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DELIVERY CONTAINER

BACKGROUND OF THE INVENTION

The present invention relates to a delivery container which is reciprocally transported between users.

Articles to be transported, e.g., products, parts, are accommodated in delivery containers, and the delivery containers accommodating the articles are sent from a sender to a receiver. The receiver returns vacant delivery containers, or refills the delivery containers with other articles and returns them to the sender.

In the case of transporting delicate articles, the articles are accommodated together with a shock absorbing member made of, for example, styrene foam. An air cushion, a sponge, etc., may be used as the shock absorbing member.

In the case of sending the vacant delivery containers, a large space for accommodating the vacant delivery containers must be required in spite of sending no articles.

To solve this problem, a folding delivery container has been provided. However, the folding delivery container cannot absorb shocks, so the shock absorbing members cannot be omitted in the case of transporting delicate articles.

Further, in the case of manufacturing a delivery container having shock absorbing function, the shock absorbing member must be attached to the delivery container. Therefore, manufacturing efficiency must be lower.

SUMMARY OF THE INVENTION

An object of the present invention is to provide a delivery



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box which has shock absorbing function and which is capable of reducing a required space for transporting the vacant delivery container.

To achieve the object, the delivery container of the present invention comprises:

a first container section being made of a shock absorbing material and having an accommodating portion, in which articles to be transported can be accommodated; and

a second container section being made of the shock absorbing material and having an accommodating portion, in which articles to be transported can be accommodated;

wherein number of accommodating the articles in the first container section is equal to that in the second container section,

the vacant second container section can be fitted into the accommodating portion of the vacant first container section in a state that the both accommodating portions are faced each other.

With this structure, volume of the vacant container sections can be reduced in spite of the shock absorbing container. Therefore, cost of transporting the vacant delivery containers can be reduced.

In the delivery container, partitions may be provided on an inner bottom face of a bottom plate of the first container section, partitions may be provided on an inner bottom face of a bottom plate of the second container section, the partitions of the second container section may be provided to correspond to the partitions of the first container section, the articles may be respectively accommodated in accommodating spaces divided by the partitions, and height of the partitions may be designed so as not to mutually interfere when the second container section is fitted

into the accommodating portion of the first container section.

With this structure, articles can be transported when the delivery container is returned. By fitting the second container section into the first container section, one of the container sections acts as a lid or a cover, so the article can be protected.

In the delivery container, ribs may be formed on outer bottom faces of the bottom plates of the first container section and the second container section, the ribs may be provided to correspond to the partitions, the articles may be respectively accommodated in the accommodating spaces, each of which is encased by the partitions and the ribs when a plurality of the first container sections are piled, and the articles may be respectively accommodated in the accommodating spaces, each of which is encased by the partitions and the ribs when a plurality of the second container sections are piled.

With this structure, the articles accommodated will never collide each other, so that breakage and damage of the articles can be prevented.

In the delivery container, a first fitting portion may be provided on an outer bottom face of the bottom plate of the first container section, the first fitting portion may be fitted with an inner edge of an opening portion of another first container section, spacers may be provided on outer faces of side walls of the second container section, planar shapes of the first container section and the second container section may be rectangular shapes, length and width of the rectangular second container section, which are defined by the spacers, may be equal to those of the rectangular first container section, which are defined by outer faces of side walls.

With this structure, the articles can be set into and/or taken out from the first container section and the second container section by the same automatic handling machine. Namely, the articles need not be assorted for the first container section and the second container section, so that working efficiency can be improved.

In the delivery container, thick sections may be formed at both ends of each partition so as to pinch the article accommodated in the accommodating portion.

With this structure, the articles can be stably accommodated and transported without play.

In the delivery container, engage portions may be formed in an upper part and a lower part of the first container section, and the engage portions may be engaged with the engage portions of another first container section. Further, engage portions may be formed in an upper part and a lower part of the second container section, and the engage portions may be engaged with the engage portions of another second container section.

With this structure, deformation of the container sections can be prevented even if the container sections are piled, so that the container sections piled can be securely engaged each other.

