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(54) GRIPPING APPARATUS FOR OMNIFARIOUS CONTAINERS
GREIFVORRICHTUNG FÜR VERSCHIEDENNARTIGE BEHÄLTIER
APPAREIL DE SERRAGE POUR TOUT TYPE DE RECIPIENTS

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Description

Technical Field

[0001] This invention relates to gripping devices. More particularly, the present invention relates to gripping apparatus of the general type having a pair of opposed gripping members and typically fitted to a refuse collection vehicle.

[0003] In a further and more specific aspect, the instant invention concerns an improved gripping apparatus especially adapted for alternately engaging and holding multifarious refuse containers.

Background Art

[0004] The collection and disposition of refuse, common commercial and domestic waste and trash colloquially referred to as garbage, has become highly sophisticated, mechanized and automated. Initially, the refuse is deposited and temporarily stored in a conveniently located container. Subsequently, the contents of the container are received by a refuse collection vehicle for ultimate transfer to a disposal site. The vehicle, usually operating on a regular periodic schedule, is generally capable of accommodating numerous containers.

[0005] Refuse containers for the instant purpose are readily available commercially in an array of types, sizes and configurations. Common, for example, are stationary containers and portable containers, large containers and small containers, and round containers and square containers. Large round containers, usually permanently positioned at a central location for multiple users, have a capacity ranging to four hundred gallons and a diameter as large as forty-eight inches. Having capacities beginning at approximately thirty gallons and diameters of fifteen inches, small round containers are frequently fitted with wheels for mobility. Square containers, with a transverse measurement in the range of fourteen inches to twenty-nine inches, have a nominal capacity of forty to ninety gallons.

[0006] The foregoing measurements and geometric configurations are taken in cross-section at the gripping surface or perimeter which typically reside approximately twenty-eight inches above the supporting surface. In actuality, each container is defined by a continuous, upright sidewall having a taper in the general range of four to seven degrees which accommodates mold release and stacking. Preferably fabricated of polyethylene by various conventional molding processes, the typical container is characterized by a relatively flexible sidewall having a substantially smooth exterior surface.

[0007] The conventional refuse collection vehicle basically includes a cab, a body and a container handling mechanism carried upon a wheeled chassis. The container handling mechanism is controllably actuated in response to an on-board source of pressurized hydraulic fluid selectively directed by controls located at the operator's compartment within the cab. The body is generally bipartite, having a hopper and a stowage bin for respectively receiving and stowing refuse. Refuse handling means, usually termed a packer, transfers and compacts refuse from the hopper to the stowage bin.

Typically, the container handling mechanism includes a pair of opposed gripping members carried at the end of a lifting member or boom which is extendable and retractable relative the curb or pick-up side of the vehicle. During travel of the vehicle, the container handling mechanism resides in a retracted position with the gripping members extending in opposite directions, fore and aft, along the side of the vehicle. After the vehicle is brought to a stop, the boom is extended and the gripping members engaged about the container. The boom is then elevated to position the container atop the hopper for deposit of the refuse. Successively, the boom is lowered, the container released and the container handling mechanism retracted for stowage during subsequent movement of the vehicle.

US-A-4401407 and US-A-4669940 both describe gripping apparatus for use in combination with a refuse collection vehicle for engaging a container including a pair of gripping members, each having an inner arm and an outer arm movably extending from the inner arm together with actuating means for moving the gripping members to grip a container.

[0010] The interaction between the container and the container handling mechanism is rife with inherent problems. Initially noted is the engagement of the gripping members which is primarily dependent upon the forces of constriction and friction to lift, tilt and maneuver the container. Insufficient force will result in the container slipping from the grasp of the gripping members, especially during tilting with a resultant fall into the hopper. Conversely, a container is easily subjected to destructive distortion by excessive or improperly applied force.

[0011] Another source of considerable concern is the fact that a random, homogeneous mix of containers are frequently utilized within a given geographic area. Conventional prior art gripping members are generally limited to engaging and holding a specifically designated container. Accordingly, the area must be traversed by more than one collection vehicle, or alternately, by a single vehicle on successive trips following alteration of the gripping apparatus.

