

DESCRIPTION

FREIGHT IDENTIFICATION CODE, ITEMS DISPLAYING SAME, AND ROBOT HAND USED FOR SAME

5

TECHNICAL FIELD

[0001] The present invention relates to a freight (package) identification code, items (objects) displaying the identification code, and a robot hand used for the freight (package) displaying
10 the identification code, specifically suitable for automatically unloading a rectangular package stacked on a cargo deck or a palette.

BACKGROUND ART

15 [0002] Recently, in devanning or depalletizing a package packed in a cardboard box or the like and stacked on a cargo deck or a container, a technology has been widespread in which a programmed robot is used to automate an unloading operation to greatly reduce labor and work by humans.

[0003] For example, Japanese Unexamined Patent Application Publication No. H08-304025
20 discloses a method in which a camera capturing a 2D or a 3D vision is used to identify coordinates of a target package from a stack of packages. With this configuration, it is possible to automatically unload the package while positioning a robot hand with the package, which results in great reduction of labor by humans. However, in the above described method, when the rectangular packages are well aligned and stacked tightly, it may become difficult to
25 recognize vertical/ horizontal edge position(s) of the package, causing a difficulty in positioning the robot hand.

[0004] On the other hand, Japanese Patent No. 3849633 discloses a method in which an identification portion is provided at a predetermined position of the package. Based on the presence/absence of the identification portion at a predetermined detection position, a stacking
30 pattern is determined among several kinds of pre-stored stacking patterns. Even if packages are stacked tightly, automatic unlading by a robot hand is possible. However, in the above described method, it requires labor and cost to pre-store all the stacking patterns corresponding to various types of packages. In addition, when the stacking pattern is not pre-stored or packages having various sizes are mixed, the above described method may tend to be difficult
35 to apply.

[0005] Then, Japanese Unexamined Patent Application Publication No. 2017-58130

discloses a method in which a rectangular package includes a marker at respective four corners of all surfaces, and vertical/horizontal sides forming the corners are obtained from the markers as a rectangular surface displaying the markers. Thus, it is possible to position the robot hand. This makes it unnecessary to pre-store various types of stacking patterns. In addition, smooth
5 unloading is possible even if the packages having various sizes are mixed.

[0006] However, the above described method requires to attach a marker at respective four corners of all the six surfaces of the rectangular box. Thus, it is impractical to attach markers on all 24 corners of existing packing boxes and packages since it takes time, labor, and cost. In order to practically execute the above described method, a special package box with the
10 pre-printed markers has to be used.

[0007] In addition, when devanning the packages stacked in a roofed truck bed or a container, the package stacked close to the roof and left and right walls should be held at the front surface side of the package and pull the package to pick up the package. In this case, only the markers attached on the front surface can be read and a depth size cannot be unidentified. This may
15 cause insufficient catching of the package when a center of gravity is far away from the holding position. In such a case, safe unloading may tend to be difficult.

PRIOR ART DOCUMENTS

20 [Patent Documents]

[0008] Patent Document 1: Japanese Unexamined Patent Application Publication No.
H08-304025

Patent Document 2: Japanese Patent No. 3849633

Patent Document 3: Japanese Unexamined Patent Application Publication No.
25 2017-58130

DISCLOSURE OF THE INVENTION

[Problems to be Solved by the Invention]

30 [0009] The present invention is made to solve the above problems, and aims to achieve smooth devanning or depalletizing of the stacked rectangular packages while managing various situations.

[Means for Solving the Problem]

35 [0010] Thus, the present invention provides a package identification code displayed at a predetermined position of each of four surfaces of front, back, left and right or each of all

surfaces of a package having a rectangular shape so that code data of the package identification code is configured to be identified by a predetermined controller via a reading unit, wherein the code data includes size information indicating a height size and a width size of a code display surface of the package, and the controller of a robot having the reading unit and a robot hand is configured to position the robot hand with the package based on a code display position and the size information.

[0011] As described above, the package identification code includes the size information of the height size and the width size of a surface displaying the identification code, and the robot hand is positioned based on the code display position and the size information. Thus, even when the packages are stacked tightly and the edge portions are unclear, or even when the packages are stacked in various orientations, it is possible to identify the vertical/horizontal edge portions by the size information, which indicates the height size and the width size of the code display surface, based on the code display position. Thus, smooth devanning and depalletizing can be achieved while correctly positioning the robot hand with the target package.

