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(54) CONTAINER AND PICKUP ASSEMBLY FOR COLLECTION OF RECYCLABLE MATERIALS

BEHÄLTER MIT EINER GREIFERANORDNUNG FÜR DAS SAMMELN VON WIEDERTVERWERTBAREN MATERIALIEN

CONTENEUR ET ENSEMBLE DE RAMASSAGE POUR LA COLLECTE DE MATIERES RECYCLABLES

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Description

The invention relates to an apparatus for receiving separated materials and for selectively dumping said materials, comprising a container divided into a plurality of bins, each bin being provided for receiving one type of said separated materials, a plurality of planar lids, each of said lids being hingedly attached to a corresponding bin for closing the bin, and a pickup assembly for engaging and picking up said container.

Such an apparatus is disclosed in the US-A-4 175 903. The lids of the bins of the known apparatus are hinged to bins but not closable at the free ends thereof. Therefore all lids are opened during dumping of the materials. Thus, an exact separation of the materials during dumping is not guaranteed.

In the US-A-4 113 125 a pick-up apparatus is disclosed which comprises two clamping arms for engaging a container. On the inside surface of these arms conical pads are provided.

The problem underlying the invention is to provide an apparatus for receiving separated materials and for dumping said materials without mixing them.

Starting out from the apparatus of the generic kind this problem is solved by lid closure means for maintaining each of said lids in a closed position during pickup of said container, and lid release means for selectively releasing said lids during dumping of said materials.

Due to the lid closure means and the lid release means of the apparatus of the present invention the bins can be opened successively during dumping. This avoids mixing of the separated materials, when the materials are dumped in the respective compartments.

Preferred embodiments of the invention are the subject matter of claims 1 to 12.

Embodiments of the invention are discussed below by means of the accompanying drawings, in which

Figure 1 is a perspective view of a first embodiment of the trash collection container assembly for use outside of a building and at curbside;

Figure 2 is a partial perspective view of a pickup arm assembly of my invention for use with the outside container assembly of Figure 1;

Figure 3 is a partial view of a pickup arm of the assembly of Figure 2 showing resilient cones attached thereto;

Figure 4 is a partial top view of the container assembly of Figure 1 and the pickup arm assembly of Figure 2 in place preparatory to picking up the container assembly;

Figure 5 shows a partial cross-sectional view of the framework of the container assembly of Figure 1 and an end view of a pickup arm of Figure 3 showing a lid release mechanism for the container of Figure 1;

Figure 6 is a perspective view of a second embodiment of the trash collection container assembly for use outside of a building and at curbside;

Figure 7 is a partial perspective view of a pickup arm assembly of my invention for use with the outside container assembly of Figure 6;

Figure 8 is a partial top view of the container assembly of Figure 6 and the pickup arm assembly of Figure 7 in place preparatory to picking up the container assembly; and

Figure 9 shows a partial cross-sectional view of the frame work of the container assembly of Figure 6 and an end view of a pickup arm of Figure 7 showing a lid closure and release mechanism.

Figure 1 illustrates a container to be normally stationed outside of a building and adapted to be moved to curbside for trash pickup. Outside container 30 preferably utilizes a tubular metal framework 32 having essentially rectangular sides. As will be explained below, the framework provides a means for gripping of the container 30 for lifting and dumping. Framework 32 is covered on the inner faces thereof by panels 36 which may be of sheet metal, or sheet plastic. Alternatively, the entire container 30 may be molded from plastic having ribs on the external surface thereof to provide strength and gripping surfaces. A plurality of dividers 37 is provided to divide the container 30 into a plurality of bins 45. Three bins 45 are shown although it is to be understood that the system of the invention may utilize more or less than three bins. Each bin 45 includes a hinged lid 40; for example, lid 40B shown in an open position. Each lid 40 is hinged along one edge by hinge 44. Handles 41 are provided for manual opening of lid 40. Although lids 40 are shown hinged along a longitudinal edge of container 30, the lids may be hinged laterally. A metal channel 34 may be attached around the top periphery of tubular framework 32 and divider 37 to provide a flat mating surface for lids 40.

It is necessary for lids 40 to be maintained in the closed position during a pickup and dumping procedure. To this end, a spring loaded catch 42 is provided for each bin 45, shown in more detail in Figure 5. An operating rod 57 for each lock extends from catch 42 to a pivot bracket 60 attached to a lower element of pipe frame 32. A push plate 43 is attached to each catch 42 to permit manual release thereof for placing materials in a bin. Pressure on push plate 43 causes catch member 50 to pivot at pin 51 in bracket 53 against spring 52, releasing lid 40. As discussed below, catch 42 may also be released by pressure against rod 57.