[0012] Various other sources of perturbation are also evident. For example, initial overextension of the boom can tip or push the container beyond reach of the gripping members. Correction is laborious and wasteful. Further noteworthy is the retracted position of container handling apparatus. The exceedingly long gripping members, extending fore and aft, must either reside precariously outboard of the wheels, beyond the legal envelope width, or require a vehicle of considerable wheelbase.

[0013] The prior art has proposed various purported solutions to the foregoing problems. However, none has
proven to be entirely satisfactory. It would be highly desirable, therefore, to remedy the foregoing and other deficiencies inherent in the prior art.

[0014] Accordingly, it is an object of the present invention to provide an improved gripping apparatus of the type normally used in connection with a refuse collection vehicle.

[0015] Another object of the invention is the provision of an improved gripping apparatus especially adapted for engaging and holding refuse containers of diverse cross-sectional configuration and measurement.

[0016] And another object of this invention is to provide a gripping apparatus which, without modification or alteration, can alternately grip a variety of containers.

[0017] Still another object of the invention is the provision means for securely gripping a wide variety of containers with minimal distortion.

[0018] Yet another object of the instant invention is to provide a gripping apparatus having improved means for relatively uniformly distributing the gripping load about the perimeter of a container.

[0019] Yet still another object of the invention is the provision of an improved gripping apparatus for applying a generally circumferential compressive gripping force to a refuse container.

[0020] A further object of the invention is to provide a gripping apparatus having novel means for extending about and pulling a container into an ameliorated gripping position.

[0021] And a further object of the immediate invention is the provision of a gripping apparatus which is more compactly stowable, thereby allowing for a collection vehicle of substantially shortened wheelbase.

[0022] Still a further object of the invention is to provide an improved gripping apparatus which can be readily and conveniently retrofitted to a conventional prior art refuse collection vehicle.

[0023] And still a further object of the invention is the provision of improvements according to the foregoing which are expediently practiced, fabricated and maintained, in accordance with standard techniques of the art.

DISCLOSURE OF THE INVENTION

[0024] Briefly, to achieve the desired objects of the invention in accordance with a preferred embodiment thereof, first provided are first and second segmented gripping members, each having an inner arm movably affixed to the lifting member of a refuse collection vehicle and an outer arm movably extending from the inner arm. Next provided are actuating means carried by the lifting member for moving the gripping member between a retracted position and an extended position. In the retracted position, the inner arms extend in substantially opposed directions. In the extended position, the inner arms extend in substantially the same direction. Further provided are tensioning means for moving each outer

arm inwardly relative the respective inner arm.

[0025] The invention provides gripping apparatus as set out in the appended claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] The foregoing and further and more specific objects and advantages of the instant invention will become readily apparent to those skilled in the art from the following detailed description of a preferred embodiment thereof taken in conjunction with the drawings in which:

Fig. 1 is a partial perspective view of a refuse collection vehicle fitted with a gripping apparatus embodying the principles of the instant invention, the gripping apparatus being illustrated as it would appear when engaged about a refuse container;

Fig. 2 is a fragmentary perspective view of an embodiment of a gripping apparatus embodying the principles of the instant invention, the gripping apparatus being illustrated as it would appear in a retracted position;

Fig. 3 is an enlarged fragmentary perspective view of the grip actuating assembly of the gripping apparatus of Fig. 2;

Fig. 4 is a perspective view of the gripping apparatus of Fig. 2 illustrated in the extended position;

Fig. 5 is an exploded perspective view of a gripping member of the gripping apparatus of Fig. 2;

Fig. 6 is a top plan view of the gripping apparatus of Fig. 2 illustrated in an extended position, gripping a small refuse container; and

Fig. 7 is a top plan view of the gripping apparatus of Fig. 2 illustrated in the extended position, gripping a larger refuse container.

BEST MODE FOR CARRYING OUT THE INVENTION

[0027] Turning now to the drawings, in which like reference characters indicate corresponding elements throughout the several views, attention is first directed to Fig. 1 which illustrates a conventional prior art refuse collection vehicle generally designated by the reference character 20. Herein viewed from the curb side, vehicle 20 includes a chassis 22 supported and mobilized by a plurality of wheels including front wheels 23 and rear wheels 24 having complimentary mirror images on the opposite or street side of vehicle 20.

