

DESCRIPTION

TITLE OF THE INVENTION: PACKAGING DEVICE FOR HOME DELIVERY SERVICE

Technical Field

[0001]

The present invention relates to a packing device for an article, specifically, an article packing device to be preferably used for home delivery service of an article that is requested to be repaired.

Background Art

[0002]

When transporting an article, to effectively protect the article from impacts and vibrations that may be applied thereto during transportation, normally, the article is packed by using cushioning bodies of paper, plastic sheets, or other materials having shock-absorbing characteristics, and further, the article is packed with fillings to prevent the article from moving as appropriate.

[0003]

Recently, in home delivery services, requests for delivery of electronics such as laptops and digital cameras to manufacturers and repair centers of mass retailers have increased. The products such as laptops and digital cameras

are normally packed in exclusive packing boxes when the products are purchased at mass retailers and retail stores, and if the boxes are not disposed of but are left as they are, they can be reused at the time of request for repair, however, in actuality, such boxes are disposed of immediately after the purchase of the products, so that in the case of request for repair, an available box is used.

[0004]

Of course, home delivery service companies prepare boxes of various sizes to meet customer requests, however, the sizes and shapes of products are diverse, and it is difficult to satisfactorily pack all products in boxes that home delivery service companies prepare.

[0005]

According to Japanese Industrial Standards (JIS Z 101), packing means "a technique for applying appropriate material and a container, etc., to an article for protecting the article's value and conditions at the time of transportation or storage of the article, and a state where the technique is applied, and packing is classified into individual packing, inner packing, and outer packing," and when selling a product, "individual packing" is necessary, that is, it is necessary to pack articles individually and, for increasing the commodity value of the

article, apply an appropriate material and container for protecting the articles to the articles, however, when a person requests a home delivery service person to transport a product to be repaired, "individual packing" as in the case of product sale is not necessary, but the product must be effectively protected from impacts and external forces that may apply thereto during transportation, so that a packing box must not be necessarily used.

[0006]

Therefore, when delivering an article to a manufacturer or a repair center of a mass retailer, it is convenient that the article is put in a bag and directly transported. However, a simple paper bag or vinyl bag cannot secure safety. When using a bag, a special measure for protecting a product from impacts is necessary. For example, Patent Document 1 describes a package including a bag-shaped article storing portion for storing articles and a bag-shaped cushioning portion which is connected to at least a part of the periphery of the article storing portion and reduces impacts applied from the outside to the article storing portion by cushioning materials sealed inside.

[0007]

Patent Document 2 describes a bag using a heat-insulating

effect of foamed granular bodies as a temperature-keeping bag to be used as a shopping bag although it is not a bag for article transportation. This temperature-keeping bag is a double bag, having an inner bag portion and an outer bag portion which form a granular body storing portion therebetween and are freely deformable, and includes a bag main body that is formed so as to store an object to be kept in temperature, and is non-breathable on at least the side of the outer bag portion of the bag portions, numerous foamed granular bodies which are stored in the granular body storing portion and gather together in a close-contact state and turn into a solidified state as the granular body storing portion is deaerated, and an air intake/exhaust port that is provided in the bag main body and communicatively connected to the granular body storing portion, and includes an on-off valve for keeping the deaerated state of the granular body storing portion.

[0008]

The effect of the temperature-keeping bag described in Patent Document 2 is emphasized in which, by solidifying numerous foamed granular bodies stored in the granular body storing portion along the shape of the object to be kept in temperature, heat loss due to circulation of air around the object to be kept in temperature inside the bag main body is eliminated,

and the foamed granular body group can insulate heat, so that changes in temperature of the object to be kept in temperature can be reduced for a long period of time, and by positioning the object to be kept in temperature by the solidified foamed granular bodies so as to prevent this from moving inside the bag main body, the object to be kept in temperature can be prevented from being deteriorated in quality due to movement of the object to be kept in temperature.

[0009]

The temperature-keeping bag described in Patent Document 2 uses the heat-insulating effect of the foamed granular body group for temperature keeping of the object to be kept in temperature by solidifying the foamed granular body group along the shape of the object to be kept in temperature, and it can be expected that positioning of the object to be kept in temperature by the solidified foamed granular bodies so as to prevent the object to be kept in temperature from moving inside the bag main body will provide not only a heat-insulating effect but also a cushioning effect by the solidified foamed granular bodies, and it can also be expected that stable holding of the article at a fixed position will provide a great effect in packing of the article to be transported by home delivery service.

[0010]

However, the temperature-keeping bag described in Patent Document 2 is intended to be used as a shopping bag, and although it is not impossible to use the bag described in Patent Document 2 as a bag for storing an article to be transported by home delivery service, the bag is merely a bag as it is, and it is impossible that a customer possesses this bag for home delivery service, and on the contrary, even in the case where a packing and home delivery service person gives this bag to a customer, it is difficult to prepare bags of various sizes corresponding to the kinds of products in advance, and preparation of disposable bags increase the cost and is not realistic. The trouble is that the conventional system in which a customer requests a home delivery service person to deliver an article is on the assumption that the customer packs the article and then requests the home delivery service person to deliver the packed article.

