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Dongelmans

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[54] **AUTOMATIC PICK-UP DEVICE FOR HOLDING A CARRIER**

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[52] **U.S. Cl.** ..... **214/621,** 214/89, 198/177 R

[51] **Int. Cl.** **B65g 47/02**

[58] **Field of Search** ..... 198/177 R; 214/89, 621

[56] **References Cited**

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[57] **ABSTRACT**

A pick-up device for or in combination with a carrier which carrier has a handle having a portion offset from the gravitational line of force passing through the center of gravity of the carrier. The handle comprises two upwardly extending rods joined by first and second horizontal rods, the first of the rods being in a plane above the second of the rods. The pick-up device is provided with slots for engaging the horizontal rods and lifting the carrier. The slots for engaging the first of the rods having a vertically directed wall which contacts the first rod and opposes the horizontal force applied by the first rod which horizontal force results as a vector component of the gravitational force through the center of gravity of the carrier.

3 Claims, 9 Drawing Figures

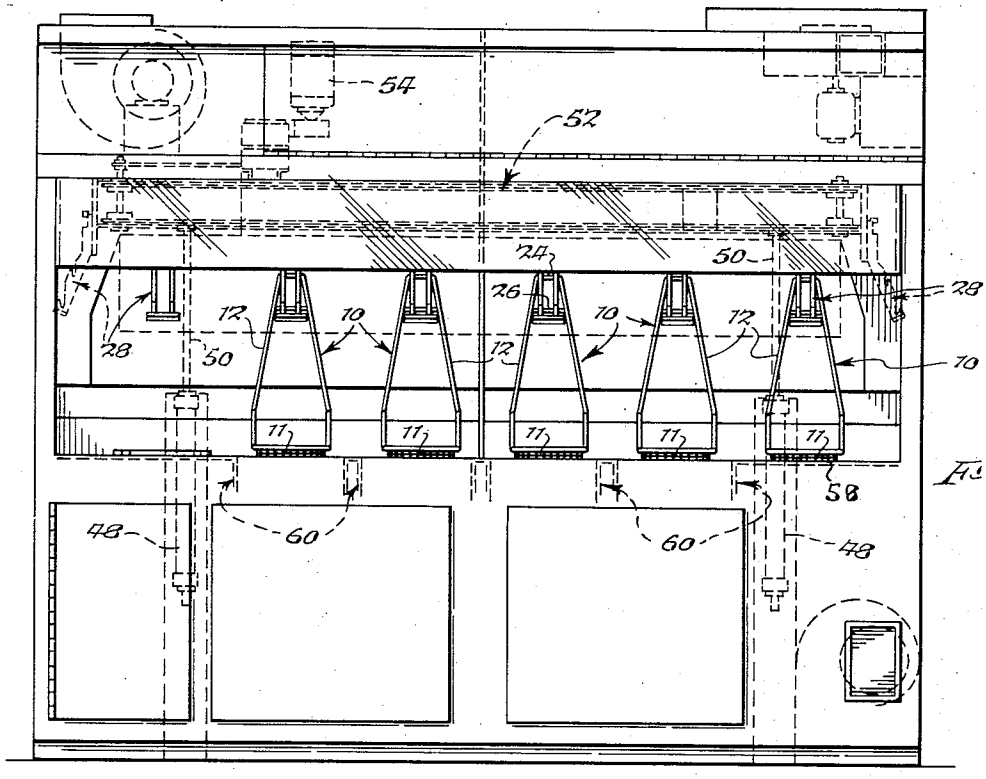


Fig. 1.

