

DESCRIPTION

METHOD FOR PACKING TWO OR MORE ARTICLES OF DIFFERENT SHAPE AND PACKING MAT

Technical Field

[0001]

The present invention relates to a method for packing articles, specifically, two or more articles of different shapes made of different materials, and a packing mat to be used for the method.

Background Art

[0002]

When transporting an article, in order to effectively protect the article from shocks and vibrations that may be applied thereto during transportation, normally, the article is packed by using paper or a plastic sheet with shock absorbing properties or a bubble wrap, and then contained in an outer case, if necessary. Similarly, when transporting two or more similar articles, each article is wrapped individually in wrapping paper or a buffer material and contained in an outer case, and packed upon filling a filler to prevent the articles from moving if necessary.

[0003]

The packing procedures are basically the same even when

two or more articles different in shape, weight, size, and material from each other are packed together. As for articles, a combination of two or more articles may constitute one system. For example, a desktop personal computer is configured as one system by combining, normally, articles (equipment in this case) such as a modem for network configuration and a mouse, etc., as an external input device in addition to a personal computer main body, a keyboard, a display, and a printer.

[0004]

When the desktop personal computer in use thus combined as one system needs to be transported to a different location because of a move, first, wiring cables connecting the equipment including the personal computer main body, the keyboard, the display, and the printer are disconnected from the equipment, and individually packed on an equipment-to-equipment basis and transported to and unpacked at the location of a new address, and the equipment is set up again in the original layout and the wiring cables between the equipment are re-connected.

[0005]

Recently, by reason that such rewiring is troublesome or a user is a beginner and unaccustomed to this work and does not know how to connect the disconnected wiring cables, carriers have been requested to carry a personal computer set as is,

that is, without disconnecting the wiring cables connecting the personal computer main body, the keyboard, the display, and the printer from these pieces of equipment.

[0006]

Carriers have conducted various considerations to satisfy this request. The problem is that although the set of equipment can be contained in one outer case without disconnecting the wiring cables, the sizes, heights, and shapes of the personal computer main body, the keyboard, the display, and the printer are different from each other, so that it is difficult to secure these pieces of equipment in a case to effectively protect them from possible shocks and vibrations applied during transportation.

[0007]

Packing of a product and two or more articles (equipment) as components of the product in one case in a secure manner is conventionally performed and not necessarily rare. For example, articles such as a laptop, a battery, a drive disk, cables, and an operation manual, etc., are usually packed in one case so as not to move.

[0008]

In Patent document 1, a package capable of containing a digital camera and a battery charger together in one package

without interference with each other is described. According to the package described in Patent document 1, an effect in which a digital camera and a battery charger can be protected from shocks applied from the outside during transportation is emphasized.

[0009]

However, specifically, this package has two containing sections formed by dividing the inside of an outer case by an exclusive partition and articles are individually contained in the respective sections, and a buffer section injected with air is provided separately from the containing sections to protect the articles from shocks applied from the outside during transportation, and the articles are not secured at fixed positions when they are packed, and free packing of two or more articles while being connected to each other regardless of whether their forms are standard or nonstandard is not realized.

[0010]

A packing device consisting of a combination of a packing case capable of changing its internal capacity by combining a first packing case and a second packing case and fitting bodies disposed in the first and second packing cases respectively, is described in Patent document 2 as one attempt to pack articles in a case in a secure manner although it is not an example of

packing two or more articles together.

[0011]

Here, the fitting body is formed by combining a bag body having a deaeration port and a large number of granular bodies that are filled in the bag body and gather in a close contact state with each other and solidify according to deaeration. According to this packing device, an article to be packed, for example, a jar is inserted between the first packing case and the second packing case, these packing cases are brought relatively closer to each other to reduce the internal capacity to support the jar, and the packing cases are further brought closer to each other, by deaerating air from the bag body and the fitting bodies are brought into close contact with the surfaces of the bottom and the mouth of the jar and solidify, and accordingly, the jar is secured and packed in the packing case.