[0012] In addition, the code data of the above-described package identification code can include position information to identify the code display position on the code display surface. Thus, even when the package does not display all the codes at a constant position or the packages include various code display positions, use of the position information and the size information enables correct positioning.

[0013] Furthermore, the code data of the above-described package identification code can include rotation identification information to identify a rotation angle when the package is loaded in a state of being rotated from a reference posture by a magnification of 90° about a line of a central axis perpendicular to the code display surface. Thus, even when the package is loaded in a state of being rotated from the reference posture, it is possible to know a rotation direction and a rotation angle of the code display surface. Therefore, the height size and the width size of the code display surface in the actually loaded posture can be identified.

[0014] Furthermore, the code data of the above-described package identification code can include information of a depth size based on the code display surface or/and a weight of the package. Thus, it is easy to select a safe holding method even if the packages are long or heavy.

[0015] Furthermore, the above described package identification code can be a matrix-type two-dimensional code. This makes it easier to include various information such as a product number showing the contents and product information. In addition, when the matrix-type two-dimensional code includes directional information, the matrix-type two-dimensional code by itself can display the rotation identification information.

[0016] In addition, the present invention provides a sheet or a sticker sheet with an adhesive

layer for displaying the package identification code and having a predetermined shape. The sheet or the sticker sheet is configured to be displayed on each of the four surfaces of front, back, left and right or each of the all surfaces of the package when the sheet or the sticker sheet is adhered to the predetermined position of each of the four surfaces or each of the all surfaces.

5 Thus, the package identification code can be easily adhered even to the existing cardboard boxes or packing cases.

[0017] In this case, three package identification codes are arranged in an L-shape while interposing a predetermined distance between the three package identification codes so that one of the three package identification codes is located at a center of the three package
10 identification codes and other two of the three package identification codes are arranged so as to form a right angle. The sheet or the sticker sheet is formed in the L-shape and configured to be adhered on three surfaces forming a corner portion of the package having a rectangular shape while the sheet or the sticker sheet is bent between neighboring package identification codes at a right angle so that the package identification code is displayed on each corner of the
15 three surfaces. The package identification code is displayed on each of different three surfaces of the package only by adhering one sheet or one sticker sheet.

[0018] In addition, when the above-mentioned package identification code is printed or adhered on a packing cardboard box so as to be displayed on each of the four surfaces of front, back, left and right or each of the all surfaces at a predetermined position, it is possible to easily
20 exert all of the above-described effects and functions by only using the cardboard box.

[0019] Furthermore, the present invention provides a robot hand for picking up the above described package displaying the package identification code, the robot hand including: the reading unit provided on an arm tip side of the robot, the reading unit being configured to read the package identification code; a support plate configured to support a bottom surface of the
25 package from below, the support plate being capable of adjusting an angle of an upper surface of the support plate by vertically swinging a tip side of the support plate within a predetermined range; and a suction-pullout unit configured to pull out the package and place the package on the support plate while sucking the code display surface, wherein the package is configured to be held in a state of being pulled out and placed on the support plate. With this configuration,
30 even when the gaps on top and sides of the package stacked tightly are small, it is possible to smoothly pull out and unload the package with simple configuration without cost increase.

[Effects of the Invention]

[0020] In the present invention, the package identification code includes the size information
35 of the height size and the width size of the code display surface, and the robot hand is positioned based on the code display position and the size information. With this configuration,

the present invention realizes smooth devanning or depalletizing of stacked rectangular packages while managing various situations.

BRIEF DESCRIPTION OF THE DRAWINGS

5

[0021] Fig. 1 is a perspective view of a package displaying package identification codes concerning the first embodiment of the present invention.

Fig. 2 is a perspective view of a package with sheets each displaying a package identification code concerning the second embodiment of the present invention.

10

Figs. 3A and 3B illustrate sticker sheets displaying the package identification codes concerning the third embodiment of the present invention. The sticker sheet shown in Fig. 3A is used for a corner of the front surface. The sticker sheets shown in Fig. 3B is used for a corner of the rear surface.

15

Fig. 4 is a perspective view of the package to which the sticker sheets of Figs. 3A and 3B are adhered.

Fig. 5 is a side view showing a robot unloading the package, to which the sticker sheets are adhered, from a stack of packages of Fig. 4 in a state that a robot hand is positioned with the front surface of the package.