Prior Art Documents

Patent Documents

[0011]

Patent Document 1: Japanese Published Unexamined Patent Application No. 2008-74451

Patent Document 2: Japanese Published Unexamined Patent Application No. 2001-321217

Summary of the Invention

Problem to be Solved by the Invention

[0012]

A theme to be achieved by the present invention is how to abandon the system in which a customer packs an article and then requests a home delivery service person to deliver the article and eliminate the need to pack an article to be requested to be repaired, and as a solution, there will be a use mode preferable for packing an article requested to be delivered as a home delivery parcel because the bag described in Patent Document 2 is not necessarily sufficient to be used by a packing and home delivery service person to pack, at the time of pickup, an article received from a customer and transport it while the bag is a shopping bag although it is not impossible to use the bag as it is as a bag for packing an article to be delivered by home delivery service.

[0013]

In particular, the problem is the system that, in most conventional cases where a customer requests a home delivery service person to deliver an article, the customer packs the article and then requests the home delivery service person to deliver it. In the temperature-keeping bag described in Patent Document 2, the bag main body is provided with an air

intake/exhaust port communicatively connected to the granular body storing portion, and to the air intake/exhaust port, an air intake valve that keeps a deaerated state of the granular body storing portion is attached. According to the description of Patent Document 2, this air intake valve is the same as that used for a child floating bag, and keeps a valve closed state in a no-load state, and turns into a valve opened state by being pinched and pushed with fingers from the outside.

[0014]

Further, an evacuation pump for deaerating the inside of the bag main body is a manual type or an electric type, which is carried by a consumer who possesses a shopping bag or is installed in a food store to be used. To use the bag, the evacuation pump is connected to the air intake/exhaust port, and a valve opened state of the air intake valve is kept by holding the air exhaust valve at the air intake/exhaust port from the outside, and by actuating the evacuation pump, the air in the granular body storing portion of the double bag of the bag body is evacuated, and there is room for improvement in this operation.

[0015]

Specifically, it is very inconvenient that, as an on-off valve, similar to the valve used for a child floating bag, a

valve opened state of the air intake valve is held by holding from the outside and the inside of the bag body is deaerated by a vacuum pump, and this is inevitably inferior in reliability. Further, under the assumption of shopping at a store, as an evacuation pump, it is unavoidable to use a pump that is carried by a consumer or installed in a food store, however, the use of the home delivery service for requesting delivery of an article should not be handled in an equivalent manner to shopping.

Means for Solving the Problem

[0016]

The present invention provides a packing device for an article to be delivered by home delivery service, formed of a combination of an outer layer sheet, a mat, and cushioning bodies filled inside the mat. The outer layer sheet is a surface protective cover for the mat, and the mat is laminated integrally on the outer layer sheet. A holder is formed by folding the mat in two together with the outer layer sheet, and by sandwiching an article between the bottom portion and the surface portion of the holder, closing both side edges of the mat folded in two as appropriate, and deaerating the inside of the mat, the article is packed.

[0017]

As a main feature of the present invention, a valve is formed of a combination of a check valve and an air intake valve and is attached to a part of the mat, and when packing, by applying a suction force of a pump, the inside of the mat is deaerated and cushioning bodies solidify, and after deaeration, the check valve functions to keep the deaerated state, and when unpacking, the air intake valve is manually opened and the outside air is suctioned into the mat to soften the cushioning bodies.

Effects of the Invention

[0018]

With a packing device according to the present invention, when a home delivery service person carries the packing device and a pump to a customer, packs an article requested to be delivered, and inserts a suction port of the exclusive pump into the air intake/exhaust port of the valve and deaerates the inside of the mat by operating the pump, cushioning bodies inside the mat solidify along the shape of the article, and in the state where the respective surface portions of the article are protected by the mat, the article is packed.

[0019]

The valve is a check valve, so that the outside air is not suctioned naturally, however, for safety, after a knob is rotated to prevent the air intake valve from opening, the flap

is folded to close the opening of the bag and cover the surface of the valve, and the bag is loaded as it is in a vehicle and transported.

[0020]

At the delivery destination, the air intake valve is unfixed by exposing the valve by opening the flap and rotating the knob, and accordingly, the outside air is suctioned and cushioning bodies are softened only by opening the valve port of the air intake valve by pushing the valve stem down, so that the article can be easily attached to and detached from the holder.

[0021]

A packing device according to the present invention can be used as a packing device that a home delivery service person possesses and carries to a customer, and collects from a delivery destination and repeatedly uses, and unlike a disposable cardboard box, the packing device produces no waste after it is used.