To permit outside container 30 to be easily moved, a pair of wheels 61 is mounted midway of container 30 with a stand 62 at one end to maintain container 30 level. A handle 50 is provided at the other end for moving container 30. The size of container 30, as well as the individual bins 45, may be selected in accordance with the expected volume of trash, frequency of collection, and relative amounts of separated trash. If the weight and size permits, casters may be substituted for stand 62 for ease of handling of outside container 30.

The outside container 30 is designed in conjunction with a clamping arm assembly 100 having a pair of container clamping arms 80A and 80B as shown in Figure 3. A frame 90 supports a set of cylinders 91 and a set of rods 92 are telescopically inserted into cylinders 91. Clamping arm mounting plates 89 are attached to the respective ends of rods 92. A hydraulic linear actuator 93A is mounted on frame 90 and connected to mounting plate 89 of clamping arm 80A while linear actuator 93B is attached to mounting plate 89 of clamping arm 80B. As will be understood, simultaneous operation of actuators 93A and 93B will cause clamping arms 80A and 80B to move inwardly or outwardly, as indicated by arrows A, in accordance with the direction of movement of actuators 93. A panel 97 may mount a bar code reader bead 96 with the assembly shown in exploded view, normally mounted at the upper end of frame 90 as will be shown in more detail hereinafter. The inner surfaces of clamping arms 80A and 80B are covered with a resilient pad 87, each preferably having a plurality of resilient conical projections 82, and arranged in orthogonally related rows and columns disposed parallel to the longitudinal edges of arms 80A and 80B, as best seen in Figure 3. Pad 87 may be formed from urethane, rubber, or the like. Additional details of pads 87 may be found in my U.S. Patent No. 4,175,903.

Outside container 30 may include a bin identification plate 38 attached to one end thereof as shown in Figure 1. The arrangement and contents of each bin may be indicated as at indicia 39 by appropriate legends. Additionally, a set of bar codes 41 may be provided on plate 38 for identifying the bin contents, and may also provide identification of the customer.

With reference to Figures 2, 4 and 5, the operation of the clamping arm assembly 100 of Figure 2 in combination with outside container 30 will be described. When a container 30 is to be picked up, the clamping arms 80A and 80B of assembly 100 are spread apart by operation of actuators 93. The arms 80 and assembly 100 are then moved forward, by a pickup arm 99, along the sides of container 30 having identification plate 38 attached thereto. When bar code reader mounting assembly 97 contacts plate 38, a limit switch 98 will open causing the forward movement of assembly 100 to cease. As may be noted, bar code reader 96 will be opposite bar codes 41. An external control system (not shown) will identify the materials in each of bins 45 of container 30.

The control system will then operate actuators 93 to close, moving arms 80A and 80B inwardly. Limit switches 101 indicate when clamping pad 87 (best seen in Figure 4) is against tubular frame 32. Alignment is not critical since the cones 82 will deform as the tubular members 33 are gripped. As will be noted from Figure 1, tubular braces 33 are set at an angle with respect to vertical corner elements 35. Thus, angular members 33, which will prevent vertical slipping of container 30 when clamped between arms 80A and 80B.

To be able to dump the contents of each bin 45 of container 30, lids 40 must be released at the proper time.

Referring to Figures 2 and 5, an actuator 70 for each respective bin 45 is mounted at an angle to clamping arm 80A that operates release arm 86, pivoted by pin 85. A horizontal bar 84 is attached to the distal end of release arm 86. After clamping container 30 as hereinabove described, an external lifting and dumping apparatus (not shown) picks up and inverts container 30 over a collection truck body. When it is required to dump a bin, the appropriate actuator 70 is energized, pressing bar 84 against rod 57, and permitting lid 40 to open by gravity.

An alternative mode of carrying out the invention is illustrated in Figure 6. As will be noted, container 30-1 is constructed as in the mode shown by Figure 1, and like reference numerals correspond to the like elements of Figure 1. In this mode, catches for lids 40 are omitted. The user accesses each bin by using handles 41, and lids 40 are normally held closed by gravity.

As will be understood, lids 40 must be held closed during the pickup, lifting and inverting operation. To this end, the structure shown in Figures 7, 8, and 9 is provided. In Figure 7, a set of closure actuator elements 70-1 is provided, each having on closure element 50-1, as best shown in Figure 9.