20

Fig. 6 is a side view showing the robot picking up the package after the state of Fig. 5.

Fig. 7 is a side view showing the robot continuing to unload the package after the state of Fig. 6 and the robot hand is positioned with the lowermost package.

Fig. 8 is a side view showing the robot of Fig. 5 unloading the package, to which the sticker sheets are adhered, from the stack of the packages of Fig. 4 in a state that the packages are placed in various orientations on a palette.

25

MODES FOR CARRYING OUT THE INVENTION

[0022] Hereinafter, the embodiments of the present invention will be described with reference to the drawings. In the present invention, a term L-shape includes the L-shape in a normal orientation, the L-shape rotated by a magnification of 90° from the normal orientation, and plane symmetries of them. In the present invention, the code data includes direct information directly showing the information to be obtained and also includes indirect information to access a storage means to obtain the information pre-stored in the storage means.

35

[0023] Fig. 1 shows package identification codes 10a, 10b, 10c, 10d and a package (freight) 5A packed in a cardboard box that is an object (item) displaying the package identification code.

In the present embodiment, in a basic posture of the package 5A shown in Fig. 1 (i.e., a lid is on the top and a surface with a sheet 1a is on the front), packages are stacked so that side surfaces (front, back, left, right) each displaying the package identification codes 10a, 10b, 10c, 10d do not come on the top surface or the bottom surface in any case and any one of the four side surfaces always comes in the front that is configured to face a reading unit of a robot hand.

[0024] Namely, each of the package identification codes 10a, 10b, 10c, 10d is displayed on each surface of front, back, left and right at a predetermined position of the rectangular package 5A. In addition, the package identification codes 10a, 10b, 10c, 10d are used for identifying the code data including at least a height size and a width size of the code-displaying-surface by a not-illustrated robot-side controller via a reading unit such as 2D camera. Furthermore, as for a robot which includes the reading unit and the robot hand and is controlled by the controller, the robot hand is positioned with a holding position of the package 5A based on the read and identified size information and code display position to pick up the package 5A. Note that the code data of the package identification code 10a, 10b, 10c, 10d is not limited to the above described size information directly indicating the size information. The code data can indirectly indicate the size information. For example, the code data may be the access information to access a server (storage means) such as intranet and internet. In this case, the controller of the robot hand accesses a predetermined storage means based on the access information in the code data obtained by the reading unit to obtain the size information and other information.

[0025] In addition, each code data of the package identification code 10a, 10b, 10c, 10d includes a depth size of the package 5A based on the code display surface. This makes it easier to hold (catch) the package 5A safely and pick up the package 5A easily by the robot hand. Furthermore, in the cardboard box of the package 5A, the package identification codes 10a, 10b, 10c, 10d are pre-printed on each side surface (four surfaces) and the printed position is on a vertical and horizontal center of the code display surface.

[0026] Since the above described configuration/method is adopted, even when the code data of the package identification code 10a, 10b, 10c, 10d does not include position information indicating the code display position on the surface displaying the data, the step of determining that “the code display position is coordinates obtained from a center of the height size and the width size” can be preset to the robot-side controller reading and identifying the code data. Thus, the holding portion can be correctly positioned with the package 5A while calculating the code display position based on the height size and the width size in the code data.

[0027] Therefore, even if the packages 5A are stacked tightly and the vertical edge and the horizontal edge become unclear, or even if the packages 5A are rotated horizontally and stacked in various orientations, the code display position is located on the center of the height size and width size of the code-displaying-surface. Therefore, by identifying only the height

size and the width size of the code-displaying-surface, accurate and smooth devanning and depalletizing are possible while positioning the robot hand with the target package 5A based on the code display position.

5 [0028] In a stacking style in which multiple packages are stacked at random and the upper surface or the bottom surface of the package may come in the front, the package identification code can be printed at a predetermined position of all the surfaces (six surfaces) of the cardboard box. In addition, when the code data includes a position information indicating the code display position at the time of printing, the limitation on the printing position can be eliminated and the program to make the robot-side controller execute the above step become
10 unnecessary.