In the delivery container, step portions may be formed on the inner bottom face of the bottom plate of the first container section or the second container section,

the step portions may be respectively formed in the accommodating spaces, each of which is formed between the side wall and the partition adjacent to the side wall, and each step portion may be formed close to the partition, and

a bottom part of the article accommodated in each

accommodating space may contact the step portion so as to incline an upper part of the article toward the side wall.

With this structure, even if the bottom plate is deformed when the articles are accommodated, the articles can be respectively accommodated in the accommodating spaces without interfering with the ribs formed on the outer bottom face of the bottom plate of the container section piled on the upper side. Therefore, the engagement of the piled container sections can be maintained.

In the delivery container, the first container section and/or the second container section may have means for checking number of use.

With this structure, the number of use of the container sections can be easily known.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments of the present invention will now be described by way of examples and with reference to the accompanying drawings, in which:

Fig. 1 is a plan view of a delivery container of a first embodiment of the present invention;

Fig. 2 is a side view of the delivery container;

Fig. 3 is a bottom view of the delivery container;

Fig. 4 is a sectional view taken along a line A-A of Fig. 1;

Fig. 5 is a sectional view taken along a line B-B of Fig. 1;

Fig. 6 is a sectional view of the delivery container, whose container sections are mutually fitted for return;

Fig. 7 is a plan view of a delivery container of a second embodiment;

Fig. 8 is a bottom view of a delivery container of a third embodiment; and

Fig. 9 is a plan view of a delivery container of a fourth embodiment.

DETAILED DESCRIPTION OF THE EMBODIMENTS

Preferred embodiments of the present invention will now be described in detail with reference to the accompanying drawings.

(First Embodiment)

A first embodiment will be explained with reference to Figs. 1-6. Fig. 1 is a plan view of a delivery container of the first embodiment; Fig. 2 is a side view of the delivery container; Fig. 3 is a bottom view of the delivery container; Fig. 4 is a sectional view taken along a line A-A of Fig. 1; Fig. 5 is a sectional view taken along a line B-B of Fig. 1; and Fig. 6 is a sectional view of the delivery container, whose container sections are mutually fitted for return.

In the present embodiment, two kinds of container sections constitute the delivery container 10 for transporting articles. When the delivery container 10 is returned, one of the container sections is fitted into the other one, so that a required space or required capacity of the delivery container can be reduced. The delivery container 10 will be explained.

The delivery container 10 is constituted by a first container section 20 and a second container section 40.

Firstly, the first container section 20 will be explained.

The first container section 20 is made of a shock absorbing

material, e.g., polyethylene foam. The first container section 20 comprises a bottom plate 21, and longitudinal walls 22 and lateral walls 23 extended from the bottom plate 21. An opening portion is formed by the walls 22 and 23, and a space enclosed by the bottom plate 21 and the walls 22 and 23 is an accommodating portion. As shown in Fig. 1, A partition 24 is provided on an inner bottom face of the bottom plate 21, and the partition 24 divides the accommodating portion into two in the longitudinal direction. Further, a plurality of partitions 25 are provided between the partition 24 and the walls 23. A frame portion 60 is provided on the inner bottom face of the bottom plate 21 along inner faces of the walls 22 and 23. In the present embodiment, the delivery container 10 is made of polyethylene foam so as to absorb shocks. To solve a disadvantage of the soft shock absorbing material, thick reinforcing portions 61 are provided to inner middle parts of the walls 22.

Height of the partitions 24 and 25 and the frame portion 60 are lower than that of the walls 22 and 23. With this structure, they do not interfere each other when the second container section 40 is fitted into the first container section 20.

Notches 29 are formed at upper middle parts of the walls 23. Hands of a worker can enter the notches 29 so as to securely grip the first container section 20. Further, handhold portions 28 (see Fig. 2) are formed by cutting parts of the bottom plate 21 and the walls 23. Therefore, the worker easily piles a plurality of the first container sections 20.

Since the first container section 10 is made of the soft material, the walls 22 are outwardly pushed by weight of accommodated articles when a plurality of the first container

sections 20 are piled. By deformation of the first container sections 10, they cannot be piled. To prevent the deformation, engage holes 63 are formed in upper outer parts of the walls 22; engage portions 64 (see Fig. 2), which can be engaged with the engage holes 63 of another first container section 20, are formed in outer side faces of the bottom plate 21.