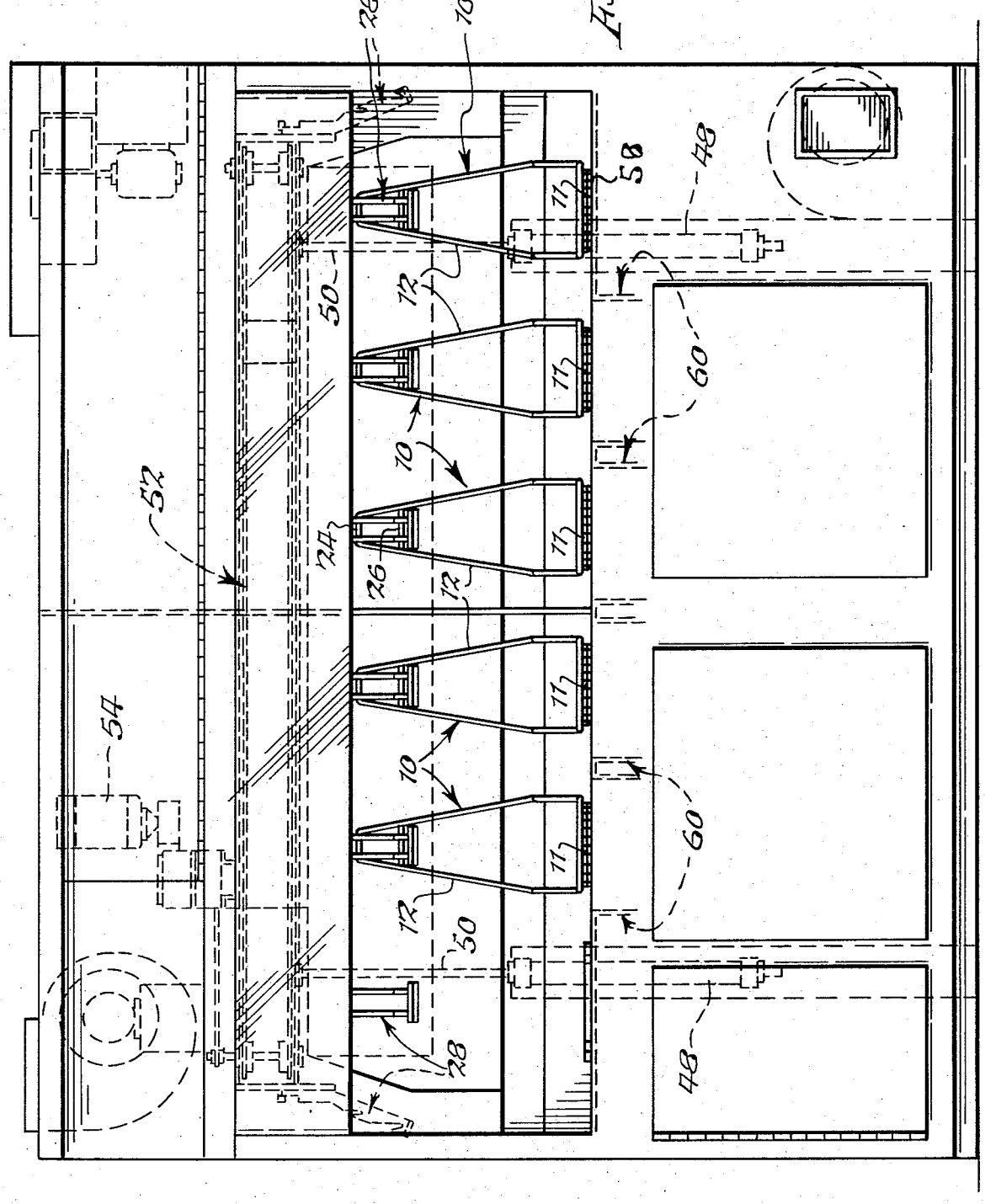


Fig. 3.

