponding reception space of the base, the guide portion being suitable for carrying the second magnet.

[0020] In embodiments where the cover slides on the base, preferably with two magnets, as well as those where the cover is hinged on the base, preferably with three magnets, the magnets may cause a stable position of the base with respect to the cover in the closed position as well as in the open position.

[0021] The closure portion may carry a mirror or it may have a metal-plated surface.

[0022] The cover may include a mirror on its outer face.

[0023] The base may include a housing that receives at least one composition to be taken and/or an applicator, the bottom of the housing possibly being defined by a wall carrying the first magnet. The base may have a separate bottom fitted thereto.

[0024] The compact may comprise a mild magnetic material, in particular a mild steel, so as to reduce magnetic field leakage out from the compact. For a compact that is carried in the handbag of a user, the presence of such a material makes it possible to limit the risks of demagnetizing personal articles, such as a credit card with a magnetic track.

[0025] In another of its aspects, and independently or in combination with the above, the invention also provides a compact comprising a base and a cover that is hinged on the
base, the base including at least a first magnet, and the cover including at least a second magnet, the polar axes of the magnets being perpendicular to a plane in which the cover turns, the first and second magnets being arranged so as to attract each other when the compact is in its closed position and/or its open position. The base may define a housing that receives at least one cosmetic or skin care product. By way of example, the base may include two magnets, and the cover may include two other magnets, the magnets being suitable for being superposed after the cover has turned through half a turn relative to the base.

In an embodiment, at least one of the cover and of the base includes an additional magnet that is arranged to repel at least one other magnet while the cover is being moved from the open position towards the closed position or vice versa. The additional magnet may be semi-circular in shape, for example, and may be situated between two other magnets of opposite polarity, so as to work in repulsion while the other magnets work in attraction.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention can be better understood on reading the following description of non-limiting embodiments thereof, and on examining the accompanying drawings, in which:

FIG. 1 is a perspective view showing a first embodiment of a closed compact of the invention;
FIG. 2 shows the FIG. 1 compact open;
FIG. 3 is a diagrammatic section of the compact on III-III in FIG. 1;
FIG. 4 is a diagrammatic section of the compact on IV-IV in FIG. 2;
FIG. 5 is a perspective view showing another embodiment of a closed compact of the invention;
FIG. 6 shows the FIG. 5 compact open;
FIG. 7 is a diagrammatic section on VII-VII in FIG. 5;
FIG. 8 is a diagrammatic section on VIII-VIII in FIG. 5;
FIG. 9 shows the housings for receiving the magnets of the base of the compact in FIGS. 5 to 8;
FIG. 10 shows the compact while the cover is being moved between its closed position and its open position;
FIGS. 11 to 13 show the relative positions of the magnets of the base and the magnets of the cover of the compact;
FIGS. 14 and 15 are perspective views showing a variant embodiment of the compact; and
FIG. 16 is a diagrammatic cross section showing an example of sliding mechanism between the cover and the base.

MORE DETAILED DESCRIPTION

The compact 1 shown in FIGS. 1 to 4 comprises a base 3 and a cover 2 that is moveable relative to the base between a closed position and an open position.

The base 3 comprises a body 6 and a separate bottom 16 that is fitted onto the body 6, e.g. after the cover 2 has been put into place, so as to hold said cover on the compact.

The base 3 defines at least one housing 18 that receives at least one composition to be taken by the user, e.g. a cosmetic or a skin care product.

The composition can be directly in contact with a wall 20 of the body 6, said wall defining the sides and the bottom of the housing 1, or it can be contained in a dish (not shown) that is received in the housing 18. In the embodiment under consideration, said housing is circularly cylindrical in shape, but the invention is not limited to a particular shape of housing. In addition, the base and the cover can present shapes other than the shapes shown.

In the embodiment under consideration, the cover 2 is moveable in translation along an axis X relative to the base 3.

