A vacuum bottle includes a bottle with a cap mounted on a top opening of the bottle, the cap having pipes and vacuuming members connected thereto so as to vacuum the interior of the bottle. A through hole and a release hole are respectively defined through the cap. A sleeve, a connection member and a bellow member are respectively received in the through hole. When vacuuming the interior of the bottle, the bellow member is compressed to lift the sleeve out from the through hole. When the vacuum status is released, the bellow member is released and the sleeve is merged in the through hole. By the movement of the sleeve, users are acknowledged the status in the bottle. A valve assembly is connected to the pipes in the cap so as to prevent air from entering into the bottle.
FIG. 5B
FIG. 6
PRIOR ART
SEAL VALVE ASSEMBLY FOR VACUUMING BOTTLES

FIELD OF THE INVENTION

[0001] The present invention relates to a vacuum bottle having a dual seal assembly to ensure the vacuum status in the bottle and an indicator is used to easily identify the status in the bottle.

BACKGROUND OF THE INVENTION

[0002] A conventional vacuum bottle is disclosed in FIGS. 7A and 7B, and generally includes a bottle 60, a cap 61 and a cover 70. The cap 61 has a tube 62 with a spring 621 and a bellow member 622 mounted thereto, a top cap 623 seals a top opening of the tube 62. When vacuuming the interior of the bottle 60 by using the vacuuming members 64 via the pipes 63, the bellow member 622 is compressed by the lower pressure, and expand to its original status when the vacuum status disappears and protrudes from the hole 71 of the cover 70. By this way, the users identify the status of the bottle 60. Another hole 72 is defined in the cover 70 so that the user may press the release valve 66 in the release hole 65 of the cap 61 to allow air to enter into the bottle 60 so that the bottle 60 can be opened. A date ring 73 is connected on the cover 70 and tells the date that the contents in the bottle 60 is put in the bottle 60.

[0003] It is noted that the cap 61 is cooperated with the cover 70 and the two parts requires two different molds to manufacture and this increase the cost of manufacture. Besides, the release valve 60 cannot perfectly seal the bottle 60. The date ring 73 and the holes 71 and 72 require more steps of machining.

[0004] The present invention intends to provide a vacuum bottle which includes a dual seal assembly for providing a satisfied sealing function to prevent air from entering the bottle. The cap includes a simple structure and the date ring is co-axially connected with the release tab so that the outer appearance meets requirements of aesthetic purposes.

SUMMARY OF THE INVENTION

[0005] The present invention relates to a vacuum bottle that includes a bottle and a cap mounted on a top opening of the bottle, and the cap has pipes and vacuuming members connected thereto. A through hole and a release hole are respectively defined through the cap and a release tab is engaged with the release hole. A sleeve and a bellow member are received in the through hole and the sleeve is moved relative to the through hole by deformation of the bellow member due to pressure change. A valve assembly is located between the pipes and the bottle so as to prevent air from entering the bottle.

[0006] The present invention will become more obvious from the following description when taken in connection with the accompanying drawings which show, for purposes of illustration only, a preferred embodiment in accordance with the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] FIG. 1 is a perspective view of the vacuum bottle of the present invention;

[0008] FIG. 2 is an exploded view to show the vacuum bottle of the present invention;

[0009] FIG. 3A is a cross sectional view of the vacuum bottle of the present invention;

[0010] FIG. 3B is another cross sectional view of the vacuum bottle of the present invention;

[0011] FIG. 3C is a cross sectional view of the vacuum bottle of the present invention when the interior of the bottle is in vacuum status;

[0012] FIG. 4 is a cross sectional view of the valve assembly of the vacuum bottle of the present invention;

[0013] FIGS. 5A and 5B show the cross sectional view of the valve assembly;

[0014] FIG. 6 shows a conventional vacuum bottle, and

[0015] FIGS. 7A and 7B show cross sectional views of the conventional vacuum bottle.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0016] Referring to FIGS. 1, 2, 3A and 3B, the vacuum bottle of the present invention comprises a bottle 10 and a cap 20 mounted on a top opening of the bottle 10. The cap 20 has two pipes 23 and vacuuming members 24 connected thereto. A through hole 21 and a release hole 22 are respectively defined through the cap 20 and a release tab 50 is engaged with the release hole 22. A sleeve 36 and a bellow member 37 are received in the through hole 21 and the sleeve 36 can be moved relative to the through hole 21 by deformation of the bellow member 37 due to pressure change so that the users are acknowledged of the vacuum status in the interior of the bottle 10 by the position of the sleeve 36. The release tab 50 has a date ring 51 co-axially connected thereto which shows the date that the food or the like is put in the bottle 10.