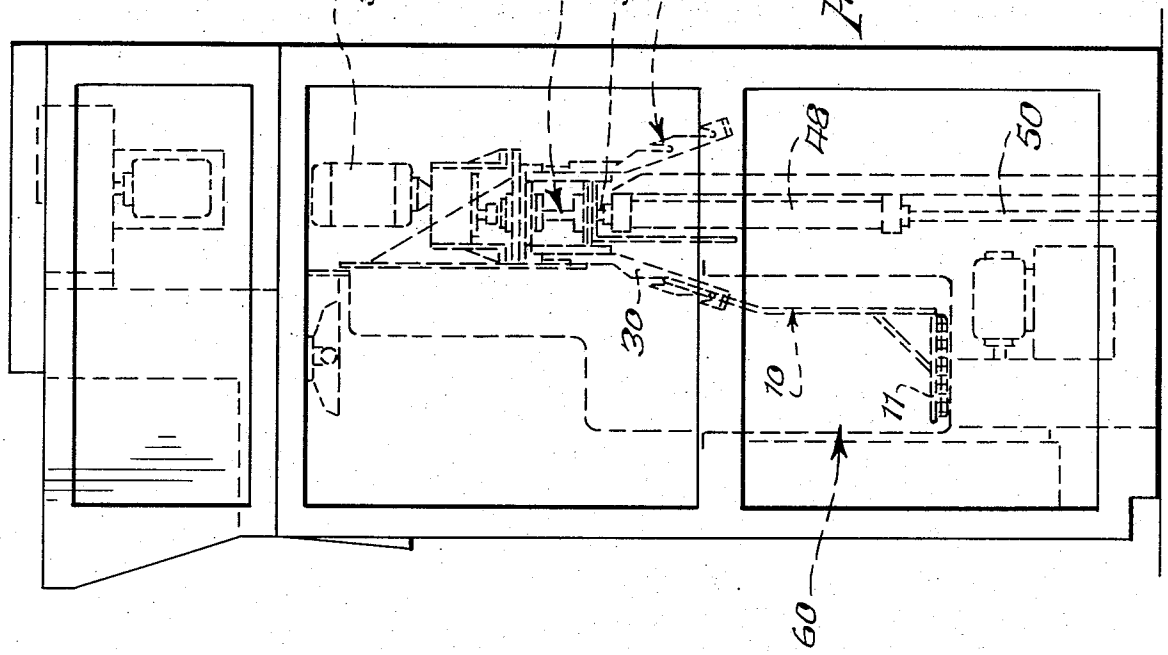


Fig. 2.

