

CHECK VALVE FOR VACUUM PACKING BAGS

Technical Field

5 The present invention relates generally to check valves for vacuum packing bags, and more particularly, to a check valve installed on a vacuum packing bag, which is improved in its structure to reduce a volume of a packing bag in which an item, such as bedclothes, clothing and
10 foods, is vacuum packed, and allow a suction nozzle of a suction means, such as a vacuum cleaner, to easily form a close connection with the check valve, therefore accomplishing high operational efficiency.

15 Background Art

 Generally, bedclothes or thick winter clothing are stored in a wardrobe when not in use. Such items which are stored in the wardrobe occupy a considerably large space,
20 so it is difficult to store the items in a limited space. Also when foods are stored in vacuum envelopes, it is necessary to seal the vacuum envelopes with a vacuum packer.

 In order to store the items in a limited space, there has been proposed a method of storing the item in a packing
25 bag which is made of vinyl. Further, in order to dramatically reduce the volume of the item to be packed, there has been proposed a vacuum packing method using a suction nozzle of a vacuum cleaner. Such a vacuum packing method removes air from a packing bag, thus protecting the
30 item to be packed from mold or moths which grow in the wardrobe, depending on moisture therein.

 Furthermore, there has been proposed and marketed an improved packing bag. According to the improved packing

bag, the packing bag is made of a durable material, thus allowing the bag to be reused. A slide fastener used for fastening the bag which contains an item therein is designed to have a two-ply or multiple-ply structure, thus
5 having excellent sealing effect. A check valve is installed at a predetermined position of the bag to discharge air from the bag to the outside, thus keeping the interior of the bag in a vacuum state.

As shown in Fig. 1, a conventional check valve 100
10 includes a valve body 10. The valve body 10 is installed at a predetermined position of a packing bag 1 in such a way as to allow air to flow into and out the bag 1.

As shown in the drawing, the circular valve body 10 includes a hole 11. The hole 11 is formed at a center of a
15 bottom surface of the valve body 10. A plurality of air guide wings 12 extend toward the hole 11. A packing guide channel 13 extends upwardly from the bottom surface of the valve body 10 to communicate with the hole 11. An external threaded bushing 15 is provided to define the packing guide
20 channel 13. An annular tape seat 16 is externally formed around the external threaded bushing 15 so that a double-sided adhesive tape T is seated on the tape seat 16.

The external threaded bushing 15 defining the packing guide channel 13 is outwardly projected from the packing
25 bag 1. A ring-shaped disc 60 is fitted over the external threaded bushing 15 from an upper end of the bushing 15, and is provided on its lower surface with another double-sided adhesive tape T so that the disc 60 is closely adhered to an outer surface of the packing bag 1.

30 The conventional check valve 100 also has a suction nozzle-connecting unit 3. The suction nozzle-connecting unit 3 hermetically engages with the valve body 10.

The suction nozzle-connecting unit 3 includes an air

discharging hole 3a. The air discharging hole 3a is formed at a center of a base panel of the suction nozzle-connecting unit 3. Two threaded cylindrical parts are provided on both sides of the suction nozzle-connecting unit 3 to communicate with the air discharging hole 3a. A first internal threaded part 3b is provided at the lower portion of the nozzle connecting unit 3, and engages with the external threaded bushing 15 of the valve body 10. A second internal threaded part 3c having a different diameter from the first internal threaded part 3b is provided at the upper portion of the nozzle connecting unit 3. A guide groove 3d having a predetermined depth is formed along an edge of an upper surface of the base panel of the suction nozzle-connecting unit 3.

A packing 20 is set in the hole 11 of the valve body 10 to open or close the hole 11 according to a suction pressure of a vacuum cleaner. A stopper 5 engages with the second internal threaded part 3c of the suction nozzle-connecting unit 3 to support the packing 20 at a proper place.

The method of packing bedclothes in the packing bag 1 using the conventional check valve 100 is as follows. First, the bedclothes are put into the packing bag 1, and the slide fastener provided at an opening of the bag 1 is closed. Thereafter, air remaining in the packing bag 1 is discharged through the check valve 100, thus forming a vacuum in the packing bag 1.

As shown in Fig. 2 in detail, after the stopper 5 is removed from the check valve 100, a suction nozzle 2 of a vacuum cleaner is placed to come into close contact with the guide groove 3d of the suction nozzle connecting unit 3 in such a way that the suction nozzle 2 is at a right angle to the guide groove 3d.

When the vacuum cleaner is operated in such a state, air remaining in the packing bag 1 is rapidly sucked through the air guide wings 12 which are provided on the bottom surface of the valve body 10, and then flows into
5 the hole 11.