[0029] As the second embodiment of the present invention, Fig. 2 shows package identification codes 11a-11f (reference numerals are omitted in the figure), sheets 1a, 1b, 1c, 1d, 1e, 1f (i.e., objects displaying the package identification codes 11a-11f) and a package 5B containing contents in a state that the sheets are adhered to a cardboard box. The present
15 embodiment is suitable for the case where there are rectangular packages such as home delivery packages having various shape and size and each package contains contents having various weight and the package is sequentially carried in. In such a case, while the size and weight of the package are sequentially measured, the package identification codes 11a-11f are respectively printed on the sheets 1a, 1b, 1c, 1d, 1e, 1f and the sheets 1a, 1b, 1c, 1d, 1e, 1f are
20 adhered on the packages.

[0030] In the present embodiment, since the packages may be stacked at random in various orientations, the sheets 1a, 1b, 1c, 1d, 1e, 1f are adhered to all the surfaces (preferably, each sheet includes a printed indication for instructing the surface/position to which the sheet is adhered). With this configuration, the package identification codes 11a-11f can be always read
25 regardless of which surface comes in the front facing the reading unit of the robot. In addition, the code data includes the information of a depth size and a weight of the package 5B. Thus, it is easy to select a safe holding method of the robot hand.

[0031] Furthermore, in the present embodiment, the code data does not include the position information indicating the code display position. However, the sheets 1a, 1b, 1c, 1d, 1e, 1f
30 having a square shape are adhered at a fixed position of an upper right corner of the adhered surface. For example, when a step of determining that “the code display position is coordinates of 5 cm from the top side and the right side” is pre-set to the robot-side controller, the robot hand can be correctly positioned with the package 5B similar to the case of using the package 5A.

35 [0032] In addition, the code data includes rotation identification information indicating a rotation angle of the package 5B when the package 5B is stacked in a state of being rotated by a

magnification of 90° from a reference posture around a line (central axis) perpendicular to the code display surface displaying the package identification codes 11a-11f. Thus, even when the package 5B is stacked in the state of being rotated from the reference posture, it is possible to identify an actual height size and width size of the code display surface and an actual depth of the package 5B in the stacked posture.

[0033] Namely, the package identification codes 11a-11f of the present embodiment is a so-called matrix-type two-dimensional code configured to include the directional information. Therefore, it is possible to display the rotation identification information by itself. Also in the present embodiment, when the code data includes the position information indicating the code display position, the position to adhere the sheet is not limited as long as every sheet is correctly adhered to a position corresponding to the position information.

[0034] As the third embodiment of the present invention, Figs. 3A and 3B show the package identification codes 12a-12f and sticker sheets 2a, 2b (i.e., objects displaying the package identification codes 12a-12f). Fig. 4 shows a package 5C (display object) on which the sticker sheets 2a, 2b are adhered. As shown in Fig. 3A, the present embodiment is characterized in that a sticker sheet 2a includes three package identification codes 12a, 12b, 12c arranged in an L-shape while interposing a predetermined distance between the three package identification codes 12a, 12b, 12c so that one package identification code 12b is located at a center and other two package identification codes 12a, 12b are arranged so as to form a right angle, and the sticker sheet 2a shown in Fig. 3A and the sticker sheet 2b shown in Fig. 3B are arranged in pairs.

[0035] Namely, as shown in Fig. 4, the sticker sheet 2a is adhered over the three surfaces of a corner portion while the sticker sheet 2a is bent at a right angle at the positions of bending portions 200, 201 formed between the display portions 20 and 21 (respectively displaying the package identification codes 12a and 12b) and between the display portions 21 and 22 (respectively displaying the package identification code 12b, 12c). Thus, the sticker sheet 2a (similarly in sticker sheet 2b) is formed by arranging the display portions 20, 21, 22 into the L-shape so that each of the package identification codes 12a, 12b, 12c is displayed on the corner of each surface. Accordingly, it is possible to display the package identification code on the three surfaces of the rectangular package only by adhering one sheet.

[0036] Therefore, as exemplarily shown in Fig. 4, only by adhering the sticker sheet 2a in a corner portion located on the front side of the cardboard box containing the contents and adhering the sticker sheet 2b in a corner portion of the back side (i.e., a diagonal position of the sticker sheet 2a), the package 5C is provided with the package identification codes on all the six surfaces. With this configuration, a sticking work can be completed in a relatively short time while minimizing the labor and time to identify the adhering position and the adhering

direction.

[0037] In addition to the information included in the second embodiment, the present embodiment is characterized that the code data includes the position information indicating a code display position displayed on each display surface (a coordinate position obtained from each 5 cm from a vertical side and a horizontal side forming the corner portion). Therefore, the robot hand side controller does not require a program to execute the steps described above, and even if there are packages having various sizes, the controller can easily handle with them.