[0028] Cab 25 and body 27 are carried at spaced apart locations upon chassis 22. Cab 25, enclosing an operators compartment, resides proximate the forward end of chassis 22. Body 27, located upon the rearward portion of chassis 22, includes storage bay 28 and hopper 29. Although not specifically illustrated but as will be appreciated by those skilled in the art, hopper 29 located forwardly of storage bay 28, includes means for compacting and stowing refuse within storage bay 28.
A container handling mechanism, generally designated by the reference character 30, for lifting refuse container 32 and dumping the contents thereof into hopper 29 is carried upon the chassis 22, intermediate cab 25 and body 27. For purposes of exemplification, container handling mechanism 30 is illustrated as having a lifting member or boom 33 which is reciprocally movable in lateral directions, as indicated by the double arrowed line A, between an extended position as shown and a retracted position. Boom 33 is also angularly movable through an upright arc, as indicated by the double arrowed line B, between a lowered position as shown and an elevated position in which container 32 is atill and substantially above hopper 29.

Double acting hydraulic cylinder assembly 34 urges lateral movement of boom 33. Angular movement is effected by hydraulic cylinder assembly 35. Pressurized hydraulic fluid for selective actuation of the cylinder assemblies is supplied by an on-board source in response to controls located at the operator's station within cab 25. Neither the source of pressurized hydraulic fluid nor the controls are specifically illustrated.

Set forth for purposes of orientation and reference in connection with the ensuing detailed description of the preferred embodiment of the instant invention, the foregoing brief description of refuse collection vehicle 20 is intended to be generally representative of typical, prior art, commercially available vehicles of the type. Details not specifically illustrated and described will be readily understood and appreciated by those skilled in the art.

With continued reference to Fig. 1, there is seen a gripping apparatus 40, generally designated by the reference character 40, embodying the teachings of the instant invention. Preferably carried by the outboard terminal portion of boom 33, gripping apparatus 40 includes a pair of opposed gripping members, first gripping member 42 and second gripping member 43. Specifically shown in the gripping position with gripping members 42 and 43 engaged about container 32, gripping apparatus 40 is selectively actuated in response to the previously described pressurized hydraulic fluid and control operators.

Referring now to Fig. 2, gripping apparatus 40 includes first and second gripping members 42 and 43 respectively, which are illustrated in the extreme release or travel position. Briefly, first gripping member 42 includes inner arm 44 and pivotally connected outer arm 45. Second gripping member 43 similarly includes inner arm 47 and pivotally attached outer arm 48. The pivotal connection between each inner arm and the respective outer arm is rotatably about a substantially vertical axis.

A pedestal 49, carried by boom 33, pivotally supports the inner end of each gripping member for rotation about a substantially vertical axis. Actuating means generally designated by the reference character 50, including hydraulic cylinder assembly 52, rotates gripping members 42 and 43 relative pedestal 49. More specifically, actuating means 50 moves the inner arms between a retracted position and an extended position. Tensioning means, generally designated by the reference character 53, moves each outer arm inwardly relative the respective inner arm and assist gripping members 42 and 43 in grasping and holding a refuse container, distributing the gripping force substantially equally around the periphery of the refuse container. Extension means, generally designated 54 moves each outer arm outwardly relative the respective inner arm. An extension 66 projects substantially horizontally outward from pedestal 49, and includes a substantially vertical plate 67 which pivotally supports a pair of pads 68 and 69 for receiving the refuse container thereagainst. Further description of the foregoing elements will be made presently.

During travel of vehicle 20, gripping apparatus 40 is normally stowed in the retracted position with first and second gripping members 42 and 43 in the extreme release, retracted or travel position as illustrated in Fig. 2. Inner arms 44 and 47 extend fore and aft, respectively. Outer arms 45 and 48 extend convergently outboard from the respective inner arms. With boom 33 in the retracted position, gripping apparatus 40 preferably lies inboard of a plane defined by wheels 23 and 24. For engaging a container, first gripping member 42 and second gripping member 43 are extended in response to the operation of actuating means 50 to a position as seen in Fig. 4.