At this time, the packing 20 is upwardly moved by a suction force of the vacuum cleaner, thereby opening the hole 11. When the packing 20 moves upwards, air sequentially passes through the packing guide channel 13 of
10 the valve body 10 and the air discharging hole 3a of the suction nozzle-connecting unit 3, thus being discharged to the outside. In this case, the air remaining in the packing bag 1 is almost completely removed, thus dramatically reducing a volume of an item to be vacuum
15 packed in the packing bag 1.

When the volume of the item to be packed in the packing bag 1 is not further reduced during the suction process using the vacuum cleaner, the suction nozzle 2 of the vacuum cleaner is removed from the check valve 100 so
20 as to stop the air suction process. At this time, the packing 20 automatically closes the hole 11 by a vacuum pressure generated in the packing bag 1. Next, when the stopper 5 engages with the second internal threaded part 3c of the suction nozzle-connecting unit 3, the lower end of
25 the stopper 5 presses the packing 20 down. At this time, the packing 20 closes the hole 11 of the valve body 10 airtight, thus maintaining a vacuum of the bag 1.

However, when one desires to vacuum-pack an item in this way, the item must first be put into the packing bag 1.
30 Next, the packing bag 1 containing the item therein must be placed on a flat support surface. Thus, the vacuum packing method using the conventional check valve 100 has a problem that the guide groove 3d must be placed flat and the

suction nozzle 2 of the vacuum cleaner must be held vertically to come into close contact with the guide groove 3d, so it is difficult to vacuum-pack an item in the packing bag 1 using only a single hand. That is, in order to vacuum-pack an item in the packing bag 1, a user must grasp the suction nozzle 2 of the vacuum cleaner with one hand while grasping the suction nozzle-connecting unit 3 with the other hand.

In the case where a user unexpectedly moves his/ her hand grasping the suction nozzle 2 of the vacuum cleaner, external air may flow into a gap formed around the suction nozzle 2, thus reducing suction efficiency of the vacuum cleaner.

Further, the vacuum packing method using the conventional check valve 100 has another problem that the hole 11 must be closed using the stopper 5 when a vacuum is formed in the packing bag 1, so it is complicated to vacuum-pack an item in the packing bag 1 and the stopper 5 may be undesirably lost.

When the hole 11 is closed using the stopper 5, as shown in Fig. 3, the stopper 5 is inevitably projected from the packing bag 1. Thus, when one or more packing bags 1 containing items therein are stacked, the appearance of the stacked bags 1 becomes poor due to the projected stoppers 5.

The vacuum packing method using the conventional check valve 100 has a further problem that the packing bag 1 may be undesirably scratched and damaged due to a difference in the height of the projected stoppers 5 and the projected suction nozzle connecting units 3 when several packing bags 1 containing items therein are stacked.

Disclosure of the Invention

Accordingly, the present invention has been made keeping in mind the above problems occurring in the prior art, and an object of the present invention is to provide a check valve installed on a vacuum packing bag, which is improved in its structure to reduce a volume of a packing bag in which an item, such as bedclothes, clothing and foods, is vacuum-packed, and allow a suction nozzle of a suction means, such as a vacuum cleaner, to easily form a close connection with the check valve, therefore accomplishing high operational efficiency.

In order to accomplish the above object, the present invention provides a check valve for vacuum packing bags, installed on a suction nozzle of a packing bag to discharge air from the bag to the outside, the check valve comprising: a valve body including a hole formed at a central of a bottom of the valve body, an inner space defined within the valve body above the hole and a projected section for being inserted into the suction nozzle, the projected section being reduced in diameter as extended away from the hole; and means for opening and closing the hole installed in the inner space of the valve body.

It is preferred that the opening and closing means includes: a packing installed in the hole of the valve body to open or close the hole; a spring for elastically supporting the packing; a locking unit installed in the packing guide channel of the valve body and elastically supported by a spring, wherein the locking unit includes: a base panel; a handle provided in an upper portion of the base panel; guide lugs extended from opposed edges of the base panel; and air discharge holes formed on the base panel on opposite sides of the handle; and a cylindrical guide unit fitted into the valve body, wherein the guide

unit includes: a through hole for receiving the locking unit from a lower end of the guide unit; inclined edges formed along a lower end of a sidewall of the guide unit to guide a helical movement of the guide lugs of the locking unit; and a locking flange outwardly extended along an upper edge of the sidewall of the guide unit to be stopped on an upper end of the projected section.

It is also preferred that the projected section has an outside surface which forms a portion of a globe or a tapered cylindrical section.