With reference to Figures 8 and 9, the operation of the clamping arm assembly 100-1 of Figure 7 in combination with container 30-1 will be described. When a container 30-1 is to be picked up, clamping arms 80A and 80B of assembly 100-1 are spread apart by operation of actuators 93. Arms 80 and assembly 100-1 are then moved forward along the sides of container 30-1. When bar code reader mounting assembly 97 contacts plate 38, a limit switch 98 will close causing the forward movement of assembly 100-1 to cease. As may be noted, bar code reader will be opposite bar codes 41.

A control system (not shown) will operate actuators 93 to move arms 80A and 80B inwardly. Limit switches 101 are set to indicate when clamping pads 87 are within a few inches of tubular frame 32. Arm assembly 100-1 is then lowered until closure arm 50-1 of each closure element 88 contacts lids 40 of container 30-1. Thereafter, actuators 93 operate to move arms 80A and 80B inwardly until clamping pads 87 close against vertical members 33 of Figure 6, which will be securely clamped between the resilient cones 82.

The release mechanism to permit dumping of the contents of bins 45 is described with reference to Figure 9. As previously mentioned, lid 40 is held against channel member 34 by closure element 50-1. Plate 50 is connected to actuator 70 which is mounted at an angle with respect to arm 80A. When a lid 40 is to be opened for dumping, actuator 70 is operated, moving closure element 50-1 in the direction of the arrow. As will be recognized, dumping occurs when container 30 is inverted and closure element 50-1 is moved to the position shown in phantom view in Figure 9, permitting lid 40 to open by gravity, as indicated by the dashed-line arrow.

As will now be recognized, a container and pickup arm assembly for use in an automated trash pickup system for recyclable materials has been disclosed. The

container and pickup assembly has been shown in exemplary form; however, the invention is not to be limited to the specific arrangements as many variations may be made without departing from the spirit and scope of the invention. More or fewer bins may be provided, and in varying sizes and orientation. The lid closure systems may be changed to have closure devices associated with both pickup arms. Thus, the invention is to be limited only by the appended claims.

Claims

1. Apparatus for receiving separated materials and for selectively dumping said materials, comprising
 - a container (30, 30-1) divided into a plurality of bins (45), each bin (45) being provided for receiving one type of said separated materials;
 - a plurality of planar lids (40, 41, 44), each of said lids (40, 41, 44) being hingedly attached to a corresponding bin (45) for closing the bin (45), and
 - a pickup assembly (100, 100-1) for engaging and picking up said container (30, 30-1),
 characterized by
 - lid closure means (42) for maintaining each of said lids (40, 41, 44) in a closed position during pickup of said container (30, 30-1), and
 - lid release means (70, 86, 84) for selectively releasing said lids (40, 41, 44) during dumping of said materials.
2. The apparatus according to claim 1, characterized in that said container (30, 30-1) has a plurality of ribs (33, 35) on vertical exterior surfaces thereof.
3. The apparatus according to claim 2, characterized in that said pickup assembly (100, 100-1) has a pair of opposed clamping arms (80A, 80B) adapted to move from an open position to a closed position for engaging said ribs (33, 35) of said container (30, 30-1) for picking up said container (30, 30-1).
4. The apparatus according to one of the preceding claims, characterized in that each of said bins (45) includes coding means (38, 46) representative of the material to be deposited therein.
5. The apparatus according to one of the preceding claims, characterized in that each bin (45) has an essentially rectangular horizontal cross section.
6. The apparatus according to one of the claims 3 to 6, characterized in that
 - said lid closure means (42) includes catch means (50) attached to said container (30, 30-1), and
 - said lid release means (70, 86, 82) includes actuator means (70) attached to one of said clamping arms (80A, 80B) for selective release of said catch means (50).
7. The apparatus according to one of the claims 3 to 6, characterized in that said lid closure means (42) includes a plurality of actuator means (70-1) mounted to said clamping arms (80A, 80B) and having lid engaging means (50-1) for holding said lids (40, 41, 44) closed.
8. The apparatus according to one of the preceding claims, characterized by
 - wheel means (61) attached to a lower portion of said container (30, 30-1); and
 - a handle (50) attached to said container (30, 30-1).
9. The apparatus according to one of the claims 3 to 6, characterized in that said pair of clamping arms (80A, 80B) includes a resilient pad (87) disposed on each opposing surface thereof, said pad (87) engaging said ribs (33, 35) of said container (30, 30-1).
10. The apparatus as defined in claim 9 in which said pad (87) includes a plurality of resilient conical projections (82) arranged in rows and columns.
11. The apparatus according to one of the claims 4 to 10 characterized by
 - a bin identification plate (38) attached to an end of said container (30, 30-1) and
 - a machine-readable barcode (46) for each of said bins (45) to permit said container (30, 30-1) to be selectively dumped by an automated pickup system.
12. The apparatus according to one of the preceding claims, characterized in that the bins (45) are color coded representative of the material to be deposited.