Magnetic means are provided so as to assist the opening movement of the cover 2. The magnetic means comprise a first magnet 4 that is carried by the base 3, and a second magnet 5 that is carried by the cover 2, as can be seen in FIGS. 3 and 4.

By way of example, the first magnet 4 is fastened on the wall 20, being stationary relative to the base 3. By way of example, the first magnet is snap-fastened, overmolded, or bonded on said wall. The wall 20 can present a recess 21 that opens downwards, of shape adapted to receive the magnet 4, and that is situated below the housing 18 on the side thereof towards which the cover is moved in order to open the compact.

A reception space 22 is formed between the wall 20 and the bottom 16 so as to receive a guide portion 14 of the cover 2.

The cover 2 also includes a closure portion 12 that comes to cover the housing 18 in the closed position, and that externally matches the shape of the base 3. A mirror 10 can be fitted on the closure portion 12, as shown.

The guide portion 14 and closure portion 12 can be made integrally by molding a thermoplastic material, e.g. a transparent thermoplastic material.

The guide portion 14 is arranged so as to slide inside the reception space 22, and it carries a second permanent magnet 5, e.g. identical to the magnet 4.

By way of example, the magnet 5 is received in a downwardly-open recess 23 of the guide portion 14, and can be fastened therein by using any suitable means. In the embodiment described, the magnet 5 is stationary relative to the cover 2.

An end-of-stroke abutment 9 can be formed on the guide portion 14, e.g. coming to bear against a shoulder of the bottom 16 in the completely open position.

In the embodiment under consideration, the magnets 4 and 5 are disposed within the compact in such a manner that they are not superposed when the cover is in its closed position, as shown in FIG. 3, nor when it is in its open position, as shown in FIG. 4.

As shown, the magnets 4 and 5 can have polar axes that are parallel to each other and perpendicular to the axis X, and of magnetic orientations that are opposite, such that when the magnets become superposed during movement of the cover, the south pole S of the first magnet 4 faces the south pole S of the second magnet 5, the same result can be obtained in a variant (not shown) when it is the north poles N that face each other.

By way of example, the magnets 4 and 5 are disk shaped, but they could be of some other shape.

In the closed position of the cover, corresponding to FIGS. 1 and 3, the first magnet 4 and the second magnet 5 repel each other, thereby tending to urge the cover towards its closed position.
In the open position of the cover, shown in FIGS. 2 and 4, the first and second magnets 4 and 5 also repel each other, thereby tending to urge the cover towards its open position.

When the cover 2 is substantially mid-way between its open position and its closed position, the magnets 4 and 5 are superposed and the repulsion between them is at its maximum.

In order to open the compact, the user must initially overcome the repulsion force of the magnets 4 and 5, before the end of the opening movement is assisted by the repulsion force. In order to close the compact, the user must also overcome the repulsion force of the magnets 4 and 5, before said repulsion force assists in finishing off the closure movement.

Where appropriate, the cover and/or the base can comprise a mild magnetic material, e.g. a mild steel. The mild magnetic material can be disposed in such a manner as to loop the magnetic field of the magnets 4 and 5 within the compact, so as to limit magnetic field leakage out from the compact.

In variants not shown, one or more additional magnets working in attraction with the magnet 5 could be provided on the base 3.

FIGS. 5 to 7 show another embodiment of a compact of the invention, said compact comprising a base 3 and a cover 2 that is hinged relative to the base about a swivel axis Y, the cover 2 moving in a plane that is perpendicular to the axis Y.

In the embodiment under consideration, the base 3 comprises an outer shell 50 that houses an insert 51 that is made by molding a thermoplastic material with a slotted pin 40, and further comprises a wall 52 that defines the sides of the housing 18. In the embodiment shown, the housing receives a dish 54 that is filled with a composition P.

By way of example, the insert 51 is fastened by snap-fastening in the shell 50. In the embodiment shown, the bottom of the housing 18 is defined by the shell 50 itself.

The insert 51 defines three other housings, namely a first housing 60 for receiving a magnet 61 and two housings 63 each receiving a respective magnet 64.