Brief Description of the Drawings

The above and other objects, features and other advantages of the present invention will be more clearly understood from the following detailed description taken in conjunction with the accompanying drawings, in which:

Fig. 1 is an exploded perspective view showing a conventional check valve for packing bags;

Fig. 2 is a sectional view showing the conventional check valve, when the check valve is installed on a packing bag;

Fig. 3 is a sectional view showing the conventional check valve, when the check valve is closed;

Fig. 4 is an exploded perspective view showing a check valve according to a first embodiment of the present invention;

Fig. 5 is a sectional view showing the check valve according to the first embodiment of the present invention, when a suction nozzle of a suction means is placed at the check valve;

Fig. 6 is a sectional view showing the check valve according to the first embodiment of the present invention,

when the check valve is closed;

Fig. 7 is a plan view of the check valve according to the first embodiment of the present invention, with OPEN and CLOSED marks being shown;

5 Fig. 8 is an exploded perspective view showing a check valve according to a second embodiment of the present invention; and

Fig. 9 is a sectional view showing the check valve according to the second embodiment of the present invention,
10 when a suction nozzle of a suction means is placed at the check valve.

Best Mode for Carrying Out the Invention

15 Hereinafter detailed description will be made about a first embodiment of the invention with reference to Figs. 4 through 7.

Fig. 4 is an exploded perspective view showing a check valve according to the present invention. Fig. 5 is
20 a sectional view showing the check valve according to the present invention, when a suction nozzle of a suction means is positioned at the check valve. Fig. 6 is a sectional view showing the check valve according to the present invention, when the check valve is closed. Fig. 7 is a
25 plan view of the check valve according to the present invention, with OPEN and CLOSED marks being shown.

According to the present invention, a check valve 100 is installed on a packing bag 1 to discharge air from the bag 1 to the outside, and includes a valve body 10, a
30 locking unit 40, and a guide unit 50. The valve body 10 is installed on the packing bag 1 in such a way as to pass through the bag 1, thus allowing air remaining in the bag 1 to be directly sucked through a suction nozzle 2 of a

suction means (not shown), such as a vacuum cleaner. The locking unit 40 functions to control the flow of air in the check valve 100. The guide unit 50 controls the operation of the locking unit 40, thus controlling the flow of air according to a rotated state of the locking unit 40. The check valve 100 also has a disc 60 which is coupled around a lower outer periphery of the valve body 10 with the packing bag 1 interposed between the disc 60 and the valve body 10.

10 The valve body 10 includes a hole 11, a plurality of air guide wings 12, a packing guide channel 13, and a projected section 14 in the form of a hemisphere. The hole 11 is formed at the center of the bottom surface of the valve body 10. The air guide wings 12 extend toward the hole 11 in radial directions. The packing guide channel 13 extends upwardly from the bottom surface of the valve body 10 to communicate with the hole 11. The hemispherical projected section 14 is provided to define the packing guide channel 13 and allow the suction nozzle 2 to be in close contact with the hemispherical projected section 14. The valve body 10 also includes an annular flange 15 which is extended radially from a lower end of the hemispherical projected section 14 to couple with the disc 60 so that the packing bag 1 is secured between the annular flange 15 and the disc 60.

25 The valve body 10 is installed on the packing bag 1 in such a way that the upper surface of the valve body 10 is adhered to the bag 1 and the hemispherical projected section 14 passes through the packing bag 1.

30 A packing 20 and a spring 30 are set in the packing guide channel 13 of the valve body 10. The packing 20 is set in the hole 11 inside the packing guide channel 13 to open or close the hole 11, and is elastically biased by the

spring 30.

The locking unit 40 is installed in the packing guide channel 13 of the valve body 10 at a position above the spring 30, thus forced by the spring 30. The locking unit 5 40 includes a handle 41, a base panel 42 in the form of a disc, guide projections 44, and air discharging holes 43. The handle 41 is provided on an upper surface of the base panel 42 of the locking unit 40. The guide projections 44 are extended from opposed edges of the base panel 42. The 10 air discharging holes 43 are formed on the base panel on opposite sides of the handle 41.

The cylindrical guide unit 50 controls the rotation of the locking unit 40, thus controlling the flow of air, and includes a through hole 51, inclined edges 52, and a 15 locking flange 53. The through hole 51 is formed to allow the locking unit 40 to be set in the guide unit 40 from a lower end of the guide unit 40. The inclined edges 52 are formed along a lower end of a sidewall of the guide unit 40 to guide a helical movement of the guide projections 44 of 20 the locking unit 40. The locking flange 53 extends outwardly along an upper edge of the sidewall of the guide unit 40 to be stopped on an upper end of the hemispherical projected section 14.