Brief Description of the Drawings

[0022]

Figs. 1 show a combination of a mat and an outer layer sheet to be used for a packing device for an article to be delivered by home delivery service according to the present invention,

and Fig. 1(a) is a plan view of the mat, and Fig. 1(b) is a plan view of the outer layer sheet.

Figs. 2 are views showing a state where the mat to be used for a packing device for an article to be delivered by home delivery service is laminated on the outer layer sheet and sewn, and Fig. 2(a) is a bottom view, Fig. 2(b) is a plan view, and Fig. 2(c) is a sectional view taken along line X_1-X_1 of Fig. 2(a).

Fig. 3(a) is a developed view of a packing device for an article to be delivered by home delivery service, and Fig. 3(b) is a view showing a state where the bottom portion and the surface portion of a holder are formed by folding the packing device.

Figs. 4 show a structure of a valve, and Fig. 4(a) shows the structure when a check valve is opened, Fig. 4(b) shows the structure when an air intake valve is opened, and Fig. 4(c) shows the structure when the air intake valve is made unable to open. Fig. 4(a) and Fig. 4(b) show a front surface central longitudinal section of a valve, and Fig. 4(c) shows a side surface central longitudinal section of the same.

Figs. 5 show a configuration of the valve, and Fig. 5(a) is a sectional side view, and Fig. 5(b) is a plan view.

Figs. 6 are perspective views of the valve, and Fig. 6(a)

is a view showing a position at which an air intake valve is openable in a state immediately after a knob is inserted into a valve cage, and Fig. 6(b) is a view showing a state where the air intake valve is made unable to open by turning the knob.

Figs. 7 are views schematically showing a relationship between an operation push button and a tubular portion, and Fig. 7(a) shows a position at which a stay is opposed to a recessed portion of the tubular portion, Fig. 7(b) shows a state where the push button is depressed, and Fig. 7(c) is a view showing a state where the push button becomes unable to be depressed.

Fig. 8(a) to Fig. 8(c) are views showing article packing steps using the packing device for an article to be delivered by home delivery service according to the present invention.

Fig. 9(a) is a view showing a state before the inside of the mat is deaerated, and Fig. 9(b) is a view showing a state after the inside of the mat is deaerated.

Fig. 10 is a view showing an example in which both side edges of the mat are connected by creased sheets.

Figs. 11 shows a packing device for an article to be delivered by home delivery service according to Example 2, and Fig. 11(a) and Fig. 11(c) are developed views of the packing device according to Example 2, and Fig. 11(b) is a sectional view taken along line D-D of Fig. 11(a).

Fig. 12 is a view showing amorphous small pieces made of polystyrene as cushioning bodies.

Fig. 13(a) to Fig. 13(f) are views showing various examples of materials that can be used as cushioning bodies.

Figs. 14 show a packing device for an article to be delivered by home delivery service according to Example 3, and Fig. 14(a) is a plan view, Fig. 14(b) is a bottom view, and Fig. 14(c) is a sectional view taken along line X₂-X₂ of Fig. 14(b).

Mode for Carrying Out the Invention

Example 1

[0023]

Figs. 1 are developed views of constituent members of a packing device for an article to be delivered by home delivery service according to the present invention. The packing device for an article to be delivered by home delivery service in this example is formed by combining and laminating a mat 1 and an outer layer sheet 2 integrally. A valve 6 is attached to the mat 1 as shown in Fig. 1(a). The mat 1 is formed by filling cushioning bodies 4 in an airtight bag formed by overlapping a front surface sheet 1a and a rear surface sheet 1b that are airtight and rectangular and sealing the peripheral edges thereof, and the valve 6 is for evacuating air from the inside of the mat 1 or taking the outside air into the inside of the

mat, and is attached to a part of the mat 1.

[0024]

In this example, the outer layer sheet 2 is merely a cover covering a surface of the mat 1 as shown in Fig. 1(b), and in a part of the sheet surface, a small hole H which the valve 6 attached to the mat faces is opened.

[0025]

The outer layer sheet 2 and the mat 1 are square-shaped sheets horizontally long (vertically long when they are placed vertically), the outer layer sheet 2 is longer than the mat 1, the mat 1 and the outer layer sheet 2 are overlapped up and down by fitting their one ends together as shown in Figs. 2, and the overlapping section becomes an article packing region Wa, and the extension portion Wc of the outer layer sheet 2 becomes a flap 5 that closes an opening of a holder 3 formed by folding the mat 1 in two together with the outer layer sheet 2 as described later.

[0026]

The cushioning bodies 4 have a function to reduce impacts to be applied to an article from the outside by bringing the mat 1 into close contact with the surface of the article by fitting the shape of the article packed in the mat 1 and increasing the filling density when the air inside the bag body of the

mat 1 is evacuated and the internal capacity of the bag body is reduced. Materials having this function are, for example, beads of a synthetic resin foamed material, and are filled in the mat 1. The air intake/exhaust port of the valve 6 is positioned at a part of the sheet surface of the outer layer sheet 2 in the packing region Wa, specifically, near the end edge of the outer layer sheet 2.