[0012]

This attempt utilizes a phenomenon in which granular bodies filled inside the bag body come into close contact with each other according to deaeration of the inside of the bag body and the fitting bodies solidify while being deformed along the shape of the jar, and although the jar is eventually secured inside the packing case, the contained article is only partially

supported by the fitting bodies, and the contained article is recognized as being secured at a fixed position by a force to press the first packing case against the second packing case. The internal capacity of the packing case is determined by the height of the contained article, so that this attempt is not applicable to packing of two or more articles with different heights.

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

Patent document 2: Japanese Published Unexamined Patent Application No. 2001-163361

Disclosure of the Invention

Problem to be Solved by the Invention

[0013]

A problem to be solved by the invention is that no packing material can freely pack two or more articles while being connected to each other regardless of whether the forms of the articles are standard or nonstandard.

Means for Solving the Problem

[0014]

As a main feature of the present invention, by utilizing a phenomenon in which granular bodies filled inside a bag body come into close contact with each other according to deaeration

of the inside of the bag body and the bag body solidifies as a whole, a bag-shaped mat in which beads are filled and closely sealed is processed, and the mat solidifies by deaeration of the inside of the mat in a state where articles are wrapped in the mat, and accordingly, the two or more articles wrapped in the mat are stably held.

Effects of the Invention

[0015]

According to a packing mat of the present invention, not only can two or more articles be packed together at a time, but also two or more articles can be packed in a state where the individual packed articles are stably held at fixed positions by deformation of the mat due to deaeration of the inside of the mat and close contact and solidification of beads inside the mat. In particular, regardless of differences in shape, size, height, and material among two or more articles, the articles can be packed together, and in addition, the two or more articles can be packed while being connected to each other.

[0016]

The packing mat of the present invention entirely solidifies while packing two or more articles, so that it can be transported as is, and in addition, when the packing mat packing the articles must be transported as a standard pack,

some filler can be filled and contained in an outer case and transported.

[0017]

In particular, according to the present invention, in the case of a move, it is not necessary to disconnect wiring cables connected between equipment such as a personal computer main body, a keyboard, a display, and a printer, etc., from these pieces of equipment, and the equipment can be packed together and transported while the wiring cables are left connected to the equipment, and after the move, the mat is unpacked and the equipment is taken out from the mat and arranged in the original layout on a desk and connected to a power supply, and accordingly, operation of the personal computer can be restarted immediately.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018]

Fig. 1(a) is a plan view, Fig. 1(b) is a sectional view along the Y-Y line of Fig. 1(a), and Fig. 1(c) is a sectional view along the X-X line of Fig. 1(a), showing an embodiment of a packing mat of the present invention.

Fig. 2 is a view showing an example of a set of equipment of a personal computer to be packed.

Fig. 3 is a view showing a state where the set of equipment

of the personal computer is placed on the packing mat.

Fig. 4 is a view showing a state where the back surface of the set of equipment of the personal computer placed on the packing mat is covered.

Fig. 5 is a view showing a state where the back surface and front surface of the set of equipment of the personal computer placed on the packing mat are covered, and showing procedures of deaeration of the inside of the packing mat.

Fig. 6 is a partially sectional view showing a state where the inside of the packing mat is deaerated, and the set of equipment of the personal computer is held at fixed positions on the packing mat by the solidified mat.

Fig. 7 is a sectional view showing a state where portions of the solidified packing mat enter gaps between the equipment and secures the equipment.

Fig. 8 is a partially sectional perspective view showing another example of the packing mat.

Description of Reference Numerals

[0019]

1: Mat

1a: Edge

1b, 1c, 1d, 1e, 1f: Solidified portion of mat

2: Outer layer sheet

3: Inner layer sheet
4: Beads
5: Check valve
6: Protective cover
7: Peripheral edge
8: Bag
9: Section
10: Shape retaining plate
11: Personal computer main body
12: Keyboard
13: Mouse
14: Display
15: Evacuation pump
21: Mat
22: Outer layer sheet
23: Inner layer sheet
24: Beads
25: Check valve
26: Peripheral edge
P: Intersection
S: Set of equipment

Best Mode for Carrying Out the Invention

[0020]

An object to pack two or more articles consisting of a combination of two or more pieces of equipment, such as a personal computer set, together, is achieved by using a bag-shaped mat in which beads are filled and closely sealed.