Spaces divided by the partitions 24 and 25 are accommodating spaces 30 in which articles to be transported will be accommodated. In the present embodiment, two rows of the articles will be accommodated in the accommodating portion. Note that, number of the accommodating space 30 can be optionally changed by changing numbers of the partitions 24 and 25. A symbol 80 stands for marks for identification, etc..

Successively, the bottom plate 21 of the first container section 20 will be explained with reference to Fig. 2.

A fitting portion 62 is formed in the bottom plate 21 like a frame, and it can be fitted with an inner edge of the opening portion of another first container section 20 when a plurality of the first container sections 20 are piled. In the first fitting portion 62, lateral ribs 26 corresponding to the partition 24 and longitudinal ribs 27 corresponding to the partition 25 are downwardly extended so as to prevent mutual collision of the articles when the first container sections 20 are piled.

Height of the ribs 26 and 27 are equal to or slightly lower than that of the fitting portion 62. Shapes or arrangement of the ribs 26 and 27 and the fitting portion 62 are designed by considering the shock absorbing function. In the present embodiment, shocks applied to the articles accommodated in the delivery container 10 can be reduced to one third or less of that

accommodated in a conventional delivery container made of corrugated plastic board.

Next, the second container section 40 will be explained with reference to Figs. 1 and 2.

The second container section 40 is made of polyethylene foam as well as the first container section 20.

The vacant second container section 40 can be fitted into the accommodating portion of the vacant first container section 20 in a state that the both accommodating portions or the both opening portion are faced each other. Namely, outer size of the second container section 40 defined by outer walls 42 and 43 is equal to or slightly smaller than inner size of the first container section 20 defined by the walls 22 and 23. The second container section 40 comprises a bottom plate 41, and the outer walls 42 and 43. The opening portion is formed by the walls 42 and 43, and a space enclosed by the bottom plate 41 and the walls 42 and 43 is an accommodating portion as well as the first container section 20. Upper ends of articles accommodated in the second container section 40 will be upwardly projected from the opening portion. Preferably, the outer walls 42 and 43 contact an upper face of the frame portion 60 of the first container section 10 when the second container section 40 is fitted in the first container section 20.

A partition 44 divides the accommodating portion into two in the longitudinal direction. Further, a plurality of partitions 45 are provided between the partition 44 and the wall 43 with regular separations.

Spaces divided by the partitions 44 and 45 are accommodating spaces 50 in which the articles to be transported

will be accommodated. In the present embodiment, two rows of the articles will be accommodated in the accommodating portion. Note that, number of the accommodating space 50 can be optionally changed by changing numbers of the partitions 44 and 45 as well as the first container section 20. The symbol 80 stands for marks for identification, etc..

Notches 49 are formed in upper parts of the walls 42. Shapes of the notches 49 correspond to those of the reinforcing portions 61 of the first container section 20, so that the walls 42 is not interfered with the reinforcing portions 61 when the second container section 20 is fitted in the first container section 40.

Through-holes 71 are respectively bored in the accommodating spaces 50 including four corners of the bottom plate 41. With this structure, air in the accommodating portions of the container sections 20 and 40 can be discharged through the through-holes 71 when the second container section 20 is fitted in the first container section 40. On the other hand, air is introduced into the accommodating portions when the container sections 20 and 40 are separated.

L-shaped fitting portions 70, which act as spacers, are provided to four outer corners of the second container section 40. The L-shaped fitting portions 70 is slightly outwardly projected with respect to sides of the bottom plate 41. Length and width of the rectangular second container section 40, which are defined by outer faces of the L-shaped fitting portions 70, are equal to those of the rectangular first container section 20, which are defined by outer faces of the walls 22 and 23. Namely, projection length of the L-shaped fitting portions 70, which are outwardly

projected from the walls 42 and 43, are equal to thickness of the walls 22 and 23 of the first container section 20. Handhold portions 48, whose thickness is equal to that of the L-shaped fitting portions 70, are provided to lower outer middle parts of the walls 43. Therefore, the worker can securely grip and easily pile a plurality of the second container sections 40.