[0027]

In Fig. 3(a), the mat 1 is folded inward in two together with the outer layer sheet 2 from the intermediate portion O-O of the entire length in the longitudinal direction of the packing region Wa, and the folded portions become the bottom portion B and the surface portion C of the holder 3 as shown in Fig. 3(b). In this example, one side edge of the holder 3 formed by folding the packing region Wa in two from the intermediate portion O-O is sewn in advance by a seam S. To the other side edge, a fastener 7 for opening and closing the gap is attached.

[0028]

Further, to the end edge of the flap 5 of the outer layer sheet 2 and a corresponding portion on the sheet surface of the outer layer sheet 2 forming the surface portion C of the holder 3, hook-and-loop fasteners 8 for closing the gap between the bottom portion B and the surface portion C of the holder

3 formed when the packing region Wa is folded in two are attached. To a part of the outer surface of the flap 5 that is the extension portion Wc of the outer layer sheet 2, a home delivery slip pocket 5a is attached. The slip pocket 5a is a pocket having a transparent sheet which allows characters written on a slip stored inside to be seen through.

[0029]

In this example, for the mat 1, a thermoplastic polyurethane sheet or a vinyl chloride sheet is used, and for the outer layer sheet 2, a thermoplastic polyurethane sheet, a vinyl chloride sheet, a laminate film of metallocene-based polyethylene with softness and EVOH/polyethylene or a laminate film of metallocene-based polyethylene and gas barrier nylon, nylon 6, nylon 66 base cloth/thermoplastic urethane tarpaulin, nylon 6, nylon 66 base cloth/vinyl chloride tarpaulin, or polyester base cloth/thermoplastic urethane tarpaulin, polyester base cloth/vinyl chloride tarpaulin is used.

[0030]

When beads are used as cushioning bodies 4, it is necessary to fill the beads in the mat 1 without partial bias. In this example, in order to fill a large number of beads over the entire surface without bias, it is also possible that a breathable bag using polyester spunbond nonwoven fabric or nylon spunbond

nonwoven fabric is partitioned into several narrow and long bag-shaped sections, and in the sections, the same fixed amounts of beads are filled, and the bag is inserted between the front surface sheet 1a and the rear surface sheet 1b of the mat 1 to finish a mat having a flat appearance.

[0031]

The beads are granular bodies of foamed polyethylene or foamed polystyrene, and as the grain diameter becomes smaller, the beads can more satisfactorily fit the shape of an article although the grain diameter is not limited.

[0032]

The structure of the valve 6 is shown in Figs. 4. The valve 6 consists of a combination of a check valve 9 and an air intake valve 10, and at the center of the inside of a cylindrical valve cage 11 having a flange 11a on the bottom, the air intake valve 10 is installed, and around the air intake valve 10, the check valve 9 is installed. The flange 11a is a support that airtightly supports the valve cage 11 from the inside of the mat 1. The check valve 9 opens when a suction force of a pump is applied thereto for deaerating the inside of the mat 1, and after the deaeration, opens to block introduction of the outside air into the mat 1, and the air intake valve 10 is opened by a push button operation to allow

the outside air to be introduced into the deaerated inside of the mat 1.

[0033]

The valve cage 11 is removably coupled to a coupler 12 fitted to the pump (or to a suction port of a hose connected to the pump). As described later, Fig. 4(a) shows a state where the check valve is opened by suctioning by the pump and the air inside the mat is evacuated, Fig. 4(b) is a state where the air intake valve 10 is opened and air is introduced into the mat, and Fig. 4(c) shows a state where a valve opening operation is blocked to prevent the air intake valve 10 from opening. Fig. 5(a) and Fig. 5(b) show constituent members of the check valve 9 and the air intake valve 10. The air intake valve 10 consists of a combination of a tubular portion 10a projecting at the center of the valve cage 11, and a valve stem 10c for opening and closing the valve port 10b inside the tubular portion 10a, and a coil spring 10d is fitted to the outside of the valve stem 10c, and a rubber packing 10e is fitted to the neck portion of the valve stem 10c, and by applying a resilient force of the coil spring 10d to the valve stem 10c, a spring presser 10f is supported on the inner wall of the tubular portion 10a, the rubber packing 10e is brought into pressure contact with the port edge of the valve port 10b, and accordingly, the

valve port 10b is normally held in a valve closed state.