The disc 60 is fitted over the hemispherical 25 projected section 14 of the valve body 10 for example through welding in such a way as to be in close contact with an outer surface of the packing bag 1, thus preventing a portion of the packing bag 1 where the valve body 10 is installed from being exposed to the outside.

30 Further, OPEN and CLOSED marks are formed on an upper surface of the disc 60, thus allowing a user to reliably control the check valve 100 to maintain or release a vacuum.

The operation and effect of the check valve for

vacuum packing bags according to the present invention is as follows.

First, bedclothes are put into the packing bag 1, and a slide fastener (not shown) installed at an opening of the bag 1 is closed.

Next, air remaining in the packing bag 1 is sucked through the check valve 100 installed on the packing bag 1, thus forming a vacuum inside the packing bag 1. When it is required to discharge air from the bag 1 to the outside, as shown in Fig. 5, the handle 41 of the locking unit 40 is rotated at an angle of 90 degrees, thus allowing air to freely flow through the check valve.

That is, when the handle 41 is rotated, the guide projections 42 of the locking unit 40 are helically and upwardly moved from a closed position along the inclined edges 52 of the guide unit 50 so that the locking unit 40 is opened, thus allowing the packing 20 to freely move.

In this case, the packing 20 still maintains its closed position by an elastic force of the spring 30, wherein the hole 11 is closed by the packing 20.

In such a state, the suction nozzle 2 of a vacuum cleaner is positioned in such a way as to be in close contact with the hemispherical projected section 14 of the valve body 10. In this case, the suction nozzle 2 may be positioned in such a way as to be perpendicular to the hemispherical projected section 14. Alternatively, as shown by one-dot chain lines of Fig. 5, the suction nozzle 2 may be positioned at an angle with respect to the hemispherical projected section 14. That is, since the suction nozzle 2 has a circular cross section and the projected section 14 has a hemispherical configuration, a portion of the hemispherical projected section 14 in contact with the suction nozzle 2 always defines a circle

equal to the cross section of the suction nozzle 2. As a result, although the suction nozzle 2 is positioned at an angle with respect to the hemispherical projected section 14, no gap is formed between the suction nozzle 2 and the hemispherical projected section 14, thus allowing the suction nozzle 2 to be stably and closely in contact with the hemispherical projected section 14.

In other words, the suction nozzle 2 is in close contact with the hemispherical projected section 14 regardless of an angle between the suction nozzle 2 and the hemispherical projected section 14, so a user has only to grasp only the suction nozzle 2 with one hand to perform an air suction process using the suction nozzle 2 of the vacuum cleaner, thus easily carrying out the air suction process.

When the suction nozzle 2 is placed at the hemispherical projected section 14 in this way, the vacuum cleaner is operated to generate a suction force.

At this time, the air remaining in the packing bag 1 is sucked through the air guide wings 12 which are provided in the bag 1. Next, the sucked air flows into the hole 11 of the valve body 10.

When the sucked air flows into the hole 11, the packing 20 is moved upward by the air flow. Thereafter, the air flowing into the hole 11 is discharged through the air discharging holes 43 of the locking unit 40. As the air is discharged to the outside, a volume of the packing bag 1 which contains an item, such as bedclothes and clothing, therein, is dramatically reduced. Further, the item is vacuum-packed in the packing bag 1, thus suppressing the growth of mold in the packing bag 1, therefore protecting the item from bacteria.

Although the packing bag 1 is not placed flat when an

item is packed in the packing bag 1 having the check valve 100 of the present invention, the suction nozzle 2 of the vacuum cleaner is easily placed to come into close contact with the check valve 100 of the packing bag 1 using only a
5 single hand, therefore being convenient to use.

When the volume of the packing bag 1 which contains an item therein is dramatically reduced, the suction nozzle 2 is removed from the hemispherical projected section 14 of the valve body 10, thus stopping the suction operation of
10 the suction nozzle 2.

At this time, the packing 20 is returned to its original position by a restoring force of the spring 30 so that the hole 11 is automatically closed, thus keeping the interior of the packing bag 1 in a vacuum state. When the
15 handle 41 of the locking unit 40 is rotated to the closed position, both the spring 30 and the packing 20 are pressed down so that the hole 11 is forcibly closed, thus stably maintaining a vacuum.

In this case, the locking unit 40 is always set in the check valve 100, so it may be not lost, therefore being
20 convenient to use.

When an item is vacuum-packed in the packing bag 1 with the check valve 100 of the present invention, the check valve 100 is designed such that only the
25 hemispherical projected section 14 is projected from the bag 1, so the projected part is considerably lower in height than that of a conventional check valve. Thus, when one desires to stack several packing bags 1, they may be neatly stacked due to reduced interference of the check
30 valves. Further, the valve body 10 is made of a soft material, such as polyester (PE), and is inclinedly projected from the packing bag 1, thus preventing one packing bag from being damaged by another packing bag.