[0038] Furthermore, in the present embodiment, the code data includes the information indicating a product number of the contents contained in the cardboard box. Thus, the present embodiment exerts excellent logistics/storage convenience. When the size/contents of the package are known before adhering the sticker sheets, a required number of the sticker sheets 2a, 2b may be printed in advance. Even if the size/contents of the package are known immediately before adhering the sticker sheets, it is possible to relatively easily cope with such situation since printing a required number of sheets takes a short time (two sets of sticker sheets can be printed on one sheet of A4 size).

[0039] In the sticker sheets 2a, 2b, each of the package identification codes 12a to 12f is displayed at a position diagonally displaced from a center position of each of the display portions 20, 21, 22, 23, 24, 25 to secure a space for a tape closing the lid as shown in Fig. 4. Thus, the package identification codes 12a-12f are prevented from being partially hidden by an opaque tape. When the sticking method shown in the figure is used, the sticker sheet can be adhered to the cardboard box even before closing the lid, and the sticker sheet 2a, 2b can be prevented from being cut at the time of opening the lid by cutting the tape.

[0040] Fig. 5 shows a state that the sticker sheets 2a, 2b (i.e., objects displaying the above-described package identification codes 12a-12f) are adhered to a package 5C and the package 5C is unloaded by a robot 3 from a stack of the packages 5C in a container. In this case, the stack of the packages 5C stacked up tightly has small gaps between a container ceiling board 500 and between left and right boards (not illustrated). Thus, it is necessary to pull the packages 5C forward (toward a robot 3) to pick up the packages 5C placed on the top, leftmost and rightmost positions.

[0041] Thus, the robot 3 is provided with an arm 30 and a robot hand 31 arranged at a tip side of the arm 30, and the robot hand 31 includes a camera 315 that is a reading unit to read the package identification codes 12a-12f, a support plate 310 supporting a bottom surface of the target package 5C from the bottom, a suction pad 311 sucking a code display surface, and a sucking/pulling-out means formed by a structure (not shown) to pulling out the sucked package 5C and placing it on the support plate 310.

[0042] Then, based on the size information and the position information read from the

package identification codes 12a-12f, the tip side of the support plate 310 of the robot hand 31 is positioned slightly below the lower edge of the package 5C, and the suction pad 311 sucks while closely coming in contact with the package 5C. In this way, as shown in Fig. 6, the package 5C is unloaded while pulled out and picked up successively from the top of the stacked packages. Thus, even when the package 5C is stacked tightly and the gaps on top and/or side(s) of the package 5C are small, it is possible to smoothly pull out and unload the package 5C with simple configuration without cost increase.

[0043] The robot hand 31 is configured to vertically swing the tip side of the support plate 310 within a predetermined range. As shown in Fig. 6, the tip side of the support plate 310 is lifted while the package 5C is sucked up onto the support plate 310. This makes it possible to stably hold the package 5C even if the suction pad 311 does not have a great suction power. In addition, as shown in Fig. 7, at the time of picking up the lowermost package 5C, the tip side of the support plate 310 is lowered to closely come in contact with a floor surface. Thus, the package 5C, which is closely fitted on the floor surface, can be lifted onto the support plate 310.

[0044] Meanwhile, as shown in Fig. 8, the robot 3 having this robot hand 31 can also be applied to a stack of the packages 5C stacked at random in various orientations, and it is possible to pick up the stacked package 5C successively from the top while adjusting the position/angle of the support plate 310. Namely, when the package identification codes 12a-12f are read, it is possible to instantly identify the size information of the height size and the width size, even the information of the depth size and weight information, and furthermore the position information and the rotation identification information of the package 5C. Thus, it is possible to safely and smoothly unload the package 5C stacked in various orientations.

[0045] Although the illustration is omitted, even when the packages having various sizes are stacked, it is possible to smoothly unload a package by reading each package identification code to identify the condition of the package. Furthermore, as for the camera 315 (i.e., reading unit) provided on the robot hand 31, when a pair of cameras 315 is provided on each end of the left and right sides of the robot hand 31, it is possible to easily measure a distance to a holding target while capturing images in stereoscopic view. Thus, faster positioning can be achieved.