[0034]

In the outer wall of the valve cage 11, a cam groove 13 is spirally opened in a rising direction (refer to Figs. 6). To the valve cage 11, a knob 15 including a protrusion 14 that is engaged in the cam groove 13 is fitted turnably. The knob 15 has an operation push button 16 that can be depressed by using the elasticity of its material on the head portion, and on the lower surface of the push button 16, a stay 17 that is brought into contact with the top portion of the tubular portion 10a into which the valve stem 10c is inserted is provided in a projecting manner. On the other hand, the tubular portion 10a has a recessed portion 18 on the top portion. Fig. 7(a) shows a state where the protrusion 14 is at the right end of the cam groove 13 rising diagonally from the left to the right (position at which the protrusion 14 is lifted maximally), and the air intake valve is openable by the push button 16. Fig. 6(b) shows a position at which the protrusion 14 is at the left end of the cam groove 13 (position at which the protrusion 14 is depressed) and the air intake valve cannot open. The relationship between the cam groove 13 and the push button 16 is shown in Figs. 7.

[0035]

Figs. 7 are views schematically showing the relationship between the operation push button 16 of the knob 15 and the tubular portion 10a. The knob 15 is displaced up and down according to a change in rotational angle along the spiral of the cam groove 13, and as shown in Fig. 7(a), when the stay 17 is at a position opposed to the recessed portion 18 of the tubular portion 10a, the operation button can be depressed within the range of the depth of the recessed portion 18 as shown in Fig. 7(b), and when the stay 17 is at a position deviating from the recessed portion 18 as shown in Fig. 7(c), the stay 17 is supported by the top portion of the tubular portion 10a and pressed against the top portion, so that depression of the operation push button 16 becomes impossible.

[0036]

Therefore, when the stay 17 is at a position deviating from the recessed portion 18, the air intake valve 10 cannot be opened. At times other than air intake, the knob 15 is rotated to bring the stay 17 into contact with the head portion of the tubular portion 10a so as to prevent the push button 10 from being depressed. On the other hand, in Figs. 5, the check valve 9 consists of a combination of a filter 9a, a ring 9b having a valve port in a space surrounded by radial ribs, and a valve plate 9c made of a soft material, and is installed on the outer

periphery of the air intake valve 10 around the tubular portion 10a.

[0037]

To assemble the check valve 9, first, the filter 9a is supported and set on the edge of the annular opening formed around the tubular portion 10a, and then, the ring 9b is fitted, and further, the valve plate 9c is inserted and held on the tubular portion 10a by a pressure applied by a valve plate presser 9d from above. The valve cage 11 attached to the mat 1 is drawn out to the surface of the outer layer sheet 2 from a small hole H opened in the outer layer sheet 2, and held at a fixed position in a state where the ring 20 is fitted from above and the valve cage 11 is airtightly sealed to the lamination of the outer layer sheet 2 and the mat 1.

[0038]

Next, a usage example of the packing device for an article to be delivered by home delivery service according to the present invention will be described. For example, a case where a laptop malfunctions and a user of the laptop requests repair of it to a repair center is considered. Normally, transportation of a laptop to be requested to be repaired (hereinafter, abbreviated to an article M) is requested to a home delivery service person. A customer is not required to perform packing

of the laptop for transportation. When a customer (customer of home delivery service) requests a home delivery service person to transport the article M, the home delivery service person visits a place (the customer's home or office, etc.) that the customer designates with the packing device for an article to be delivered by home delivery service according to the present invention and a deaeration pump, and receives the article M from the customer.

[0039]

In Fig. 8(a), the home delivery service person places the carried packing device for an article to be delivered by home delivery service on a floor or a desk at the visit, and inserts the article M into the holder 3 in a state where the fastener 7 on one side is opened, and then closes the fastener as shown in Fig. 8(b).

[0040]

In this state, as shown in Fig. 9(a), when the home delivery service person fits the coupler 12 attached to the hose tip end of the pump 19 to the valve cage 11, and suctions the air into the cylinder 19a by piston-operating the pump 19, the valve plate 9c of the check valve 9 installed in the valve cage 11 opens and the air inside the mat 1 is evacuated (refer to Fig. 4(a)). As the inside of the mat 1 is deaerated, as shown in

Fig. 9(b), the capacity thereof is reduced, and the sheet surface on the side in contact with the article M is pressed against the surface of the article M, and at this time, the cushioning bodies 4 gather closely to each other and their free movements are blocked, and accordingly, the cushioning bodies are solidified in the state where the mat 1 is in close contact with the article M and holds the article at a fixed position. In this state, the home delivery service person rotates the knob 15 so that the stay 17 of the push button 16 is supported by the head portion of the tubular portion to prevent the air intake valve 10 from opening (refer to Fig. 4(c)).

[0041]

Thereafter, as shown in Fig. 8(c), the home delivery service person folds the flap 5 back onto the surface portion C of the outer layer sheet 2 covering the surface of the article M, inserts a delivery slip into the slip pocket 5a, and keeps the pack as a home delivery parcel and transports it as a parcel to the personal computer repair center as a delivery destination.

[0042]

In the present invention, unless air is sent to the inside of the bag body of the mat 1, the mat comes into close contact with the article M and supports it stably, and due to the cushioning effect of numerous beads or other cushioning bodies

filled in the bag body, impacts and vibrations applied from the outside are reduced.