Referring to Fig. 3, actuating means 50 is carried by pedestal 49. Actuating means 50 includes first and second shafts 57 and 58 which are parallel and rotatably journelled within pedestal 49. Segment gear 59 and mounting bracket 60 are carried by shaft 57 for rotation therewith. Similarly, segment gear 62 and mounting bracket 63 are carried by shaft 58. Segmented gear 62 intermeshes with segment gear 59, and is caused to rotate therewith. In this embodiment, mounting bracket 63 is carried at a level slightly lower than mounting bracket 60. This has the effect of gripping member 43 being carried at a level lower than gripping member 42. The different levels thus produced, allow gripping members 42 and 43 to overlap when in the grip position, especially useful for gripping small containers. This effect may also be obtained by tilting one gripping member in an upward direction, and the other in a downward direction, or by bending either or both gripping members. A lever 64 is drivingly engaged at one end thereof, to shaft 57. An operating rod 65 of hydraulic cylinder assembly 52 is pivotally connected to the other end of lever 64. Gripping apparatus 40 is moveable between a release position and a gripping position. The release position is illustrated in Fig. 2, the gripping position is illustrated in Fig. 4.

In response to movement of operating rod 65 in the direction of arrowed line C, lever 64 is caused to move in the direction of arrowed line D urging counter rotation of shafts 57 and 58. Accordingly, mounting
brackets 60 and 63 move in the directions indicated by arrowed lines E and F respectively, moving inner arms 44 and 47 to the extended position and gripping apparatus 40 to the gripping position of Fig. 4.

[0038] Each gripping member 42 and 43 is substantially a mirror image of the other. Accordingly, in the following detailed description it is to be understood that elements and function described in connection with one of the gripping members is correspondingly applicable to the other.

[0039] Turning now to Fig. 5, gripping member 43 is illustrated. Inner arm 47 of gripping member 43 is an elongate member, which in this embodiment is a substantially square tube having an inner end 72 through which a series of bores 73 extend and an outer end 74 to which a lug 75 is affixed. With additional reference back to Fig. 3, inner arm 44 of gripping member 42 is coupled to mounting bracket 60. It will be understood that gripping member 43 is attached in a like manner, but for purposes of clarity of illustrations, inner end 72 of inner arm 44 is shown attached. The prime after the reference character identifies like elements for gripping member 42 with those of gripping member 43 described in greater detail in Fig. 5. Inner end 72 of first gripping member 42 is configured to receive mounting bracket 60 therein, so as to position one of bores 73 in alignment with a bore 77 extending through mounting bracket 60. A nut and bolt assembly 78 extends through bores 73’ and 77, securing gripping member 42 to mounting bracket 60.

[0040] Referring back to Fig. 5 and the description of gripping member 43, outer arm 48 is an elongate member having an inner end 79 and an outer end 80. Inner end 79 of outer arm 48 terminates with a bifurcated bracket 82 extending outwardly therefrom, having a bore 83 therethrough. Bifurcated bracket 82 is configured to receive lug 75 therein. A pin 84 extends concurrently through bore 83 and lug 75, pivotally coupling outer arm 48 to inner arm 47. Pivotal inward movement of outer arm 48 is limited by an adjustable stop 120, consisting of a threaded bumper 122 received in a threaded coupling 123 attached to inner arm 47 proximate outer end 74.

[0041] In this embodiment, extension means 54 includes a plate 87 having an inner end 88 with a bore 89 therethrough and an outer end 90 with a bore 91 therethrough. Plate 87 is affixed to the top of pin 84, and positioned so as to extend parallel with the longitudinal axis of outer arm 48. Outer end 90 of plate 87 is secured to outer arm 48 by a bolt 92 extending through bore 91 into a bore 93 extending through outer arm 48 proximate inner end 79. A tension spring 94 having a first end 95 and a second end 97 is coupled between inner arm 47 and plate 87. A coupling member 98 is received by bore 89 of inner end 88 of plate 87 to join first end 95 of tension spring 94 thereto. A second coupling member 99 illustrated in broken outline, joins second end 97 of tension spring 94 to an outer surface of inner arm 47. The bias of tension spring 94 acts on inner end 88, keeping outer arm 48 in the extended position.