First embodiment

[0021]

Fig. 1(a) to Fig. 1(c) are views showing an embodiment of a packing mat of the present invention. In Figs. 1, a mat 1 is formed by layering vertically two layer sheets of an outer sheet 2 and an inner sheet 3 each with flexibility having square shapes, filling a large number of beads 4 between the sheets 2 and 3, hermetically sealing the peripheral edges 7 of the sheets 2 and 3 with a fixed width, and attaching a check valve 5 to a part of the sheet surface of the outer layer sheet 2.

[0022]

In this embodiment, a thermoplastic polyurethane sheet or a vinyl chloride sheet is used as the inner layer sheet 3, and as the outer layer sheet 2, a thermoplastic polyurethane sheet, a vinyl chloride sheet, a flexible laminate film of metallocene-based or single-site-based polyethylene and EVA or EVOH, or sheet nylon 6,66 base cloth/thermoplastic urethane tarpaulin, nylon 6,66 base cloth/vinyl chloride tarpaulin, or polyester base cloth/thermoplastic urethane tarpaulin,

polyester base cloth/vinyl chloride is used.

[0023]

The beads 4 must be filled without generating partial unevenness inside the mat. In this embodiment, in order to avoid unevenness of a large number of beads over the entire surface, a breathable bag 8 made of polyester spunbond nonwoven fabric or nylon spunbond nonwoven fabric is divided into several narrow and long bag-shaped sections, and each of the fixed equal amount of beads 4 are filled in the respective sections 9 and the bag is inserted between the inner and outer layer sheets 2 and 3 to form a mat with a flat external appearance.

[0024]

The beads 4 are granular bodies of foamed polyethylene or foamed polystyrene, and their particle diameters are not limited, however, they can more sufficiently fit the shapes of articles as their particle diameters become smaller.

[0025]

If necessary, between the outer layer sheet 2 and the bag 8 of the mat 1, a shape retaining plate 10 that retains a fixed shape of the mat 1 is interposed and stuck on the outer layer sheet 2, and the outer surface of the outer layer sheet 2 is covered by the protective cover 6. This embodiment shows an example in which the bag 8 is divided into four narrow and

long bag-shaped sections 9, however, the form of the bag 8 and the number of sections are not especially limited. The unevenness of beads inside the mat 1 is reduced and the flatness of the mat 1 increases as the number of sections increases, however, on the contrary, if the number of sections is excessively large, it becomes difficult to solidify the mat along the shape of the article to be packed.

[0026]

Next, procedures to pack two or more articles of different shapes by using the packing mat 1 of the present invention will be described. Fig. 2 shows a desktop personal computer set, that is, a personal computer main body 11, a keyboard 12, a mouse 13, and a display 14. In actuality, other equipment such as a printer, a scanner, and a modem are also connected, however, for simple description, here, two or more articles to be packed is equipment of a desktop personal computer, that is, a combination of a personal computer main body 11, a keyboard 12, a mouse 13, and the display 14 in this example.

[0027]

When a set of equipment including the personal computer main body 11, the keyboard 12, the mouse 13, and the display 14 must be collectively transported by reason of a move or the like, first, a mat 1 having a size necessary for wrapping the

set of equipment is selected and spread on the floor (not shown) by turning the surface of the inner layer sheet 3 upward. Then, power supply wiring cables of the personal computer main body 11, the keyboard 12, the mouse 13, and the display 14 (hereinafter, referred to as a set S of equipment when the equipment is collectively referred to) on a desk are unplugged from the power supply outlets, and while wiring cables connecting the equipment are left connected, the set S of equipment is placed on at least half of the surface of the mat 1 as shown in Fig. 3.