The housings 60 and 63 open downwards in such a manner as to enable the magnets 61 and 64 to be mounted in the housings 60 and 63 before the insert 51 is put into place in the shell 50.

When the compact is open, the magnets 61 and 64 are not visible, being masked by walls 65 and 66 of the insert 51 that close the housings 60 and 63.

In the embodiment shown, the magnet 61 presents a semi-circular shape, and the magnets 64 are disk shaped.

As can be seen in FIG. 9, the magnets 61 and 64 are disposed symmetrically about a mid-plane of symmetry K for the base 3, containing the swivel axis Y.

The cover 2 includes a shell 70 and an insert 71 that is fastened in said shell, the insert 71 defining a housing 41 for snap-fastening the pin 40 so as to hinge the cover on the base.

Naturally, the cover could be hinged in some other way on the base without going beyond the ambit of the present invention.

Where appropriate, and as shown, the top portion of the shell 70 can be open so as to make the insert 71 visible through an opening 74 of the shell 70, thereby creating a decorative effect when the shell 70 and the insert 71 are made out of different materials.

For example, the insert 71 can be made out of a transparent plastics material, but not the shell 70, or the insert 71 can be of a color that is different to the color of the shell 70.

In a variant not shown, a recess is formed in the opening 74 so as to receive a mirror.

The insert 71 defines two housings 80, each receiving a respective magnet 81. The magnets 81 are disposed symmetrically on either side of a mid-plane M for the cover 2, containing the swivel axis Y, as shown in FIG. 10. When the compact is closed, the planes K and M coincide.

In the embodiment under consideration, the bottoms of the housings 80 are open, but it is not beyond the ambit of the present invention for the bottoms not to be open.

The magnets 81 can be put into place in the housings 80 before mounting the insert 71 in the shell 70.

The polar axes of the magnets 61, 64, and 81 are parallel to the swivel axis Y, and the polarities of the magnets 61, 64, and 81 are shown in the drawing. It is not beyond the ambit of the present invention for all of the magnets to have polarities that are the opposite of the polarities shown.

When the compact 1 is closed, the magnets 64 are superposed relative to the magnets 81, as shown in FIG. 13, and they are attracted to each other, thereby tending to keep the compact closed. The magnets 81 and the magnet 61 repel each other, thereby urging the compact towards its closed position.

When the cover 2 starts to pivot relative to the base 3, in one direction or in the other, from the closed position, the magnets 64 move away from the magnets 81, thereby creating a return force towards the closed position. The magnet 61 moves closer to a magnet 81, thereby increasing the repulsion force between them. After passing through the position corresponding to maximum repulsion between the magnets 61 and 81, the magnets 64 tend to move once again towards the magnets 81, and the magnet 61 moves away from the magnet 81, thereby tending to decrease the repulsion force.

The movement of the cover 2 towards the open position becomes assisted by the magnetic interaction force between the magnets, until the magnets 64 are once again superposed relative to the magnets 81 in the fully-open position, as shown in FIG. 11.

When the cover starts to move from the open position towards the closed position, the interaction between the magnets 64 and 81 tends to create a return force towards the open position, in addition to the repulsion force between the magnet 61 and the corresponding magnet 81. Once the maximum repulsion force has been reached, the remaining movement of the cover is assisted towards the closed position.

Naturally, various modifications can be applied to the embodiments described above, relating, for example, to the locations of the magnets.

In a variant not shown, the compact in FIGS. 5 to 8 is made without the magnet 61, the return forces towards the open position or the closed position being obtained solely by the attraction of magnets having facing opposite polarities.

In another variant, not shown, the return of the cover towards the open position or the closed position is obtained solely by magnets repelling each other, e.g. the magnet 61 on one side and the magnets 81 on the other side.

As with the embodiment in FIGS. 1 to 4, the compact in FIGS. 5 to 8 can comprise a shield made out of a magnetic material, so as to reduce magnetic field leakage out from the compact.