[0042] With reference to Figs. 4 and 5, tensioning means 53 is a flexible member 100, having a first end 102 coupled to vertical plate 67 proximate an upper edge, and a second end 103 adjustable coupled to outer arm 48 proximate outer end 80. Second end 103 is coupled to outer arm 48 by a nut and bolt assembly 104 extending through one of a series of bores 105 formed in second end 103 and bore 106 formed in outer arm 48 proximate outer end 80. Tensioning means 53 further includes a flexible member 107 having a first end 108 and a second end 109 coupled between vertical plate 67 and outer arm 45 of gripping member 42 respectively. Flexible member 107 is substantially identical to flexible member 100, with the exception that first end 108 is coupled to vertical plate 67 proximate a lower edge thereof. The different positioning of flexible members 100 and 107 are due to the positioning of gripping members 42 and 43. The lower placement of gripping member 43 requires a higher attachment of flexible member 100 in order for flexible members 100 and 107 to contact the sides of a gripped container at approximately the same level.

[0043] Still referring to Fig. 5, a bifurcated bracket 110 extends from outer end 80 of outer arm 48, coincidentally the outer end of gripping member 43. A bore 112 extends through bracket 110. A roller 113 with bearings 114 is rotatably supported within bracket 110 by a pin 115 which passes through bore 112. Bifurcated bracket 110 is turned angularly inward.

[0044] Referring now to Fig. 6, gripping apparatus 40 is illustrated gripping a relatively small refuse container 117. As gripping members 42 and 43 are moved inward about container 117 by actuating means 50, refuse container 117 is pulled inward firmly against pads 68 and 69, and flexible members 100 and 107 of tensioning means 53 contact the sides of container 117 and are forced in an outwardly direction. Since belts 100 and 107 are of fixed length and outer arms 45 and 48 are limited as to their respective inward movement by stop 120, this outward bend acts as biasing means, shortening the distance between first end 102 and second end 103 of flexible member 100 and first end 106 and second end 109 of flexible member 107. This results in outer arms 48 and 45 being pulled inward against the bias of extension means 54. When small containers such as illustrated are gripped, outer arms 48 and 45 overlap with flexible members 100 and 107, pulling the smaller container towards pads 68 and 69, and securely gripping the sides of container 117.

[0045] When a larger refuse container 118 is gripped, such as illustrated in Fig. 7, tensioning means 53 pulls outer arms 48 and 45 inward, with rollers 113 of outer arms 48 and 45 pressing container 118 firmly against pads 68 and 69. The force of the grip can be increased by further extension of gripping members 42 and 43, which increases the force with which tensioning means
53 pulls outer arms 45 and 48 inward against container 118.

[0046] Various changes and modifications to the embodiment herein chosen for purposes of illustration will readily occur to those skilled in the art. To the extent that such modifications and variations do not depart from the spirit of the invention, they are intended to be included within the scope thereof which is assessed only by a fair interpretation of the following claims.

INDUSTRIAL APPLICABILITY

[0047] The present invention is capable of being exploited in any situation where refuse containers are desired to be engaged. The present invention is particularly appropriate for use on refuse collection vehicles, for grasping refuse containers and transferring their contents into the refuse collection vehicle.

Claims

1. A gripping apparatus (40) for use in combination with a refuse collection vehicle (20) having a lift member (33) and for engaging a container (32), said gripping apparatus comprising:
   a) a first segmented gripping member (42) including
      i) an inner arm (44) having an inner end (72°) and an outer end (74°), movably affixed to said lifting member, and
      ii) an outer arm (45) having an inner end and an outer end, movably extending from said inner arm;

   b) a second segmented gripping member (43) including
      i) an inner arm (47) having an inner end (72°) and an outer end (74°), movably affixed to said lifting member, and
      ii) an outer arm (48) having an inner end (79°) and an outer end (80°), movably extending from said inner arm;

   c) actuating means (50) carried by said lift member (33) for moving said first and said second gripping members (42, 43) between
      i) a retracted position in which said inner arms (44, 47) extend in substantially opposed directions, and
      ii) an extended positioning which said inner arms (44, 47) extend in substantially the same direction; and

   d) tensioning means (53) passively coupled to the gripping apparatus (40) for moving said outer arm (45, 48) of said first segmented gripping member (42) and said second segmented gripping member (43) inwardly relative to said inner arm (44, 47), of said first segmented gripping member (42) and said second segmented gripping member (43), respectively; and

   e) extension means (54) for moving said outer arm (45, 48) of said first segmented gripping member (42) and said second segmented gripping member (43) outwardly relative to said inner arm (44, 47) of said first segmented gripping member (42) and said second segmented gripping member (43), respectively.