[0028]

For transportation, it is desirable that the equipment is arranged as close as possible so that it can be housed in a capacity as small as possible, however, in the present invention, as conditions for securing and holding the set S of equipment, the layout and combination of equipment rarely becomes a problem.

[0029]

In this example, for easy understanding, the keyboard 12 is placed upward in front of the display 14 assuming an erect posture, and on one side of the keyboard, the personal computer main body 11 is disposed longitudinally. As a matter of course, this layout is a layout during use of the personal computer. That is, this example shows that the set of equipment can be

transported in the usage state.

[0030]

Next, as shown in Fig. 4, the edge 1a of the remaining half of the mat 1 on which the set S of equipment is not placed is lifted up and raised along the back surface of the set S of equipment to cover the upper surface of the set S of equipment as shown in Fig. 5, and the edge 1a is hung down over the front surface of the set S of equipment. Accordingly, both side surfaces of the set S of equipment are also covered by both edges of the mat.

[0031]

In this state, the mat 1 is sufficiently fitted to the shape of the set S of equipment so that portions of the mat 1 enter gaps formed between the set S of equipment. Thereafter, as shown in Fig. 5, an evacuation pump 15 is connected to a check valve 5 attached to a part of the outer layer sheet 2 of the mat 1, and the evacuation pump 15 is manually or electrically driven to evacuate the air from the inside of the mat 1.

[0032]

As the air is evacuated from the inside of the mat 1, the mat 1 contracts and reduces its internal capacity, and beads 4 filled inside the mat 1 gather together along the shape of

the set S of equipment in accordance with contraction of the mat 1, and further fill up the gaps of the mat 1 and are restrained from freely moving, and the mat solidifies as shown in Fig. 6 while holding the set of equipment at fixed positions. The outer surface of the mat is kept comparatively flat, and does not crease.

[0033]

Generally, to hold a cubic article at a fixed position, the article must be supported at, at least three points. In this embodiment, by wrapping the set S of equipment in the mat 1, at least three surfaces of the bottom surface, the upper surface, and the front surface, the back surface, or one side surface or the other side surface of equipment disposed on the outer side of the set S of equipment are supported by portions of the surface of the solidified mat, and secured and held at a fixed position.

[0034]

At least the lower surface and the upper surface of equipment of the set S of equipment are supported by the mat even if the equipment is disposed at the center of the set S of equipment, and in addition, portions of the lower surface or the upper surface of the mat are made to enter gaps of the equipment, and accordingly, the mat comes into contact with

the article to be packed from three directions, and by deaerating the inside of the mat, the three surfaces of the cube of the article are supported by portions of the solidified mat, so that the set S of equipment wrapped in the mat is prevented from wobbling. Further, as long as the mat 1 is in contact with the surfaces of two or more pieces of equipment packed together, the mat 1 solidifies due to deaeration while being in contact with the surfaces of the equipment, so that even if the heights of the equipment to be packed are different from each other, each piece of equipment can be secured to the mat.

[0035]

In Fig. 7, the bottom surface, the back surface, and the upper surface of the display 14 are held by the solidified mat 1, and by covering the upper surface of the display 14 by the mat 1, one side of the display is held by the portion 1b hung down sideward from the upper surface of the display 14, and further, the other side is held by the portion 1c of the mat 1 which has entered the gap between the personal computer main body 11 and the display 14 and solidified, and further, portions 1d, 1e, and 1f of the mat 1 are solidified while being arbitrarily raised from below the equipment to hold the parts of equipment. The personal computer main body 11 is secured in the same manner. Specifically, the personal computer main body 11, the keyboard

12, the mouse 13, and the display 14 constituting a personal computer set are stably held by the solidified mat 1.

[0036]

When the packing mat 1 of the present invention solidifies, for example, in the case where the portion placed on the floor or desk of the mat is defined as the bottom surface, the mat becomes a cube having a side surface formed by a portion raised up and a ceiling surface formed by a portion folded laterally from the tip end of the side surface (when the tip of the ceiling surface is further folded downward, the folded portion becomes a front surface), and solidifies, and in the present invention, the folded form of the mat is determined by itself according to the layout and combined shape of the articles to be packed.