Lateral ribs 46 corresponding to the partition 44 and longitudinal ribs 47 corresponding to the partition 45 are downwardly extended from an outer bottom face of the bottom plate 41 so as to form the accommodating spaces between the upper container section and the lower container section and prevent mutual collision of the articles in the upper and the lower container sections when a plurality of the second container sections 40 are piled.

Projection height of the ribs 46 and 47, which are projected from the outer bottom face of the bottom plate 41, are equal to that of the L-shaped fitting portions 70 projected from the outer bottom face of the bottom plate 41, and higher than projection height of the articles projected from the opening portion of the second container section 40.

U-shaped edges of the opening portion, which are constituted by parts of the walls 42 and 43, act as upper engage portions; lower parts of the L-shaped fitting portions 70 act as lower engage portions, into which the U-shaped edges of another second container section 70 can be fitted. With this structure, a plurality of the second container sections 70 can be stably piled.

Shapes or arrangement of the ribs 46 and 47 and the L-shaped fitting portions 70 are designed by considering the shock absorbing function. In the present embodiment, shocks

applied to the articles accommodated in the delivery container 10 can be reduced to one third or less of that accommodated in a conventional delivery container made of corrugated plastic board.

Usually, the articles are set in and/or taken out from the container sections 20 and 40 by an automatic handling machine. In the present embodiment, the size of the first container section 20 is different from that of the second container section 40. However, there are provided the L-shaped fitting portions 70 at the four corners of the second container section 40, so that the length and the width of the second container section 40, which are defined by outer faces of the L-shaped fitting portions 70, are equal to those of the first container section 20. Therefore, if the first and the second container sections 20 and 40 are correctly positioned in the handling machine, positions of the accommodating spaces 30 and 50 can be correctly corresponded, so that the articles can be set in and/or taken out from the first and the second container sections 20 and 40 by the same handling machine.

A plurality of the first container sections 20, in which the articles have been set by the automatic handling machine, are piled and transported to a receiver. And, a plurality of the second container sections 40, in which the articles have been set, are also piled and transported to the receiver as well. At the receiver's site, the articles are taken out from the container sections 20 and 40 by the automatic handling machine.

Next, piling the first container sections 20 will be explained.

When the first container sections 20 are piled, the fitting

portion 62 of the bottom plate 21 of the upper container section 20 is fitted into the opening portion of the lower container section 20. By fitting the fitting portion 62 in the opening portion, the first container sections 20 can be stably piled. Further, the engage portions 64 of the walls 22 are engaged with the engage holes of the walls 22, so that deformation of the walls can be prevented and the first container sections 20 can be more stably piled. Weight of the upper container section 20 is applied to the side walls of the lower container section 20, so that no weight is applied to the articles.

When the first container sections 20 are piled, the ribs 26 and 27 of the bottom plate 21 of the upper container section 20 correspond to the partitions 24 and 25 of the lower container section 20. With this structure, they encase the accommodating spaces 30, so that the articles do not collide each other. Therefore, damage and breakage of the articles can be prevented.

Further, the ribs 26 and 27 act as members for reinforcing the bottom plate 21 of the first container section 20.

Piling the second container sections 40 will be explained.

When the second container sections 40 are piled, the U-shaped edges of the opening portion, which are constituted by upper ends of the walls 42 and 43, of the lower container section 40 is fitted with the L-shaped fitting portions 70 of the upper container section 40. By fitting the U-shaped edges with the L-shaped fitting portions 70, weight of the upper container section 40 is always applied to the side walls of the lower container section 40, so that no weight is applied to the articles.

When the second container sections 40 are piled, the ribs 46 and 47 of the bottom plate 41 of the upper container section

40 correspond to the partitions 44 and 45 of the lower container section 40. With this structure, they encase the accommodating spaces 50, so that the articles do not collide each other. Therefore, damage and breakage of the articles can be prevented.

The ribs 47 of the upper container section 40 enter gaps between the articles and act as stoppers with respect to an external force in the horizontal direction. Therefore, the second container sections 40 can be stably piled.

Next, the piled container sections will be explained.