2. A gripping apparatus (40) as claimed in claim 1 wherein said tensioning means (53) includes:

   a first flexible member (107) having a first end (108), said first flexible member (107) engaging a first location of said outer arm (45) of said first segmented gripping member (42), and said first end (108) fixedly coupled to a second location (67) spaced apart from said first location; and

   a second flexible member (100) having a first end (102), said second flexible member (100) engaging a first location of said outer arm (48) of said second segmented gripping member (43), and said first end (102) fixedly coupled to a second location (67) spaced apart from said first location.

3. A gripping apparatus as claimed in claim 2 further including a pedestal (49) coupled to said lift member (33) to which said first and said second gripping members (42, 43) are movably affixed.

4. A gripping apparatus as claimed in claim 3 wherein said tensioning means (53) further includes:

   said first flexible member (107) having said first end (108) fixedly coupled to said pedestal (49) and a second end (109) fixedly coupled to said outer arm (45) of said first segmented gripping member (42), and

   said second flexible member (100) having said first end (102) fixedly coupled to said pedestal and a second end (103) fixedly coupled to said outer arm (48) of said second segmented gripping member (43).

5. A gripping apparatus as claimed in claim 4 wherein said tensioning means (53) further includes biasing means for tensioning said first and second flexible members (107, 100).

6. A gripping apparatus as claimed in claim 5 wherein
said biasing means is an object (117) being gripped, forcing said flexible members (107, 100) outward, shortening the distance between said first (108, 102) and said second (109, 103) ends of said first and second flexible members (107, 100).

7. A gripping apparatus as claimed in claim 1 wherein said extension means (54) is a tension spring (94) coupled between said inner end (79) of each of said outer arms (45, 48) and said outer end (74) of each of said inner arms (44, 47).

8. A gripping apparatus as claimed in claim 7 wherein said extension means (54) further includes a lever arm (87) extending outwardly from said inner end of each of said outer arm (45, 48) to which said tension spring (94) is coupled.

9. A gripping apparatus as claimed in claim 2 further including rollers (113) affixed to said outer ends (110) of said outer arms (45, 48) angling generally inwardly and constructed to overlap.

Patentansprüche

1. Greifvorrichtung (40) zur Verwendung in Kombination mit einem eine Anhebeeinrichtung (33) aufweisenden Mülssammelfahrzeug (20) und zum Ergreifen eines Behälters (32), wobei die Greifvorrichtung aufweist:

a) eine erste segmentierte Greifeinrichtung (42), die

i) einen inneren Arm (44) mit einem inneren Ende (72) und einem äußeren Ende (74), der beweglich an der Anhebeeinrichtung gelagert ist, und

ii) einen äußeren Arm (45) mit einem inneren Ende und einem äußeren Ende, der sich beweglich von dem inneren Arm erstreckt, umfaßt;

b) eine zweite segmentierte Greifeinrichtung (43), die

i) einen inneren Arm (47) mit einem inneren Ende (72) und einem äußeren Ende (74), der beweglich an der Anhebeeinrichtung gelagert ist, und

ii) einen äußeren Arm (48) mit einem inneren Ende (79) und einem äußeren Ende (80), der sich beweglich von dem inneren Arm erstreckt, umfaßt;

c) Betätigungsmittel (50), die von der Anhebeeinrichtung (33) getragen werden, zum Bene-}

gen der ersten und der zweiten Greifeinrichtung (42, 43) zwischen

i) einer zurückgezogenen Position, in der die inneren Arme (44, 47) sich in im wesentlichen entgegengesetzten Richtungen erstrecken, und

ii) einer ausgestreckten Position, in der die inneren Arme (44, 47) sich im wesentlichen in derselben Richtung erstrecken;

d) Spannmittel (53), die passiv an die Greifvorrichtung (40) angeschlossen sind, zum Bewegen der äußeren Arms (45, 48) der ersten segmentierten Greifeinrichtung (42) und der zweiten segmentierten Greifeinrichtung (43) einwärts relativ zu dem inneren Arm (44, 47) der ersten segmentierten Greifeinrichtung (42) bzw. der zweiten segmentierten Greifeinrichtung (43);

e) Ausfahrmittel (54) zum Bewegen des äußeren Arms (45, 48) der ersten segmentierten Greifeinrichtung (42) und der zweiten segmentierten Greifeinrichtung (43) auswärts relativ zu dem inneren Arm (44, 47) der ersten segmentierten Greifeinrichtung (42) bzw. der zweiten segmentierten Greifeinrichtung (43).