[0043]

To unpack the parcel at the delivery destination, first, the flap 5 fastened by the hook-and-loop fastener 8 is taken off from the surface portion C to expose the valve cage 11 of the valve 6 to the outside. Next, when the knob 15 fitted to the valve cage 11 is rotated, the protrusion 14 engaged in the cam groove 13 is guided along the cam groove 13, and according to turning of the knob 15, as shown in Fig. 7(a), the protrusion 14 projecting on the lower surface of the push button 16 is made opposed to the recessed portion 18 formed on the head portion of the tubular portion, and it becomes possible to depress the push button 16. At this time, when the push button 16 is depressed by a finger, the valve stem 10c inserted in the tubular portion 10a is pushed down integrally and opens the valve port 10b, and the outside air is suctioned to the inside of the mat 1 the pressure in which has become negative, and the close contact state of the cushioning bodies is eliminated and the mat 1 becomes soft, so that the packed package can be freely opened (refer to Fig. 4(b)).

[0044]

The article M taken out from the mat 1 by opening the

mat 1 is handed over to the personal computer repair center together with the delivery slip, and the packing bag is recovered and prepared for the next article transportation. Alternatively, it is also possible that the packing bag is kept at a repair center, and when the article M is transported back to the customer after the article is completely repaired, the article M is packed by the mat 1 and kept as a delivery parcel and returned to the customer, and thereafter, the mat 1 is collected from the customer. It is preferable that after the article is taken out from the mat 1 by opening the mat, for the next delivery, the knob 15 is rotated at this stage to support the stay 17 of the push button 16 by the head portion of the tubular portion as shown in Fig. 4(c) so as to prevent the air intake valve 10 from opening.

[0045]

The example described above describes a case where one of both side edges of the packing region of the mat folded in two as a holder is sealed, and the other side is made openable and closable. Thus, when the front surface and one side edge of the bag are open, there is no substantial trouble in packing of an article, and after an article is stored therein, the fastener on the other side edge is only closed, so that the packing operation can be quickened. Further, the holder may

be processed in advance into a bag shape whose front surface is opened by connecting both side edges of the two-folded packing region of the mat 1 by creased sheets 21 as shown in Fig. 10. By making a crease at the center of each sheet 21 that connects the side edges, lateral projection of the sheets 21 when the mat is contracted and solidified can be minimized. By closing both side edges of the holder folded in two, the opening angle of the holder is limited, and the degree of close contact of the mat with the article stored in the bag can be increased.

Example 2

[0046]

In this example, as shown in Figs. 11, the sheet surface of the mat 1 is bonded (heat-welded) in a range of a fixed area, and on a specific portion of the mat 1, a non-cushioning portion 40 with no cushioning bodies filled is locally formed. In order to obtain the cushioning effect uniformly on the entire surface of the mat 1, it is necessary to fill the cushioning bodies 4 uniformly in the mat 1, however, in the case where beads are used as the cushioning bodies 4, if beads are filled uniformly in the mat, filling of beads may be biased, and the thickness of the mat may partially become excessively thick.

[0047]

In order to eliminate these problems, it is effective

that the non-cushioning portion 40 without cushioning bodies are formed by properly heat-welding the front surface sheet and the rear surface sheet of the mat 1. The non-cushioning portion 40 is formed by bonding upper and lower sheet surfaces of the mat of a specific portion the periphery of which is supported by the cushioning bodies 4 in a range of a fixed area.

[0048]

In detail, Fig. 11(a) shows an example in which a circular non-cushioning portion 40 is formed at corresponding four positions of the central regions of the surface portion C and the corresponding bottom portion B of the packing region. According to this example, as shown in Fig. 11(b), when an article is sandwiched by the mat folded in two as a holder, the peripheries surrounding the non-cushioning portions 40 are supported by the cushioning bodies 4 filled in the mat 1, and according to the reduction in cushioning area, impacts to be applied to the article can be reduced. The non-cushioning portions 40 are not necessarily formed dispersedly, and it is also possible that, as shown in Fig. 11(c), in the central regions of the surface portion C and the bottom portion B, non-cushioning portions 40 assuming rectangles are formed.

[0049]

In the present invention, any cushioning bodies 4 can

be used as long as the cushioning bodies are filled in the mat, and by deaeration of the inside of the mat, brought into pressure close contact with each other and brought into pressure contact with the surface of an article sandwiched by the packing region of the mat folded in two as a holder, and a frictional resistance necessary for preventing lateral displacement of the article is obtained. In this respect, granular simple bodies such as beads come into close contact with each other and are integrated to pressurize the article according to deaeration of the inside of the mat, and accordingly, the granular simple bodies prevent lateral displacement of the article.