An upper face of the uppermost container section 20 of the piled first container sections 20 is opened, so the second container section 40 can be fitted into the uppermost container section 20, in the state that the both accommodating portions are faced each other, as a lid. And, the first container section 20 can be fitted into the uppermost container section 40 of the piled second container sections 40, in the state that the both accommodating portions are faced each other, as a lid. By closing the opening portions of the uppermost container sections, the articles accommodated in the uppermost container sections can be protected.

After the transportation of the piled first container sections 20 and the piled second container sections 40 is completed, the receiver fits the vacant second container sections 40 into the vacant first container section 20 respectively for return. Namely, a required space or capacity for returning the delivery containers 10 can be reduced. Further, the accommodating spaces are formed by the partitions in each couple of the fitted container sections 20 and 40, so that other articles can be accommodated in the fitted container sections 20

and 40 and transported. If numbers of the first container sections 20 and the second container sections 40 are equal they can be efficiently returned.

The delivery container 10 to be returned is shown in Fig. 6.

As shown in Fig. 6, the second container section 40 is fitted in the first container section 20. The partition 44 of the second container section 40 contacts the partition 24 of the first container section 20 when the walls 43 and 49 of the second container section 40 contact the frame portion 60 of the first container section 20. Further, the reinforcing portions 61 can be fitted in the notches 49 of the second container section 40. With this structure, the second container section 40 can be fitted in the first container section 20, so that their capacity can be reduced to around half.

As described above, the capacity of the delivery container 10 to be returned can be much reduced. Since the second container section 40 is fitted in the first container section 20, frictional force is generated between the walls of the container sections 20 and 40, so the container sections 20 and 40 are not separated by shocks during transportation.

(Second Embodiment)

A second embodiment will be explained with reference to Fig. 7. Note that, the first container section 20 is shown in Fig. 7, but the second container section (not shown) may be formed as well as the first container section 20.

Thick portions 100a are formed at both ends of each partition 100. By forming the thick portions 100a, articles can be pinched between the partitions 100, so that the articles can be

stably transported without colliding each other.

Step portions 103 are formed on the inner bottom face of the bottom plate 21 of the first container section 20. Namely, the step portions 103 are higher than the bottom plate 21. The step portions 103 are respectively formed in the accommodating spaces 102, each of which is formed between the side wall 101 and the partition 100 adjacent to the side wall 101. Each step portion 103 is formed close to the partition 100 and extended along the partition 100. With this structure, a bottom part of the article accommodated in each accommodating space 102 contacts the step portion 103 so as to slightly incline an upper part of the article toward the side wall 101.

When a center part of the bottom plate 21 of the first container section 21 is deformed by weight of the accommodated articles, the articles, which have been previously inclined toward the side wall 101, are inclined inward, so that the articles can be vertically accommodated in the accommodating spaces, which are divided by the ribs. Therefore, the articles are not interfered with the ribs extended from the outer bottom face of the bottom plate 21 of the upper container section 20. The container sections 20 can be securely piled, and no weight can be applied to the articles.

(Third Embodiment)

A third embodiment will be explained with reference to Fig. 8. Note that, the first container section 20 is shown in Fig. 8, but the second container section (not shown) may be formed as well as the first container section 20.

As shown in Fig. 8, cut portions 111, which are capable of

absorbing deformation caused by weight of the articles, are partially formed in a fitting frame portion 110. Shapes of ribs 112 and 113 are designed so as to uniformly support the weight of the articles. Therefore, amount of the deformation of the bottom plate 21 outward can be reduced, and the bottom plate 21 can be uniformly deformed downward.

(Fourth Embodiment)

A fourth embodiment will be explained with reference to Fig. 9. Note that, the first container section 20 is shown in Fig. 9, but the second container section (not shown) may be formed as well as the first container section 20.

As shown in Fig. 9, a check sheet or plate 121 is provided on an outer face of a side wall 120. In the present embodiment, a plurality of blanks are formed in the check sheet 121, and number of use the delivery container is written in the blank. Therefore, history of the delivery container can be known. Further, cost-effectiveness and durability of the delivery container can be known.