[0017] A connection member 30 is threadedly connected with the through hole 21 and includes an upper threaded portion 32 and a lower threaded portion 33. A flange 31 is located between the upper threaded portion 32 and the lower threaded portion 33. A passage 311 is defined through the flange 31. A connection frame 34 is transversely located in the connection member 30 and has an extension 35 extending from a lower end of the connection frame 34. The extension 35 has a slot which is in communication with the passage 311. The sleeve 36, a bellow member 37 and a bellow piece 38 are respectively mounted to the connection member 30. The bellow member 37 connected between the sleeve 36, the connection member 30 and the bottom piece 38. An annular groove 341 is defined between the connection frame 34 and the extension 35 so that an end of the bellow member 37 is engaged with the annular groove 341. The sleeve 36 has a protrusion 361 extending from a top thereof and an open bottom. A plurality of engaging slots 364 are defined through the sleeve 36 and located close to the open bottom of the sleeve 36. Two slots 363 are defined axially through the sleeve 36. The connection frame 34 is engaged with the slots 363 so that the sleeve 36 is inserted in the connection member 30. The bellow member 37 has ribs 372 on an outside thereof so as to be engaged with the engaging slots 364 of the sleeve 36. An indicator 39 is mounted to the protrusion 361 of the sleeve 36 so that when the sleeve 36
is moved out from the through hole 21 by deformation of the deformation of the bellow member 37 when the bottle 10 has a vacuum interior, the indicator 39 is located above the top surface of the cap 20. The sleeve 36 is merged in the through hole 21 when the vacuum interior of the bottle 10 is released.

As shown in FIGS. 4, 5A and 5B, a valve assembly 40 is located between the pipes 23 and the bottle 10 so as to prevent air from entering the bottle 10. The valve assembly 40 includes a release cap 41, a seal 42, a base 43 with a tube 431 and a one-way valve 45. The base 43 is located beneath the pipes 23 and the release cap 41 is mounted to the base 43. A release mouth 411 is connected to the base 41 and has a release hole 412 which is normally closed when the interior of the bottle 10 communicates with outside. The release hole 412 opens when the bottle 10 has a vacuum interior. The one-way valve 45 is located at an open bottom of the base 43 and includes a plurality of apertures 451 and each aperture 451 has a wider top and a narrower bottom. When air in the interior of the bottle 10 is sucked out by operating the sucking members 24 via the pipes 34, the air releases from the release mouth 411 of the release cap 41. The seal 42 is mounted to the tube 431 of the base 43 and a plurality of stepped flanges 432 are defined in an outer periphery of the tube 431. A plurality of holes 433 are defined around the tube 431 and through an underside of the flange 432. A plurality of ribs 434 extend from an outside of the base 43 so as to be engaged with the pipes 23. The seal 42 is a cone-shaped member and an outer periphery of the seal 42 is matched with the flange 432 of the base 43. The seal 42 is deformed to define gaps through which air passes when vacuuming the interior of the bottle 10. A filter piece 44 is located between the open bottom of the base 43 and the one-way valve 45.

A pin 53 is connected to the release tab 50 and includes a cone-shaped portion 531, a washer 52 is mounted to the pin 53 and located between the cone-shaped portion 531 and a bottom flange 532 of the pin 53. The pin 53 moves upward when vacuuming the interior of the bottle 10 and the washer 52 and the cone-shaped portion 531 seal the release hole 22.

A pump (not shown) can also be connected to the pipes 23 to rapidly suck air in the bottle 10.

The bellow member 37 is deformed by the pressure change to move the protrusion 361 of the sleeve 36 out from the through hole 21 so that users easily identify the status of the bottle 10 by checking the indicator 39. The valve assembly 40 effectively controls the air which can only be sucked out from the interior of the bottle 10 and cannot enter into the bottle 10 by the valve assembly 40. The date ring 51 and the release tab 51 can be made as a piece so as to obtain an aesthetic arrangement on the top surface of the cap 20.

While we have shown and described the embodiment in accordance with the present invention, it should be clear to those skilled in the art that further embodiments may be made without departing from the scope of the present invention.