In addition, if the tip side of the support plate 310 includes a contact sensor having elasticity/cushioning by a spring and the like, the lower side of the target package 5C may not be damaged and faster positioning can be achieved.

[0046] In the above-described embodiments, a description has been made of a case where the present invention is applied to an unloading work such as devanning and depalletizing.

However, it should be clearly understood that the present invention can be also applied to various loading work/transferring work such as vaning, palletizing, or moving objects onto a

conveyer, and efficient work as described above can be achieved.

[0047] As described above, according to the present invention, it is possible to smoothly perform the devanning or the depalletizing stacked rectangular packages while managing various situations.

5

[Description of the Reference Numerals]

[0048] 1a, 1b, 1c, 1d, 1e, 1f: sheet, 2a, 2b: sticker sheet, 3: robot , 5A, 5B, 5C: package, 10a, 10b, 10c, 10d, 11a, 11f, 12a, 12b, 12c, 12d, 12e, 12f: package identification code, 20, 21, 22, 23, 24, 25...display portion, 31: robot hand, 200, 201, 202, 203: bending portion, 310: support plate,

10 311: suction pad, 315: camera, 500: ceiling board

CLAIMS

1. A package identification code displayed at a predetermined position of each of four surfaces of front, back, left and right or each of all surfaces of a package having a rectangular shape so
5 that code data of the package identification code is configured to be identified by a predetermined controller via a reading unit, wherein
the code data includes size information indicating a height size and a width size of a code display surface of the package, and
the controller of a robot having the reading unit and a robot hand is configured to
10 position the robot hand with the package based on a code display position and the size information.
2. The package identification code according to claim 1, wherein
the code data includes position information to identify the code display position on the
15 code display surface.
3. The package identification code according to claim 1, wherein
the code data includes rotation identification information to identify a rotation angle of the package when the package is loaded in a state of being rotated from a reference posture
20 by a magnification of 90° about a line of a central axis perpendicular to the code display surface.
4. The package identification code according to claim 2, wherein
the code data includes rotation identification information to identify a rotation angle
25 of the package when the package is loaded in a state of being rotated from a reference posture by a magnification of 90° about a line of a central axis perpendicular to the code display surface.
5. The package identification code according to claim 1, wherein,
30 the code data includes information of a depth size based on the code display surface or/and a weight of the package.
6. A sheet or sticker sheet displaying the package identification code according to claim 1, the sheet or the sticker sheet having a predetermined shape, wherein
35 the package identification code is configured to be displayed on each of the four surfaces of front, back, left and right or each of the all surfaces of the package when the sheet

or the sticker sheet is adhered to the predetermined position of each of the four surfaces or each of the all surfaces.

7. The sheet or sticker sheet displaying the package identification code according to claim 2,
5 the sheet or the sticker sheet having a predetermined shape, wherein
the package identification code is configured to be displayed on each of the four
surfaces of front, back, left and right or each of the all surfaces of the package when the sheet
or the sticker sheet is adhered to the predetermined position of each of the four surfaces or each
of the all surfaces.

10

8. The sheet or sticker sheet displaying the package identification code according to claim 3,
the sheet or the sticker sheet having a predetermined shape, wherein
the package identification code is configured to be displayed on each of the four
surfaces of front, back, left and right or each of the all surfaces of the package when the sheet
15 or the sticker sheet is adhered to the predetermined position of each of the four surfaces or each
of the all surfaces.

9. The sheet or sticker sheet displaying the package identification code according to claim 4,
the sheet or the sticker sheet having a predetermined shape, wherein
20 the package identification code is configured to be displayed on each of the four
surfaces of front, back, left and right or each of the all surfaces of the package when the sheet
or the sticker sheet is adhered to the predetermined position of each of the four surfaces or each
of the all surfaces.

25 10. The sheet or sticker sheet according to claim 6, wherein
three package identification codes are arranged in an L-shape while interposing a
predetermined distance between the three package identification codes so that one of the three
package identification codes is located at a center of the three package identification codes and
other two of the three package identification codes are arranged so as to form a right angle,
30 the sheet or the sticker sheet is formed in the L-shape and configured to be adhered on
three surfaces forming a corner portion of the package having the rectangular shape while the
sheet or the sticker sheet is bent between neighboring package identification codes at a right
angle so that the package identification code is displayed on each corner of the three surfaces,
and
35 the package identification code is displayed on each of different three surfaces of the
package only by adhering one sheet or one sticker sheet.