2. Greifvorrichtung (40) nach Anspruch 1, wobei die Spannmittel (53) ein erstes flexibles Element (107) mit einem ersten Ende (108), wobei das erste flexible Element (107) an einem ersten Punkt des äußeren Arms (45) der ersten segmentierten Greifeinrichtung (42) angreift und wobei das erste Ende (108) an einem zu dem ersten Punkt beabstandeten zweiten Punkt (67) fest gelagert ist, und ein zweites flexibles Element (100) mit einem ersten Ende (102), wobei das zweite flexible Element (100) an einem ersten Punkt des äußeren Arms (48) der zweiten segmentierten Greifeinrichtung (43) angreift und wobei das erste Ende (102) an einem zu dem ersten Punkt beabstandeten zweiten Punkt (67) fest gelagert ist,

umfassen.

3. Greifvorrichtung nach Anspruch 2, die weiterhin einen an die Anhebeeinrichtung (33) angeschlosse- nen Sockel (49) aufweist, an dem die erste und die zweite Greifeinrichtung (42, 43) beweglich gelagert sind.

4. Greifvorrichtung nach Anspruch 3, dadurch gekennzeichnet, daß bei den Spannmitteln (53) weiterhin vorgesehen ist,
daß von dem ersten flexiblen Element (107) das erste Ende (108) fest an dem Sockel (49) gelagert ist und ein zweites Ende (109) fest an dem äußeren Arm (45) der ersten segmentierten Greifeinrichtung (42) gelagert ist und daß von dem zweiten flexiblen Element (100) das erste Ende (102) fest an dem Sockel gelagert ist und ein zweites Ende (103) fest an dem äußeren Arm (48) der zweiten segmentierten Greifeinrichtung (43) gelagert ist.

5. Greifvorrichtung nach Anspruch 4, wobei die Spannmittel (53) weiterhin ein Beaufschlagungsmittel zum Spannen des ersten und zweiten flexiblen Elements (107, 100) umfassen.

6. Greifvorrichtung nach Anspruch 5, wobei das Beaufschlagungsmittel ein Gegenstand (117) ist, der ergriffen wird, was die flexiblen Elemente (107, 100) auswärts zwingt, wodurch der Abstand zwischen den ersten Enden (108, 102) und den zweiten Enden (109, 103) des ersten und des zweiten flexiblen Elements (107, 100) verkürzt wird.

7. Greifvorrichtung nach Anspruch 1, wobei die Ausfahrmittel (54) eine Zugfeder (94) aufweisen, die zwischen das innere Ende (79) des jeweiligen äußeren Arms (45, 48) und das äußere Ende (74) des jeweiligen inneren Arms (44, 47) geschaltet ist.

8. Greifvorrichtung nach Anspruch 7, wobei die Ausfahrmittel (54) weiterhin einen Hebelarm (87) umfassen, der sich auswärts von dem inneren Ende des jeweiligen äußeren Arms (45, 48) erstreckt und an den die Zugfeder (94) angeschlossen ist.

9. Greifvorrichtung nach Anspruch 2, die weiterhin Rollen (113) umfaßt, die an den äußeren Enden (110) der äußeren Arme (45, 48) befestigt sind und die grundsätzlich einwärts angewinkelt und überlappend vorgesehen sind.