[0050]

Without limiting to beads, this function may be performed by amorphous small pieces 4a made of polystyrene as shown in Fig. 12 (these small pieces are normally used as cushioning materials to be packed together with an article in a box), and further, the pieces may be processed into sheet-like or net-like shapes. Figs. 13 show various examples of materials that can be used as cushioning bodies.

[0051]

Fig. 13(a) to Fig. 13(d) show examples of foamed polyethylene extruded sheets 22 having punched holes formed dispersedly on the sheet surfaces, and Fig. 13(a) shows punched

holes a having circular shapes with the same diameter, Fig. 13(b) shows large and small punched holes b with different diameters, Fig. 13(c) shows punched star-patterned holes c, and Fig. 13(d) shows punched cross-patterned holes d opened dispersedly in the longitudinal and lateral directions of the sheet surface. Fig. 13(e) shows a fruit net 23 in which a fruit such as a peach, apple, or pear is placed. This fruit net is formed by processing foamed polyethylene strings into a lattice shape, and can expand and contract uniaxially. Further, Fig. 13(f) shows a bubble cushioning sheet 24 formed by forming small projecting edges e of enclosed independent bubbles longitudinally and laterally on a polyethylene sheet surface. [0052]

One or two or more sheets or nets having holes or projecting edges dispersed on the surfaces are laminated and filled in the mat as shown in Fig. 13(a). Then, when the mat 1 is folded to wrap an article and the inside of the mat 1 is deaerated, the laminated sheets come into close contact with each other and solidify along the shape of the article, and cover the surface of the article and serve as a cushioning material to protect the article. The holes or projecting edges formed on the surfaces of the sheets serve as guides when the sheets are folded, so that the sheets can be accurately folded along the shape

of the article, and when the air inside the mat is evacuated, the mat solidifies while holding the folded shape. The same applies to the case where nets are used.

[0053]

When sheets or nets are used as the sheet cushioning bodies, the shock-absorbing performance can be controlled according to the number of laminations. When sheets or nets are used as the cushioning bodies, the sheets or nets do not move inside the mat and do not become sparse unlike beads, so that a stable cushioning effect can be obtained. The shock-absorbing characteristics of the mat can be adjusted by the shapes, sizes, and number of punched holes to be formed in the sheets. Further, by forming the above-described non-cushioning portions on portions of the mat, impacts to be applied to the packed article can be reduced.

Example 3

[0054]

In the packing device for an article to be delivered by home delivery service according to the present invention, without limiting to the configuration in which the mat is laminated on the outer layer sheet, it is also possible that, when an airtight sheet is used as an outer layer sheet, as shown in Figs. 14, the outer layer sheet 32 is spread and an airtight

sheet as an inner layer sheet 41 is stuck on the rear surface of the outer layer sheet 32, and between the outer layer sheet 32 and the inner layer sheet 41, cushioning bodies 34 are filled and the peripheral edges are sealed, and accordingly, the outer layer sheet 32 and the mat 31 can be configured integrally.

[0055]

In this example, the outer layer sheet 32 is longer than the inner layer sheet 41, and the inner layer sheet 41 and the outer layer sheet 32 are overlapped up and down by fitting their one ends together, and the overlapping section of the sheets becomes an article packing region Wa, and the entire periphery of the inner layer sheet 41 is airtightly sealed to the outer layer sheet 32 with a constant width to form the mat 31. It is the same as in Example 1 that the extension portion Wc of the outer layer sheet 32 becomes a flap 35 that closes the opening of the holder 33 formed by two-folding the packing region Wa of the inner and outer layer sheets 32 and 41.

[0056]

It is also the same as in Example 1 that to the outer layer sheet 32, the air intake/exhaust valve 36 for the inside of the mat is attached, and to the inner end edge of the extension portion Wc that becomes the flap 35 of the outer layer sheet 32, a hook-and-loop fastener 38 for closing the gap between

the bottom portion B and the surface portion C of the holder formed when the packing region Wa is folded in two is provided. In this example, fasteners 37 for opening and closing gaps formed on both sides from an intermediate portion O-O when the packing region is folded in two as a holder are attached. Of course, both side edges of the two-folded holder may be closed in advance, only one side edge may be openable or closable, or both side edges may be openable and closable.

[0057]

According to the present invention, only by sandwiching an article by a holder formed by two-folding a mat filled with cushioning bodies and evacuating the air in the bag body of the mat, can the article be stably held in the two-folded holder, and both side edges of the two-folded holder do not necessarily need to be closed, however, in order to increase the reliability as a home delivery parcel, both side edges are preferably sealed by sewing or fasteners. Of course, when an article packed in the mat according to the present invention is further housed in an outer case, no problem occurs even if the article is held in the holder while both side edges of the two-folded holder are left open.

[0058]

An article to be packed by the packing device for an article

to be delivered by home delivery service of the present invention is not limited to a personal computer, and the packing device can also be utilized for delivery services for precision equipment and electronic devices or for packing and transportation of a large number of thin articles such as CDs and DVDs in a stacked state.