11. The sheet or sticker sheet according to claim 7, wherein

three package identification codes are arranged in an L-shape while interposing a predetermined distance between the three package identification codes so that one of the three package identification codes is located at a center of the three package identification codes and other two of the three package identification codes arranged so as to form a right angle,

the sheet or the sticker sheet is formed in the L-shape and configured to be adhered on three surfaces forming a corner portion of the package having the rectangular shape while the sheet or the sticker sheet is bent between neighboring package identification codes at a right angle so that the package identification code is displayed on each corner of the three surfaces, and

the package identification code is displayed on each of different three surfaces of the package only by adhering one sheet or one sticker sheet.

12. The sheet or sticker sheet according to claim 8, wherein

three package identification codes are arranged in an L-shape while interposing a predetermined distance between the three package identification codes so that one of the three package identification codes is located at a center of the three package identification codes and other two of the three package identification codes are arranged so as to form a right angle,

the sheet or the sticker sheet is formed in the L-shape and configured to be adhered on three surfaces forming a corner portion of the package having the rectangular shape while the sheet or the sticker sheet is bent between neighboring package identification codes at a right angle so that the package identification code is displayed on each corner of the three surfaces, and

the package identification code is displayed on each of different three surfaces of the package only by adhering one sheet or one sticker sheet.

13. The sheet or sticker sheet according to claim 9, wherein

three package identification codes are arranged in an L-shape while interposing a predetermined distance between the three package identification codes so that one of the three package identification codes located at a center of the three package identification codes and other two of the three package identification codes arranged so as to form a right angle,

the sheet or the sticker sheet is formed in the L-shape and configured to be adhered on three surfaces forming a corner portion of the package having the rectangular shape while the sheet or the sticker sheet is bent between neighboring package identification codes at a right angle so that the package identification code is displayed on each corner of the three surfaces,

and

the package identification code is displayed on each of different three surfaces of the package only by adhering one sheet or one sticker sheet.

5 14. A packing cardboard box displaying the package identification code according to claim 1, wherein

the package identification code is displayed at the predetermined position of each of the four surfaces of front, back, left and right or each of the all surfaces by printing or sheet adhesion.

10

15. A packing cardboard box displaying the package identification code according to claim 2, wherein

the package identification code is displayed at the predetermined position of each of the four surfaces of front, back, left and right or each of the all surfaces by printing or sheet

15 adhesion.

16. A packing cardboard box displaying the package identification code according to claim 3, wherein

20 the package identification code is displayed at the predetermined position of each of the four surfaces of front, back, left and right or each of the all surfaces by printing or sheet adhesion.

17. A robot hand for picking up the package displaying the package identification code of claim 1, the robot hand comprising:

25 the reading unit provided on an arm tip side of the robot, the reading unit being configured to read the package identification code;

a support plate configured to support a bottom surface of the package from below; and

a suction-pullout unit configured to pull out the package and place the package on the support plate while sucking the code display surface, wherein

30 the package is configured to be held in a state of being pulled out and placed on the support plate.

18. A robot hand for picking up the package displaying the package identification code of claim 2, the robot hand comprising:

35 the reading unit provided on an arm tip side of the robot, the reading unit being configured to read the package identification code;

a support plate configured to support a bottom surface of the package from below; and
a suction-pullout unit configured to pull out the package and place the package on the
support plate while sucking the code display surface, wherein

5 the package is configured to be held in a state of being pulled out and placed on the
support plate.

19. A robot hand for picking up the package displaying the package identification code of claim
3, the robot hand comprising:

10 the reading unit provided on an arm tip side of the robot, the reading unit being
configured to read the package identification code;

a support plate configured to support a bottom surface of the package from below; and
a suction-pullout unit configured to pull out the package and place the package on the
support plate while sucking the code display surface, wherein

15 the package is configured to be held in a state of being pulled out and placed on the
support plate.

20. A robot hand for picking up the package displaying the package identification code of claim
4, the robot hand comprising:

20 the reading unit provided on an arm tip side of the robot, the reading unit being
configured to read the package identification code;

a support plate configured to support a bottom surface of the package from below; and
a suction-pullout unit configured to pull out the package and place the package on the
support plate while sucking the code display surface, wherein

25 the package is configured to be held in a state of being pulled out and placed on the
support plate.