Fig. 8 is an exploded perspective view showing a check valve according to a second embodiment of the present invention, and Fig. 9 is a sectional view showing the check valve according to the second embodiment of the present invention, when a suction nozzle of a suction means is placed at the check valve.

A check valve 200 shown in Figs. 8 and 9 comprises a valve body 210 having a tapered cylindrical section 214 to allow a suction nozzle 2 (refer to Fig. 5) to be in close contact with the tapered cylindrical section 214. The hemispherical projected section 14 in the first embodiment is replaced by the tapered cylindrical section 214 in the second embodiment. The other construction of the check valve 200 of the second embodiment is substantially same as that of the check valve 100 of the first embodiment.

Therefore, it can be understood that the check valve 200 of the second embodiment has operations and effects which are substantially same as those of the check valve 100 of the first embodiment.

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Industrial Applicability

As described above, the present invention provides a check valve for packing bags, which is provided with the hemispherical section or tapered cylindrical section, thus preventing a formation of a gap between a suction nozzle of a vacuum cleaner and the check valve even when the suction nozzle is perpendicularly positioned at the packing bag or inclinedly positioned at the packing bag, therefore allowing an item to be easily vacuum-packed and being more convenient to use in comparison with a conventional check valve.

Further, the check valve of the present invention is designed such that its hemispherical or tapered cylindrical

section projected from the bag is lower in height than a projected part of a conventional check valve, thus minimizing the interference between several packing bags, therefore easily and neatly stacking the packing bags.

5 Although the preferred embodiments of the present invention have been disclosed for illustrative purposes, those skilled in the art will appreciate that various modifications, additions and substitutions can be made without departing from the scope and spirit of the
10 invention as disclosed in the accompanying claims.

Claims

1. A check valve 100, 200 for vacuum packing bags, installed on a suction nozzle 2 of a packing bag 1 to discharge air from the bag 1 to the outside, the check valve 100, 200 comprising:

a valve body 10, 210 including a hole 11, 211 formed at a central of a bottom of the valve body 10, 210, an inner space defined within the valve body 10, 210 above the hole 11, 211 and a projected section 14, 214 for being inserted into the suction nozzle 2, the projected section 14, 214 being reduced in diameter as extended away from the hole 11, 211; and

means for opening and closing the hole 11, 211 installed in the inner space of the valve body 10, 210.

2. The check valve according to claim 1, wherein the opening and closing means includes:

a packing 20, 220 installed in the hole of the valve body to open or close the hole 10, 210;

a spring 30, 230 for elastically supporting the packing 20, 220;

a locking unit 40, 240 installed in the packing guide channel of the valve body and elastically supported by a spring 30, 230, wherein the locking unit includes:

- a base panel 42, 242;
- a handle 41, 241 provided in an upper portion of the base panel 42, 242;
- guide lugs 44, 244 extended from opposed edges of the base panel 42, 242; and
- air discharge holes 43, 243 formed on the base panel 42, 242 on opposite sides of the handle 41, 241; and
- a cylindrical guide unit 50, 250 fitted into the

valve body 10, 210, wherein the guide unit includes:

- a through hole 51, 251 for receiving the locking unit 40, 240 from a lower end of the guide unit 40, 240;
- inclined edges 52, 252 formed along a lower end of
5 a sidewall of the guide unit 50, 250 to guide a helical movement of the guide lugs 44, 244 of the locking unit 40, 240; and
- a locking flange 53, 253 outwardly extended along an upper edge of the sidewall of the guide unit 50, 250 to
10 be stopped on an upper end of the projected section 14, 214.

3. The check valve according to claim 1, wherein the projected section 14 has an outside surface which forms a portion of a globe.

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4. The check valve according to claim 1, wherein the projected section 214 has an outside surface which forms a tapered cylindrical section.

20 5. The check valve according to claim 1, further comprising a disc 60, 260 coupled with a lower outer periphery of the projected section 14, 214 of the valve body 10, 210, wherein the valve body 10, 210 further includes an annular flange 15, 215 which is extended
25 radially from a lower end of the projected section 14, 214 to couple with the disc 60, 260 so that the packing bag 1 is secured between the annular flange 15, 215 and the disc 60, 260.

30 6. The check valve according to claim 1, OPEN and CLOSED marks are provided on an upper surface of the disc 60, 260, thus allowing a user to control the check valve to maintain or release vacuum in the packing bag.