Revendications

1. Appareil de préhension (40) destiné à être utilisé en combinaison avec un véhicule de collecte de déchets (20) ayant un organe de levage (33) et destiné à s'engager sur un conteneur (32), ledit appareil de préhension comprenant :

   a) un premier organe de préhension segmenté (42), comprenant

      i) un bras intérieur (44) ayant une extrémité intérieure (72) et une extrémité extérieure (74), fixé de manière déplaçable audit organe de levage, et

ii) un bras extérieur (45) ayant une extrémité intérieure et une extrémité extérieure, s'étendant de façon déplaçable depuis ledit bras intérieur;

b) un deuxième organe de préhension segmenté (43), comprenant

i) un bras intérieur (47) ayant une extrémité intérieure (72) et une extrémité extérieure (74), fixé de manière déplaçable audit organe de levage, et

ii) un bras extérieur (48) ayant une extrémité intérieure (79) et une extrémité extérieure (80), s'étendant de façon déplaçable depuis ledit bras intérieur;

c) des moyens d'actionnement (50) supportés par ledit organe de levage (33) afin de déplacer ledits premier et deuxième organes de préhension (42, 43) entre

i) une position rétractée dans laquelle lesdits bras intérieurs (44, 47) s'étendent dans des directions sensiblement opposées, et

ii) une position déployée dans laquelle lesdits bras intérieurs (44, 47) s'étendent sensiblement dans la même direction ; et
d) des moyens de traction (53) couplés passivement à l'appareil de préhension (40) pour déplacer ledit bras extérieur (45, 48) dudit premier organe de préhension segmenté (42) et dudit deuxième organe de préhension segmenté (43), vers l'intérieur par rapport audit bras intérieur (44, 47), dudit premier organe de préhension segmenté (42) et dudit deuxième organe de préhension segmenté (43), respectivement ; et
e) des moyens d'extension (54) pour déplacer ledit bras extérieur (45, 48) dudit premier organe de préhension segmenté (42) et dudit deuxième organe de préhension segmenté (43) vers l'extérieur par rapport audit bras intérieur (44, 47), dudit premier organe de préhension segmenté (42) et dudit deuxième organe de préhension segmenté (43), respectivement.

2. Appareil de préhension (40) selon la revendication 1, dans lequel lesdits moyens de traction (53) comprennent :

un premier organe flexible (107) ayant une première extrémité (108), ledit premier organe flexible (107) s'engageant contre un premier emplacement dudit bras extérieur (45) dudit premier organe de préhension segmenté (42),
et ladite première extrémité (108) couplée rigide ment à un deuxième emplacement (67) à distance du premier emplacement ; et un deuxième organe flexible (100) s'engageant contre un premier emplacement dudit bras extérieur (46) dudit deuxième organe de pr èhension segmenté (43), et ladite première extrémité (102) couplée rigide ment à un deuxième emplacement (67) espaçé dudit premier emplacement.

3. Appareil de pr èhension selon la revendication 2, comprenant en outre un socle (49) couplé audit organe de levage (33) auquel sont fixés déplaçables lesdits premier et deuxième organe de pr èhension (42, 43).

4. Appareil de pr èhension selon la revendication 3, dans lequel lesdits moyens de traction (53) comprennent en outre :

ledit premier organe flexible (107) ayant ladite première extrémité (108) couplée rigide ment audit socle (49) et une deuxième extrémité (109) couplée rigide ment audit bras extérieur (45) dudit premier organe de pr èhension segmenté (42) ; et

ledit deuxième organe flexible (100) ayant ladite première extrémité (102) couplée rigide ment audit socle et une deuxième extrémité (103) couplée rigide ment audit bras extérieur (46) du dit deuxième organe de pr èhension segmenté (43).

5. Appareil de pr èhension selon la revendication 4, dans lequel lesdits moyens de traction (53) comprennent en outre des moyens de sollicitation pour tendre lesdits premier et deuxième organes flexibles (107, 100).

6. Appareil de pr èhension selon la revendication 5, dans lequel lesdits moyens de sollicitation sont un objet (117) qui est saisi, forçant lesdits organes flexibles (107, 100) à se déplacer vers l'extérieur, en raccourcissant la distance entre lesdits premières (108, 102) et lesdites deuxièmes (109, 103) extrémités desdits premier et deuxième organes flexibles (107, 100).

7. Appareil de pr èhension selon la revendication 1, dans lequel lesdits moyens d'extension (54) sont un ressort de traction (94) couplé entre ladite extrémité intérieure (79) de chacun desdits bras extérieurs (45, 48) et ladite extrémité extérieure (74) de chacun desdits bras intérieurs (44, 47).

8. Appareil de pr èhension selon la revendication 7,