[0037]

When transporting, the mat in which the set S of equipment (two or more articles) is packed can be loaded on a vehicle and transported as it is as a pack, however, when the mat must be set in a standard form, the mat in which the set S of equipment (two or more articles) is packed may be housed in an outer case (not shown) with a standard form. In this case, the outer case must be filled with a filler to prevent the mat in which the set S of equipment (two or more articles) is packed from moving inside the outer case, and in this case, a small amount of filler

is enough.

[0038]

To unpack the pack at a transportation destination, by opening the check valve 5 attached to the mat 1 and introducing the outside air into the inside of the mat 1, the gathered state of the beads is ended, and the mat 1 becomes soft and the packing wrapper can be freely opened. In this state, the mat 1 is opened and the set S of equipment is taken out from the mat, and the personal computer main body 11, the keyboard 12, the mouse 13, and the display 14 are placed on a desk as they are, and sockets of the respective power supply wiring cables of these are inserted into outlets and supplied with power, and accordingly, the personal computer becomes ready for use immediately.

[0039]

Fig. 8 shows another example of the packing mat. Fig. 8 is an example in which beads are directly filled between the inner and outer sheets without interposing a breathable bag therebetween. In this embodiment, polyurethane sheets are used as the inner layer sheet and the outer layer sheet, however, polyethylene sheets or vinyl chloride sheets are also usable.

[0040]

In the present embodiment, a mat 21 is processed by layering two layer sheets of the outer layer sheet 22 and the inner layer

sheet 23 vertically, directly filling a large number of beads 24 between both sheets 22 and 23, and hermetically sealing the peripheral edges 27 of both sheets 22 and 23 with a fixed width, and in this embodiment, after the filled amount of beads 24 are uniformed inside the mat 21, both sheets 22 and 23 are directly heat-welded together by a fixed size at important positions of both sheets 22 and 23, for example, intersections P (welding points) of longitudinal rows and lateral rows at fixed intervals as shown in the figure without generating partial unevenness.

[0041]

The welding positions are not necessarily limited to the intersections P of the longitudinal rows and lateral rows, and may be arranged so as to zigzag longitudinally and laterally, however, it is necessary that the sheets are welded in a regular manner at fixed intervals.

[0042]

A check valve 25 is attached to a part of the sheet surface of the outer layer sheet 22. Packing procedures for collective transportation of a set of equipment including a personal computer main body, a keyboard, a mouse, and a display, etc., by using the mat 21 of the present embodiment are exactly the same as in the above-described embodiment. That is, the mat 21 is spread on the floor (not shown) by turning the surface

of the inner layer sheet 23 upward.

[0043]

Next, a set of equipment is placed on and wrapped in the mat 21 and the air inside the mat 21 is evacuated, and as the air is evacuated from the inside of the mat 21, the mat 21 contracts and reduces its internal capacity, and the beads 24 filled inside the mat 21 gather together along the shape of the set of equipment in accordance with contraction of the mat 21, and further, fill up gaps of the mat 21 and are restrained from freely moving, and the mat 21 solidifies while holding the set of equipment at fixed positions.

[0044]

In this embodiment, between welding points P and P adjacent to each other, gaps are between both sheets 22 and 23, and although the gaps are communicatively connected to each other, the beads 24 filling up the gaps hardly move, so it is understood that it is not always necessary to bind the beads by the breathable bag as in the first embodiment. Instead according to disuse of the bag for binding the beads, the pad is kept flexible, and fitting performance to the articles when the mat solidifies can be improved. In each embodiment described above, a fastener to open and close may be attached to the edge of the mat in a two-folded state.

[0045]

The kinds and number of articles to be packed by using the packing mat of the present invention are not limited at all. Therefore, the number of articles to be packed can of course be one, however, the present invention is more effective when packing two or more articles together which are different in conditions such as shape, material, height, and size, etc., while being left connected to each other.