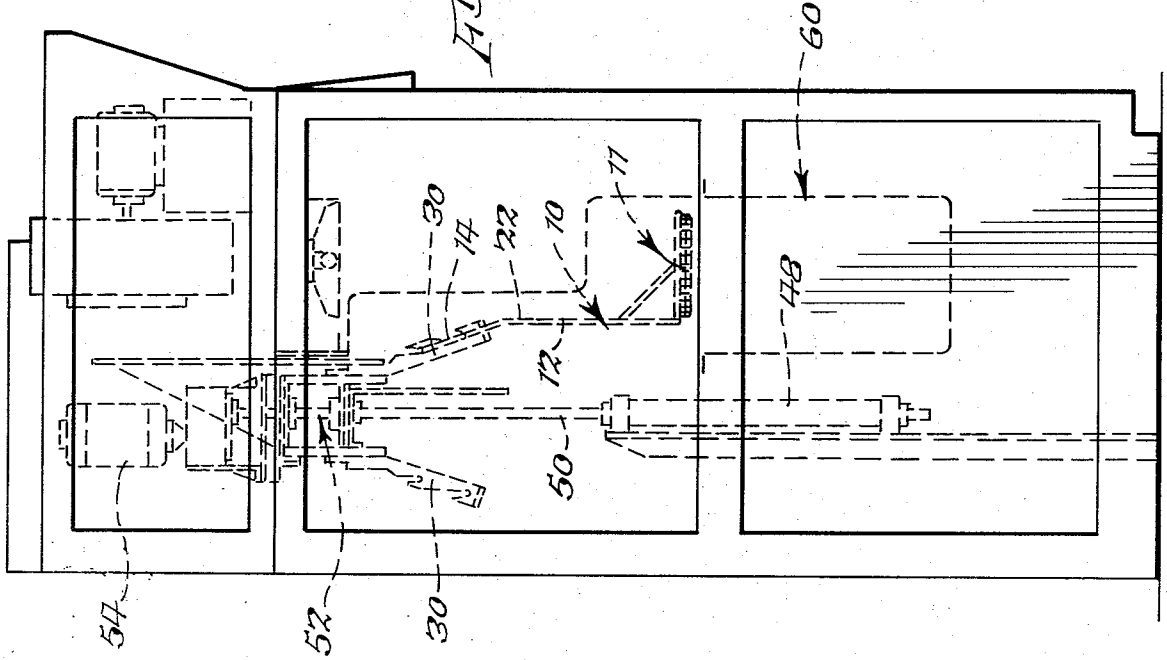


Fig. 6.
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Fig. 7.
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Fig. 4.
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Fig. 8.
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Fig. 9.
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Fig. 5.
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AUTOMATIC PICK-UP DEVICE FOR HOLDING A CARRIER

BACKGROUND OF THE INVENTION

This invention relates to a carrier pick-up device which may be in combination with a carrier. The pick-up device automatically engages the carrier in a locked position preventing the carrier from swinging or becoming disengaged from the pick-up device when the carrier is moved horizontally or vertically by a conveyor.

In the prior art, pick-up devices for carriers or baskets frequently did not lock the carrier or basket in a positive position which prevented swinging of the carrier on the pick-up device or which prevented the carrier from becoming disengaged from the pick-up device during motion of the pick-up device on a conveyor or other transporting means. In addition the prior art carriers frequently had handles located directly above the base of the carrier which handles would interfere with processing of articles located in the carrier.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a front elevational plan view showing the preferred embodiment of the carrier and pick-up device as incorporated into an apparatus for processing articles held by the carrier.

FIG. **2** is an end view of the apparatus shown in FIG. **1** showing the carrier engaged in the slots of the pick-up device.

FIG. **3** is an end view of the apparatus of FIG. **1** showing the carrier engaged in the pick-up device wherein the carrier and pick-up device have been lowered into a processing tank.

FIG. **4** is a close-up front elevational view showing the carrier and pick-up device.

FIG. **5** is an end view of the carrier and pick-up device taken on line **5—5** of FIG. **4.**

FIG. **6** is an exploded view showing the handle of the carrier engaged in the pick-up device.

FIG. **7** is a top view of the carrier taken on line **7—7** of FIG. **4.**

FIG. **8** is an end view of the carrier showing the vectorial direction of forces upon the carrier and pick-up device when the carrier is engaged in the pick-up device and

FIG. **9** is an exploded view showing the slots in the pick-up device.

BRIEF DESCRIPTION OF THE INVENTION

In accordance with this invention an automatic carrier pick-up device is provided which may be in combination with a carrier. The device holds a carrier, comprising a base and a handle, in a locked position preventing the carrier from swinging or swaying during vertical or horizontal movement of the carrier by means of a conveyor. The pick-up device engages the handle of the carrier at a point offset from the gravitational line of force passing through the center of gravity of the carrier. Engagement of the handle by the pick-up device at a position offset from the gravitational line of force passing through the center of gravity, and preferably offset from a position vertically above the base, eliminates interference by the handle directly above the effective work area of the base thus permitting articles held by base of the carrier to be more easily processed.

In accordance with this invention a pick-up device is provided for a carrier wherein the carrier comprises a base for holding articles to be carried and an upwardly extending handle attached to the base wherein the handle has an upper portion offset from the gravitational line of force passing through the center of gravity of the carrier. The handle for the carrier comprises first and second upwardly extending rods, each having first and second ends. Both of said rods being secured proximate their first ends to the base substantially equidistant from the center of gravity of the carrier. The first and second rods are joined proximate their second ends by a third rod at least a portion of which is in a horizontal position. The first and second rods are additionally joined by a fourth rod spaced from the third rod. At least a portion of the fourth rod also being in a horizontal position.