The present invention is not limited to the above described embodiments. For example, simple spacers may be employed instead of the L-shaped fitting portions 70 of the second container section 40. In this case, the second container sections 40 are simply piled, but the ribs of the upper container section 40 enter the gaps between the articles in the lower container section 40, so that the piled container sections 40 are not collapsed even if horizontal external force is applied to them .

In the above described embodiments, the delivery

container is made of polyethylene foam, but other shock absorbing materials, e.g., polypropylene foam, polyurethane foam, polyolefin foam, may be employed as well.

The invention may be embodied in other specific forms without departing from the spirit or essential characteristics thereof. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

CLAIMS

1. A delivery container (10),
comprising:
a first container section (20) being made of a shock absorbing material and having an accommodating portion, in which articles to be transported can be accommodated; and
a second container section (40) being made of the shock absorbing material and having an accommodating portion, in which articles to be transported can be accommodated;
wherein number of accommodating the articles in said first container section (20) is equal to that in said second container section (40), and
said vacant second container section (40) can be fitted into the accommodating portion of said vacant first container section (20) in a state that the both accommodating portions are faced each other.
2. The delivery container (10) according to claim 1,
wherein partitions (24, 25) are provided on an inner bottom face of a bottom plate (21) of said first container section (20),
partitions (44, 45) are provided on an inner bottom face of a bottom plate (41) of said second container section (40), the partitions (44, 45) are provided to correspond to the partitions (24, 25) of said first container section (20),
the articles can be respectively accommodated in accommodating spaces (30, 50) divided by the partitions (24, 25, 44, 45), and
height of the partitions (24, 25, 44, 45) are designed so as

not to mutually interfere when said second container section (40) is fitted into the accommodating portion of said first container section (20).

3. The delivery container (10) according to claim 2,

wherein ribs (26, 27, 46, 47) are formed on outer bottom faces of the bottom plates (21, 41) of said first container section (20) and said second container section (40), the ribs (26, 27, 46, 47) are provided to correspond to the partitions (24, 25, 44, 45),

the articles are respectively accommodated in the accommodating spaces (30), each of which is encased by the partitions (24, 25) and the ribs (26, 27) when a plurality of said first container sections (20) are piled, and

the articles are respectively accommodated in the accommodating spaces (50), each of which is encased by the partitions (44, 45) and the ribs (46, 47) when a plurality of said second container sections (40) are piled.

4. The delivery container (10) according to one of claims 1-3, wherein a fitting portion (62) is provided on an outer bottom face of the bottom plate (21) of said first container section (20), said fitting portion (62) can be fitted with an inner edge of an opening portion of another first container section (20),

spacers (70) are provided on outer faces of side walls of said second container section (40),

planar shapes of said first container section (20) and said second container section (40) are rectangular shapes, length and width of said rectangular second container section (40), which

are defined by said spacers (70), are equal to those of said rectangular first container section (20), which are defined by outer faces of side walls.

5. The delivery container (10) according to one of claims 2-4, wherein thick sections (100a) are formed at both ends of each partition (100) so as to pinch the article accommodated in the accommodating portion.

6. The delivery container (10) according to one of claims 3-5, wherein engage portions (64) are formed in an upper part and a lower part of said first container section (10), and the engage portions (64) can be engaged with the engage portions (64) of another first container section (10).

7. The delivery container (10) according to one of claims 3-5, wherein engage portions are formed in an upper part and a lower part of said second container section (40), and the engage portions can be engaged with the engage portions of another second container section (40).

8. The delivery container (10) according to one of preceding claims,

wherein step portions (103) are formed on the inner bottom face of the bottom plate (21, 41) of said first container section (20) or said second container section (40),

the step portions (103) are respectively formed in the accommodating spaces (102), each of which is formed between the side wall and the partition (100) adjacent to the side wall

(101), and each step portion (103) is formed close to the partition (100), and

a bottom part of the article accommodated in each accommodating space (102) contacts the step portion (103) so as to incline an upper part of the article toward the side wall (101).

9. The delivery container (10) according to one of preceding claims,

wherein said first container section (20) has means (121) for checking number of use.

10. The delivery container (10) according to one of preceding claims,

wherein said second container section (40) has means (121) for checking number of use.