Patentansprüche

1. Vorrichtung zur Aufnahme von getrennten Materialien und zum selektiven Abladen der Materialien, mit
 - einem Container (30, 30-1), der in mehrere Behälter (45) aufgeteilt ist, wobei jeder Behälter (45) zur Aufnahme einer Art der getrennten Materialien vorgesehen ist,
 - mehreren ebenen Deckeln (40, 41, 44), wobei jeder der Deckel (40, 41, 44) gelenkig an einem

- entsprechenden Behälter (45) zum Verschließen des Behälters (45) angebracht ist, und
- einer Aufnehmeeinrichtung (100, 101), die an dem Container (30, 30-1) angreift und diesen aufnimmt,
- gekennzeichnet durch
- Deckelverschlußeinrichtungen (42), die jeden der Deckel (40, 41, 44) während des Aufnehmens des Containers (30, 30-1) in einer geschlossenen Stellung halten, und
 - Deckelfreigabeeinrichtungen (40, 86, 84), die die Deckel (40, 41, 44) während des Abladens der Materialien selektiv freigeben.
2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Container (30, 30-1) mehrere Rippen (33, 35) auf seinen vertikalen Außenflächen aufweist.
3. Vorrichtung nach Anspruch 2, dadurch gekennzeichnet, daß die Aufnehmeeinrichtung (100, 100-1) ein Paar von gegenüberliegenden Klemmarmen (80A, 80B) aufweist, die sich von einer offenen Stellung in eine geschlossene Stellung bewegen können, um zum Aufnehmen des Containers (30, 30-1) an den Rippen (30, 35) des Containers (30, 30-1) anzugreifen.
4. Vorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß jeder Behälter (45) eine Codiereinrichtung (38, 46) aufweist, die das darin zu lagernde Material kennzeichnet.
5. Vorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß jeder Behälter (45) einen im wesentlichen rechtwinkligen horizontalen Querschnitt hat.
6. Vorrichtung nach einem der Ansprüche 3 bis 6, dadurch gekennzeichnet, daß
- die Deckelverschlußeinrichtung (42) eine Verriegelungseinrichtung (50) aufweist, die an dem Container (30, 30-1) angebracht ist, und
 - die Deckelfreigabeeinrichtung (70, 86, 82) eine Betätigungseinrichtung (70) aufweist, die an einem der Klemmarme (80A, 80B) angebracht ist, um die Verriegelungseinrichtung (50) selektiv zu lösen.
7. Vorrichtung nach einem der Ansprüche 3 bis 6, dadurch gekennzeichnet, daß die Deckelverschlußeinrichtung (42) mehrere Betätigungseinrichtungen (70-1) umfaßt, die an den Klemmarmen (80A, 80B) angebracht sind und Deckeleingriffseinrichtungen
- (50-1) aufweist, die die Deckel (40, 41, 44) geschlossen halten.
8. Vorrichtung nach einem der vorhergehenden Ansprüche, gekennzeichnet durch
- eine Radeinrichtung (61), die an einem unteren Abschnitt des Containers (30, 30-1) angebracht ist, und
 - einem Handgriff (50), der an dem Container (30, 30-1) angebracht ist.
9. Vorrichtung nach einem der Ansprüche 3 bis 6, dadurch gekennzeichnet, daß das Paar von Klemmarmen (80A, 80B) ein elastisches Polster (87) aufweist, das jeweils auf deren gegenüberliegenden Flächen angeordnet ist, wobei das Polster (87) an den Rippen (33, 35) des Containers (30, 30-1) angreift.
10. Vorrichtung nach Anspruch 9, bei der das Polster (87) mehrere elastische konische Vorsprünge (82) aufweist, die in Reihen und Spalten angeordnet sind.
11. Vorrichtung nach einem der Ansprüche 4 bis 10, gekennzeichnet durch
- eine Behälteridentifikationsplatte (38), die an einem Ende des Containers (30, 30-1) angebracht ist, und
 - einen maschinenlesbaren Strichcode (46) für jeden der Behälter (45), der es erlaubt, daß der Container (30, 30-1) selektiv durch ein automatisches Aufnehmersystem entladen werden kann.
12. Vorrichtung nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß die Behälter (45) entsprechend dem zu lagernden Material farblich codiert sind.