The pick-up device for the carrier comprises a carrier arm which includes at least one slot and preferably a plurality of slots for engaging the third rod and at least one slot and preferably a plurality of slots for engaging the fourth rod. The slots are defined by front and rear walls, the front wall of each of the slots being the wall closest to the gravitational line of force passing through the center of gravity of the carrier. The front wall of the slot for contacting the third rod of the carrier has a vertically directed lower portion and an upper portion which is directed upwardly and outwardly toward the gravitational line of force passing through the center of gravity of the carrier. The upper portion acts to guide the third rod into the vertically directed lower portion. A horizontal bar is provided which is secured to the carrier arm and is positioned between the first and second rods of the handle and is of a length substantially equal to the distance between the first and second rods of the handle at the vertical position of attachment of the horizontal bar when the third and fourth rods of the handle are engaged in the slots.

The combined carrier and pick-up device further comprises means for vertically raising and lowering the pick-up device so that when the carrier is positioned so the third and fourth rods are vertically above the respective slots for engaging the third and fourth rods, raising the pick-up device causes the third and fourth rods to engage the slots thus lifting the carrier as the pick-up device continues to be vertically raised. The carrier is released from the pick-up device by lowering the pick-up device so that the carrier rests upon a surface. Continued lowering of the pick-up device then causes the slots to become disengaged from the third and fourth rods.

PREFERRED EMBODIMENT OF THE INVENTION

As illustrated by the drawings in the preferred embodiment, the carrier **10** comprises a base **11** to which is attached handle **12.** The handle has an upper portion **14** which is offset from the gravitational line of force **16** passing through the center of gravity **18** of carrier **10** and is preferably not vertically above any portion of base **11.** This offset permits positive locking of handle **12** into pick-up device **28** and permits free access to carrier **10** without interference by handle **12.** In the preferred embodiment handle **12** comprises upwardly extending rods **20** and **22** each of rods **20** and **22** being secured to base **11** at equal distances from center of gravity **18.** Rods **20** and **22** are joined at their upper portions by horizontal third rod **24** and fourth rod **26.**

A pick-up device **28** comprises a carrier arm **30** including slots **32** for engaging rod **24** and slots **34** for engaging rod **26.** Slot **32** is defined by rear wall **31** and front wall **33** and slot **34** is defined by rear wall **35** and front wall **37.** As seen in FIG. **9** front wall **33** of slot **32** has a lower vertically directed front wall portion **36** and an outward and upwardly directed upper portion **38.**

The outward and upward directed portion **38** is to permit simplified engagement of rod **24** with slot **32** while the lower vertically directed portion is to prevent disengagement of rod **24** with slot **32** when the carrier is being held by the pick-up device. The vertically directed portion **36** provides a directly opposite force against rod **24** to compensate for vector component **40** of gravitational vector **42** as seen in FIG. **8** while vector component **44** assists in holding horizontal rod **26** in slots **34.**

Horizontal bar **46** is secured to carrier arm **30** and, when the pick-up device functions, locates itself between rods **20** and **22** of handle **12.** Horizontal bar **46** is sized so that it is substantially equal to the distance between rods **20** and **22** at the vertical position of attachment of horizontal bar **46** to carrier arm **30** when horizontal rods **24** and **26** are engaged in slots **32** and **34.** The pick-up device **28** may be vertically raised and lowered by any suitable means. In the preferred embodiment air cylinders **48** may be actuated to vertically raise and lower pistons **50** to which pick-up device **28** is interconnected. As shown in the drawings, pick-up device **28** is connected to a conveyor **52** operated by motor **54.** Conveyor **52** is in turn supported by pistons **50** thus conveyor **52** is raised or lowered by the movement of pistons **50.**