[0046]

Specifically, when packing a personal computer set, the mat not only solidifies along the shapes of hard cubes with fixed shapes of a personal computer main body, a keyboard, and a display, but also solidifies in the same manner even if the articles are bendable like wiring cables for connecting equipment. For example, the mat solidifies along the shapes of the wiring cables one by one, and when the wiring cables are bundled, the mat solidifies along the shape of the bundle, so that the wiring cables can be prevented from coming off the equipment or loosening during transportation as much as possible. By using the packing mat of the present invention, articles can be stably held and packed in the mat regardless of whether the articles to be packed are hard or soft.

[0047]

Articles to be packed in the packing mat of the present invention are of course not limited to a personal computer set, and may be furniture, fragile goods such as dishes, or a variety of articles such as clothes and papers, and two or more articles of these goods can be easily packed together and transported regardless of their shapes and materials.

Industrial Applicability

[0048]

The packing mat of the present invention can be widely used for transportation of goods in moving or home delivery services, distribution of items from department stores and shops, and transportation of articles and documents between factories and offices.

Claims

1. A method for packing two or more articles of different shapes by using a mat filled with a large number of beads, comprising:

wrapping two or more articles of different shapes in a mat, deaerating the inside of the mat, gathering and bringing the large number of beads inside the mat into close contact with each other, solidifying the mat along outer diameter shapes of the articles, at least bringing portions of the mat into contact with portions of the surfaces of each article to support three surfaces of a cube of each article, and holding the articles at fixed positions.

2. The method for packing two or more articles of different shapes according to Claim 1, wherein two or more articles of different shapes are held in the solidified mat while being connected to each other.

3. The method for packing two or more articles of different shapes according to Claim 1, wherein

the mat follows the shapes of the two or more packed articles, and

solidifies while being in contact with at least the bottom surface, the back surface or front surface, and the upper surface to hold each article at a fixed position.

4. The method for packing two or more articles of different shapes according to Claim 3, wherein the two or more articles are held by portions of the mat which has entered gaps between the articles and solidified.

5. The method for packing two or more articles of different shapes according to Claim 1, wherein in the case where the portion placed on the floor or desk of the mat is defined as the bottom surface, the mat becomes a cube having a side surface formed by a portion raised up and a ceiling surface formed by a portion folded laterally from the tip end of the side surface, and solidifies, and the folded form of the mat is determined by itself according to the layout and combined shape of the articles to be packed.

6. A packing mat formed by combining an outer layer sheet, an inner layer sheet, and beads, wherein

the outer layer sheet and the inner layer sheet are impervious sheets, and layered vertically and their peripheral edges are hermetically sealed,

the beads are granular synthetic resin foamed bodies, and a large number of beads are filled between the outer layer sheet and the inner layer sheet preventing unevenness,

the outer layer sheet and the inner layer sheet the peripheral edges of which are sealed become a mat having a fixed

thickness due to a layer of beads evenly filled, a check valve that blocks discharge of air during deaeration is attached to a part of the surface of the outer layer sheet, and according to deaeration, beads gather and come into close contact with each other and the mat contracts and solidifies,

the surface of the outer layer sheet is an outer surface of the mat which is not brought into contact with articles, and

the surface of the inner layer sheet is a surface for wrapping articles to be packed, and by folding the mat, portions of the mat are brought into contact with articles to be packed from three directions, and by deaeration of the inside of the mat, three surfaces of a cube of each article are supported and held at fixed positions.

7. The packing mat according to Claim 6, comprising:

a breathable bag between the outer layer sheet and the inner layer sheet of the mat, wherein

the bag is divided into several bag-shaped sections, the fixed equal amounts of beads are filled in the respective sections to complete the external appearance of the mat flat.

8. The packing mat according to Claim 7, wherein a shape retaining plate that retains a fixed form of the mat is interposed between the outer layer sheet and the bag of the mat.