The invention can find application in compacts comprising more than two movable elements, e.g. compacts comprising a slider that is moveable relative to a support, and a cover that is moveable relative to the support and to the slider.
The movement of the cover relative to the slider that thus acts as the base, or the movement of the slider relative to the support that thus acts as the base, can be assisted by magnetic means.

In the variant shown in FIGS. 14 and 15, the cover 2 carries a mirror 10 on its top face.

The base 3 and the cover 2 are generally in the shape of rectangular parallelepipeds. The base 3 can include a housing 120 for receiving an applicator, in addition to the housing containing the composition.

The sliding of the cover may be obtained thanks to two rails 150 in which the projections of the cover, the projections being for example ribs 151 projecting on the internal faces of side walls of the cover.

The rails may be formed by ribs 152 provided at the top end with a return directed towards the outside.

Of course, the guiding of the cover may be obtained otherwise, with for example one or more projections carried by the base and engaged in one or more rails of the cover.

The cooperating reliefs of the base and the cover may be made with other shapes.

The expression “comprising a” should be understood as being synonymous with “comprising at least one” unless specified to the contrary.

Although the present invention herein has been described with reference to particular embodiments, it is to be understood that these embodiments are merely illustrative of the principles and applications of the present invention. It is therefore to be understood that numerous modifications may be made to the illustrative embodiments and that other arrangements may be devised without departing from the spirit and scope of the present invention as defined by the appended claims.

What is claimed is:

1. A compact comprising a base and a cover that slides relative to the base or that is hinged on the base, between a closed position and an open position, the base including at least a first permanent magnet that is stationary relative to the base, and the cover including at least a second permanent magnet that is stationary relative to the cover, the first and second magnets being disposed so as to repel each other while the cover is passing from the closed position to the open position and vice versa.

2. A compact according to claim 1, a polar axis of the first magnet and a polar axis of the second magnet being parallel.

3. A compact according to claim 1, the cover sliding relative to the base.

4. A compact according to claim 1, the cover turning relative to the base.

5. A compact according to claim 4, the base including at least a third magnet, the cover being configured to pivot in two opposite directions relative to the base from the closed position, the second magnet repelling the first magnet while the cover is being pivoted in a first direction relative to the base, and the third magnet repelling the first magnet while the cover is being pivoted in a second direction, opposite to the first direction.

6. A compact according to claim 1, at least one magnet being disk shaped.

7. A compact according to claim 1, at least one magnet having a semi-circular shape.

8. A compact according to claim 2, the polar axes of the magnets being oriented perpendicularly to the direction of movement or perpendicularly to a movement plane of the cover relative to the base.

9. A compact according to claim 1, the first and second magnets being disposed so as to repel each other when the cover is in the open position.

10. A compact according to claim 1, the first and second magnets being disposed so as to repel each other when the cover is in the closed position.

11. A compact according to claim 1, the first and second magnets being disposed in such a manner that the repulsion force is at a maximum when the cover is substantially midway between the closed position and the open position.

12. A compact according to claim 3, the cover comprising a closure portion having a guide portion that slides in the base.

13. A compact according to claim 12, the guide portion carrying the second magnet.

14. A compact according to claim 1, the base and the cover including respective magnets that attract each other in at least one of the open and closed positions.

15. A compact according to claim 1, the base including a housing that receives at least one composition to be taken, a bottom of the housing being defined by a wall carrying the first magnet.

16. A compact according to claim 1, including a cosmetic or a skin care product.

17. A compact comprising a base and a cover that is hinged on the base, the base defining a housing that receives at least one cosmetic or skin care product and including at least a first magnet, and the cover including at least a second magnet, the polar axes of the magnets being perpendicular to a plane in which the cover turns, the first and second magnets being configured so as to attract each other when the compact is in the closed position and/or the open position.

18. A compact according to claim 16, the base including two magnets, and the cover including two other magnets, the magnets being configured for being superposed after the cover has turned through half a turn relative to the base.

19. A compact according to claim 16, at least one of the cover and of the base including an additional magnet.