In operation the carrier is positioned by means of a positioning block **56,** as shown in FIG. **7.** Rods **24** and **26** are positioned vertically above slots **32** and **34** respectively. Thus, when pick-up device **28** is vertically lifted, e.g., by means of air cylinders **48,** slots **32** and **34** will engage horizontal rods **24** and **26.** As pick-up device **28** continues to be vertically raised carrier **10** is lifted by pick-up device **28.** Since the upper portion **14** of handle **12** is offset from the center of gravity **18** of carrier **10,** the downward force of gravity along line **16** as seen in FIGS. **5** and **8** tends to rotate carrier **10** about rod **26;** however, such rotation is prevented by the engagement of horizontal rod **24** against lower vertically directed portions **36** of slots **32.** Side motion or rocking of carrier **10** is prevented by contact of horizontal bar **46** with rods **20** and **22.** Motor **54** may then be actuated and conveyor **52** horizontally transports pick-up device **28** and engaged carrier **10.** Pick-up device **28** and engaged carrier **10** then may be lowered by means of pistons **50** into a processing stage, e.g. processing tank **60.** After removal from tank **60** and upon reaching the proper location, carrier **10** may be disengaged from pick-up device **28** through the lowering of pistons **50** so that base **11** of carrier **10** engages a working surface e.g. surface **58** as seen in FIG. **1.** Upon continued downward motion of pick-up device **28,** slots **32** and **34** disengage horizontal rods **24** and **26.** The carrier may then be removed from surface **58.**

I claim:

1. A pick-up device, adapted for raising and lowering a carrier, which carrier includes an upwardly extending handle including an upper portion offset from the gravitational line of force passing through the center of gravity of the carrier which handle comprises first and second upwardly extending rods each having first and second ends and being joined proximate their second ends by a third rod at least a portion of which is in a horizontal position and by a fourth rod spaced from and below the third rod at least a portion of which fourth rod is in a horizontal position, which pick-up device comprises:

a carrier arm including at least one slot for engaging the third rod of the carrier and at least one slot for engaging the fourth rod of the carrier said slots being defined by front and rear walls the front wall of each of said slots being the wall closest to the gravitational line of force passing through the center of gravity of the carrier, the front wall of the slot for contacting the third rod of the carrier having a vertically directed lower portion for engaging the third rod and an upper portion directed upwardly and outwardly toward said gravitational line of force, which upper portion is adapted to guide the third rod into the vertically directed lower portion; and

a horizontal bar secured to the carrier arm said horizontal bar being adapted to locate between the first and second rods of the handle and being substantially equal to the distance between the first and second rods of the handle at the vertical position of attachment of the horizontal bar when the third and fourth rods of the handle are engaged in the slots.

2. A combined carrier and pick-up device therefore said carrier comprising:

a base for holding articles to be carried; an upwardly extending handle attached to the base said handle having an upper portion offset from the gravitational line of force passing through the center of gravity of said carrier, said handle comprising first and second upwardly extending rods each of said rods having first and second ends said rods being secured to the base proximate their first ends substantially equidistant from the center of gravity of the carrier, the first and second rods being joined proximate their second ends by a third rod at least a portion of which is in a horizontal position, the first and second rods being additionally joined by a fourth rod spaced from and below the third rod, at least a portion of said fourth rod being in a horizontal position;

said pick-up device comprising:

a carrier arm including at least one slot for engaging the third rod of the carrier and at least one slot for engaging the fourth rod of the carrier said slots being defined by front and rear walls, the front wall of each of said slots being the wall closest to said gravitational line of force, the front wall of the slot for engaging the third rod of the carrier having a vertically directed lower portion for contacting the third rod and an upper portion directed upwardly and outwardly toward said gravitational line of force for guiding the third rod into the vertically directed lower portion;

a horizontal bar secured to the carrier arm, said horizontal bar being positioned between the first and second rods of the handle and being substantially equal to the distance between the first and second rods of the handle at the vertical position of attachment of the horizontal bar when the third and fourth rods are engaged in the slots; and

a means for vertically raising and lowering the pick-up device.

3. The combined carrier and pick-up device according to claim **2** wherein the upper portion of the handle is offset from a portion vertically above the base.

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