Revendications

1. Dispositif pour la collecte de matières triées et pour le déchargement sélectif desdites matières, comprenant
- un conteneur (30, 30-1) divisé en plusieurs poubelles (45), chaque poubelle (45) étant prévue pour recevoir un type desdites matières triées;
 - plusieurs couvercles plans (40, 41, 44), chacun desdits couvercles (40, 41, 44) étant fixé de manière articulée sur une poubelle correspondante (45) pour fermer la poubelle (45), et
 - un ensemble de ramassage (100, 100-1) pour saisir et ramasser ledit conteneur (30, 30-1), et caractérisé par
 - un moyen de fermeture des couvercles (42) pour maintenir chacun desdits couvercles (40,

- 41, 44) dans une position fermée pendant le ramassage dudit conteneur (30, 30-1), et
- un moyen de déverrouillage des couvercles (70, 86, 84) pour déverrouiller de manière sélective lesdits couvercles (40, 41, 44) pendant le déchargement desdites matières. 5
2. Dispositif selon la revendication 1, caractérisé en ce que ledit conteneur (30, 30-1) est pourvu de plusieurs nervures (33, 35) sur les surfaces verticales extérieures de celui-ci. 10
3. Dispositif selon la revendication 2, caractérisé en ce que ledit ensemble de ramassage (100, 100-1) comprend une paire de bras de serrage (80A, 80B) opposés adaptés pour se déplacer d'une position ouverte dans une position fermée afin de se mettre en prise avec lesdites nervures (33, 35) dudit conteneur (30, 30-1) pour saisir ledit conteneur (30, 30-1). 15 20
4. Dispositif selon l'une des revendications précédentes, caractérisé en ce que chacune desdites poubelles (45) comprend un moyen de codage (38, 46) représentatif de la matière devant être déposée à l'intérieur. 25
5. Dispositif selon l'une des revendications précédentes, caractérisé en ce que chaque poubelle (45) a une section transversale horizontale essentiellement rectangulaire. 30
6. Dispositif selon l'une des revendications 3 à 6, caractérisé en ce que 35
- ledit moyen de fermeture des couvercles (42) comprend un moyen de verrouillage (50) fixé sur ledit conteneur (30, 30-1), et
 - ledit moyen de déverrouillage des couvercles (70, 86, 82) comprend un dispositif de commande (70) fixé sur l'un desdits bras de serrage (80A, 80B) pour le déverrouillage sélectif dudit moyen de verrouillage (50). 40
7. Dispositif selon l'une des revendications 3 à 6, caractérisé en ce que ledit moyen de fermeture des couvercles (42) comprend plusieurs dispositifs de commande (70-1) montés sur lesdits bras de serrage (80A, 80B) et pourvus de moyens d'engagement des couvercles (50-1) pour maintenir lesdits couvercles (40, 41, 44) fermés. 45 50
8. Dispositif selon l'une des revendications précédentes, caractérisé par 55
- des roues (61) fixées sur une partie inférieure dudit conteneur (30, 30-1); et
 - une poignée (50) fixée sur ledit conteneur (30, 30-1).
9. Dispositif selon l'une des revendications 3 à 6, caractérisé en ce que ladite paire de bras de serrage (80A, 80B) comprend un coussin élastique (87) situé sur chaque surface opposée de ceux-ci, ledit coussin (87) se mettant en prise avec lesdites nervures (33, 35) dudit conteneur (30, 30-1).
10. Dispositif selon la revendication 9, dans lequel ledit coussin (87) est pourvu de plusieurs projections coniques élastiques (82) disposées en rangées et colonnes.
11. Dispositif selon l'une des revendications 4 à 10, caractérisé par
- une plaque d'identification de la poubelle (38) fixée sur une extrémité dudit conteneur (30, 30-1), et
 - un code-barres (46) exploitable par une machine pour chacune desdites poubelles (45) afin de permettre audit conteneur (30, 30-1) d'être vidé sélectivement par un système de ramassage automatique.
12. Dispositif selon l'une des revendications précédentes, caractérisé en ce que les poubelles (45) sont codées par des couleurs représentatives de la matière devant être déposée.