What is claimed is:

1. A vacuum bottle comprising:
   a bottle (10) and a cap (20) mounted on a top opening of the bottle (10), the cap (20) having pipes (23) and vacuuming members (24) connected thereto, a through hole (21) and a release hole (22) respectively defined through the cap (20) and a release tub (50) engaged with the release hole (22), a sleeve (36) and a bellow member (37) received in the through hole (21) and the sleeve (36) being moved relative to the through hole (21) by deformation of the bellow member (37) due to pressure change, a valve assembly (40) located between the pipes (23) and the bottle (10) so as to prevent air from entering the bottle (10).

2. The bottle as claimed in claim 1, wherein the release tab (50) has a date ring (51) co-axially connected thereto.

3. The bottle as claimed in claim 1, wherein a connection member (30) is located in the through hole (21), the sleeve (36), a bellow member (37) and a bottle piece (38) respectively mounted to the connection member (30), the bellow member (37) connected between the sleeve (36), the connection member (30) and the bottle piece (38), the sleeve (36) moved out from the through hole (21) by deformation of the deformation of the bellow member (37) when the bottle (10) has a vacuum interior, and the sleeve (36) being merged in the through hole (21) when the vacuum interior of the bottle (10) is released.

4. The bottle as claimed in claim 3, wherein the connection member (30) has an upper threaded portion (32) and a lower threaded portion (33), a flange (31) located between the upper threaded portion (32) and the lower threaded portion (33), a passage (311) defined through the flange (31), a connection frame (34) located in the connection member (30) and has an extension (35) extending from a lower end of the connection frame (34), the extension (35) having a slot which is in communication with the passage (311).

5. The bottle as claimed in claim 4, wherein an annular groove (341) is defined between the connection frame (34) and the extension (35) so that an end of the bellow member (37) is engaged with the annular groove (341).

6. The bottle as claimed in claim 3, wherein the sleeve (36) has a protrusion (361) extending from a top thereof and an open bottom, a plurality of engaging slots (364) defined through the sleeve (36) and located close to the open bottom of the sleeve (36), two slots (363) defined axially through the sleeve (36), the connection frame (34) being engaged with the slots (363) so that the sleeve (36) is inserted in the connection member (30), the bellow member (37) having ribs (372) on an outside thereof so as to be engaged with the engaging slots (364) of the sleeve (36).

7. The bottle as claimed in claim 3, wherein an indicator (39) is mounted to the protrusion (361) of the sleeve (36).

8. The bottle as claimed in claim 1, wherein the valve assembly (40) includes a release cap (41), a seal (42), a base (43) with a tube (431) and a one-way valve (45), the base (43) located beneath the pipes (23) and the release cap (41) mounted to the base (43), a release mouth (411) connected to the base (41) and having a release hole (412) which is normally closed and opened when the bottle (10) has a vacuum interior, the one-way valve (45) located at an open bottom of the base (43), air in the interior of the bottle (10) being sucked out by operating the vacuuming members (24) via the pipes (34) and the air releases from the release mouth (411) of the release cap (41).

9. The bottle as claimed in claim 8, wherein the seal (42) is mounted to the tube (431) of the base (43) and a plurality
of stepped flanges (432) are defined in an outer periphery of the tube (431); a plurality of holes (433) defined around the tube (431) and through an underside of the flange (432), a plurality of ribs (434) extending from an outside of the base (43) so as to be engaged with the pipes (23).

10. The bottle as claimed in claim 8, wherein the seal (42) is a cone-shaped member and an outer periphery of the seal (42) is matched with the flange (432) of the base (43), the seal (42) is deformed to define gaps through which air passes when vacuuming the interior of the bottle (10).

11. The bottle as claimed in claim 8, wherein a filter piece (44) is located between the open bottom of the base (43) and the one-way valve (45).

12. The bottle as claimed in claim 8, wherein the one-way valve (45) includes a plurality of apertures (451) and each aperture (451) has a wider top and a narrower bottom.

13. The bottle as claimed in claim 8, wherein a pin (53) is connected to the release tab (50) and includes a cone-shaped portion (531), a washer (52) is mounted to the pin (53) and located between the cone-shaped portion (531) and a bottom flange (532) of the pin (53), the pin (53) moving upward when vacuuming the interior of the bottle (10) and the washer (52) and the cone-shaped portion (531) sealing the release hole (22).