Industrial Applicability

[0059]

The packing device for an article to be delivered by home delivery service according to the present invention can be widely utilized for transportation of items for house-moving or by home delivery service, delivery of items from department stores and retail stores, and transportation of articles and documents between factories and offices, as well as for delivery of items to purchasers from retail stores or mass retailers, delivery of articles from users of the articles to repair centers for repairing the articles, and returning of repaired products back to customers from the repair centers.

Description of Symbols

[0060]

1, 31: Mat, 2, 32: Outer layer sheet, 3, 33: Holder, 4, 34: Cushioning body, 5, 35: Flap, 5a: Slip pocket, 6, 36: Valve, 7, 37: Fastener, 8, 38: Hook-and-loop fastener, 9: Check valve,

9a: Filter, 9b: Ring, 9c: Valve plate, 9d: Valve plate presser,
10: Air intake valve, 10a: Tubular portion, 10b: Valve port,
10c: Valve stem, 10d: Coil spring, 10e: Rubber packing, 11:
Valve cage, 11a: Flange, 12: Coupler, 13: Cam groove, 14:
Protrusion, 15: Knob, 16: Operation push button, 17: Stay, 18:
Recessed portion, 19: Pump, 19a: Cylinder, 20: Ring, 21: Sheet,
22: Extruded sheet, 23: Fruit net, 24: Bubble cushioning sheet,
41: Inner layer sheet, a, b, c, d: Punched hole, e: Projecting
edge, M: Article, B: Bottom portion, C: Surface portion, Wa:
Packing region, Wc: Extension portion, S: Seam

[CLAIMS]

[Claim 1]

A packing bag for an article to be delivered by home delivery service including a valve in addition to a combination of an outer layer sheet, a mat, and cushioning bodies filled in the mat, wherein

the outer layer sheet is a surface protective cover for the mat,

the mat forms a holder which is folded in two and having at least one surface opened and inside which the cushioning bodies are filled,

the cushioning bodies have a function of reducing impacts from the outside by fitting the shape of the article stored in the holder, increasing the filling density, and solidifying along the surface shape of the article when the air inside the mat is evacuated and the capacity of the mat is reduced,

the valve is a combination of a check valve and an air intake valve,

the check valve opens when a suction force of a pump is applied for deaerating the inside of the mat, and closes to block introduction of the outside air into the mat after the deaeration,

the air intake valve opens according to a push button

operation to allow the outside air to be introduced into the deaerated mat,

the check valve and the air intake valve are installed in a valve cage attached to the mat, and

the valve cage is removably coupled to a coupler fitted to a pump or a suction port of a hose connected to the pump.

[Claim 2]

A packing bag for an article to be delivered by home delivery service according to Claim 1, wherein

the mat includes the cushioning bodies filled in an airtight bag formed by sealing peripheral edges of rectangular front surface sheet and rear surface sheet,

the valve cage is attached to a part of the surface sheet of the mat,

the outer layer sheet has an extension portion in addition to an article packing region to be overlapped with the mat,

the packing region of the outer layer sheet is integrated with the mat, and folded in two together with the mat to form a holder,

the valve cage is pulled out to the outer surface of the packing region of the outer layer sheet, and

the extension portion of the outer layer sheet is folded back as a flap and closes the opening of the holder and covers

the surface of the valve cage pulled out to the surface of the outer layer sheet.

[Claim 3]

A packing bag for an article to be delivered by home delivery service according to Claim 1, wherein

the air intake valve and the check valve are installed concentrically inside the valve cage so that the air intake valve is on the center side and the check valve is on the outer peripheral side,

the air intake valve includes a tubular portion formed inside the valve cage and a valve stem inserted in the tubular portion, a valve port of the tubular portion is closed by the valve stem normally energized in one direction, and is opened by depression of an operation button fitted to the valve cage, and

the check valve includes a combination of a valve port formed around the tubular portion and a valve plate that opens the valve port when suctioning the air inside the mat.

[Claim 4]

A packing bag for an article to be delivered by home delivery service according to claim 3, wherein

the valve cage includes a knob,

the knob is rotatable along a cam groove opened in a

cylindrical outer wall of the valve cage,

the operation button is attached to the knob and can be depressed by using distortion deformation of a material of the knob, and includes a stay, and

the stay is supported by a head portion of the tubular portion according to adjustment of the rotational angle of the knob, and makes it impossible to depress the operation button.

[Claim 5]

A packing bag for an article to be delivered by home delivery service according to Claim 4, wherein

the tubular portion has a recessed portion on its top portion,

the knob is displaced up and down according to a change in rotational angle along the spiral of the cam groove, and

the stay allows the operation button to be depressed within the range of the depth of the depressed portion when the stay is at a position opposed to the recessed portion of the tubular portion, and when the stay is at a position deviating from the recessed portion, the stay is supported by the top portion of the tubular portion and pressed against the top portion to make it impossible to depress the operation button.