United States Patent [19]

Dubo

[11] **3,828,956**

[45] **Aug. 13, 1974**

[54] **EJECTION APPARATUS AND METHOD FOR EMPTYING REFUSE CONTAINERS**

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[21] Appl. No.: **277,525**

[52] **U.S. Cl.** **214/510,** 214/82, 100/278, 100/218

[51] **Int. Cl.** **B60p 1/16**

[58] **Field of Search** 214/505, 510, 82, 514; 100/278, 218

[56] **References Cited**

UNITED STATES PATENTS

3,648,868 3/1972 Richler ..... 214/82 X

Primary Examiner—Albert J. Makay

[57] **ABSTRACT**

A refuse dumping apparatus having a pivotal and displaceable container in which a normally stored ejector blade can be disposed in the rearward path of the container and in which power means can move the container onto the rearwardly directed ejector blade causing impacted refuse to be pushed toward the rearward, dump opening of the refuse container; the ejector blade being fixed in either an operative or stored position; being raised by movement of the container and a cooperating cam means or by mechanical means such as a fluid motor, screw or the like; and the ejector blade being extensible by power means.

10 Claims, 11 Drawing Figures

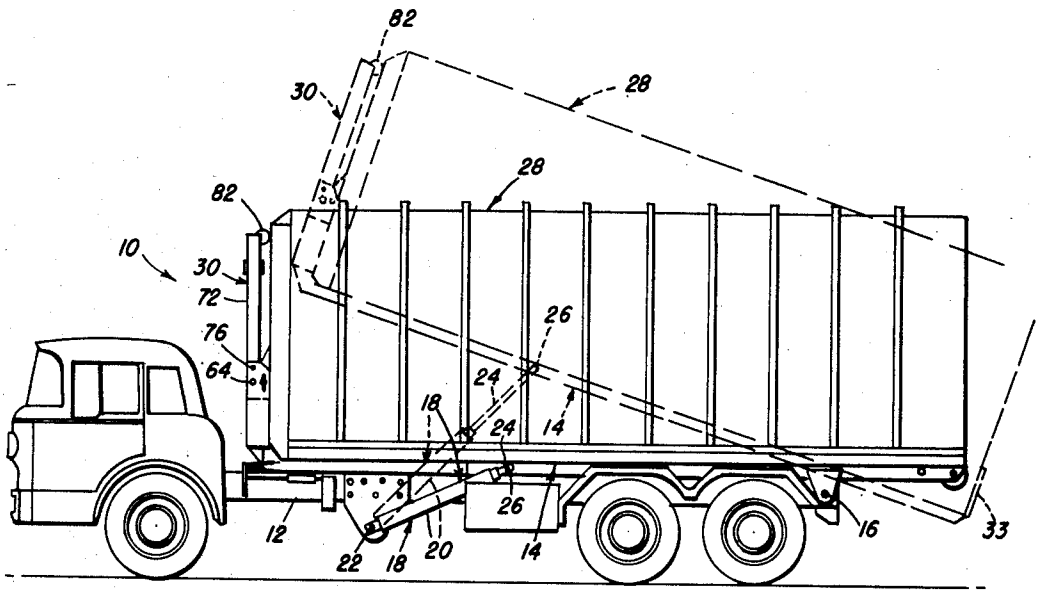


FIG. 1

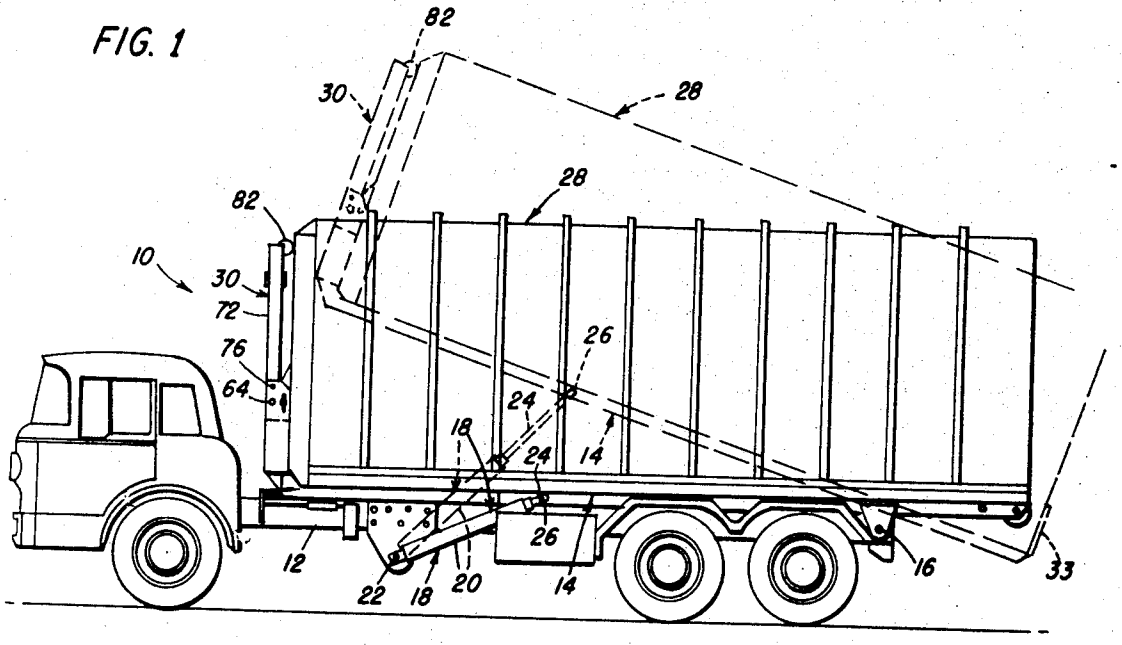

82
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FIG. 2

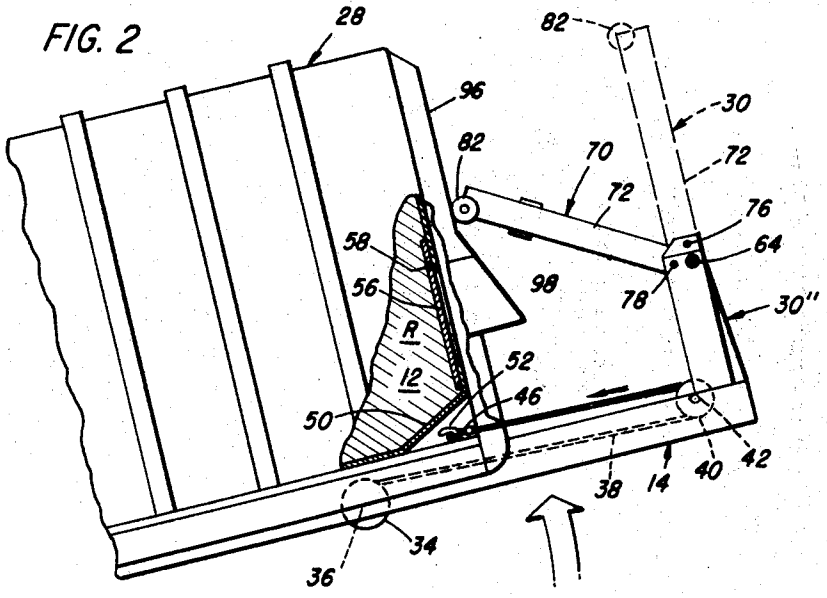

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FIG. 3

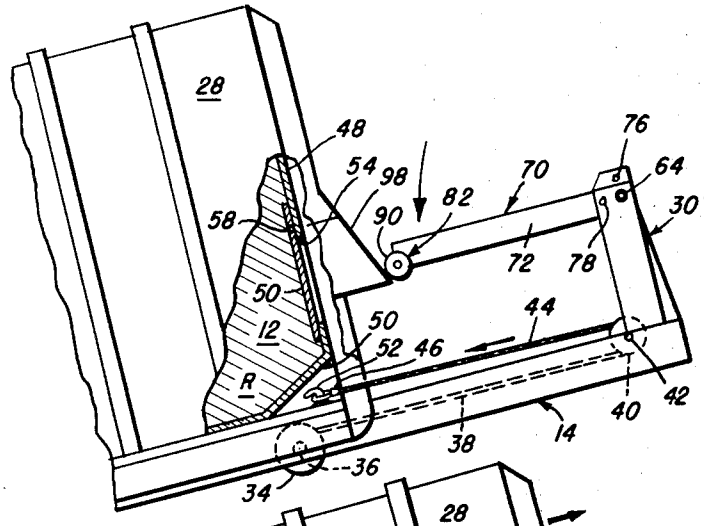


FIG. 6

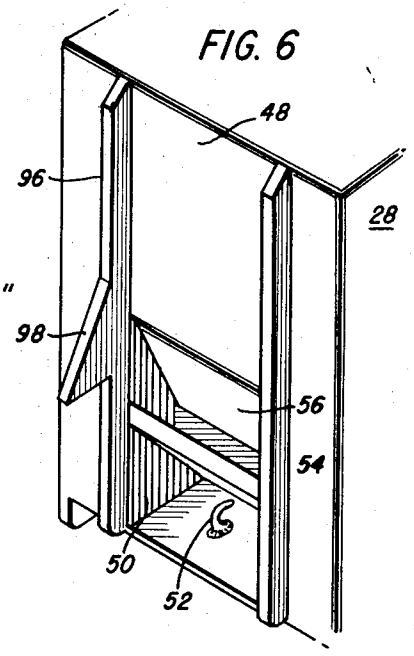


FIG. 4

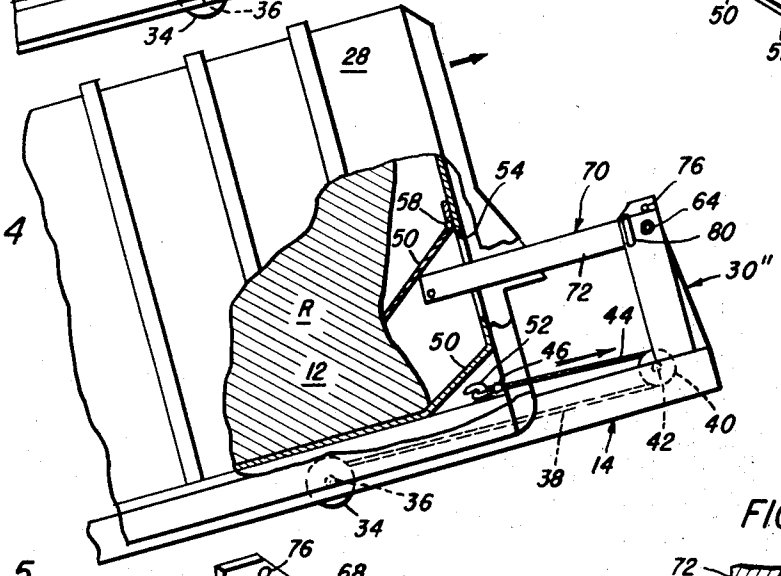


FIG. 5

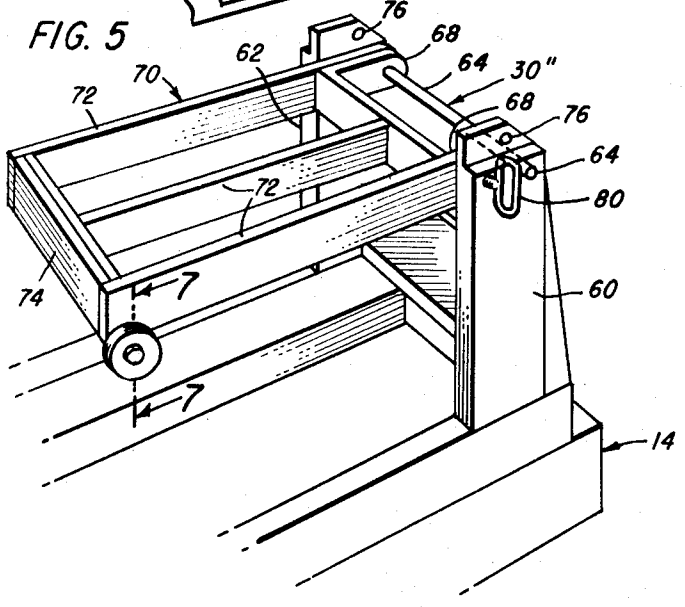


FIG. 7

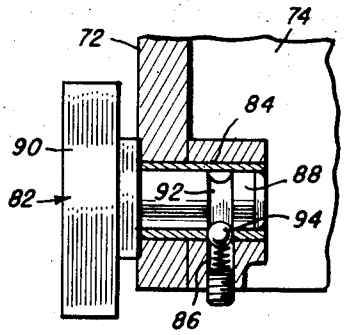


FIG. 8

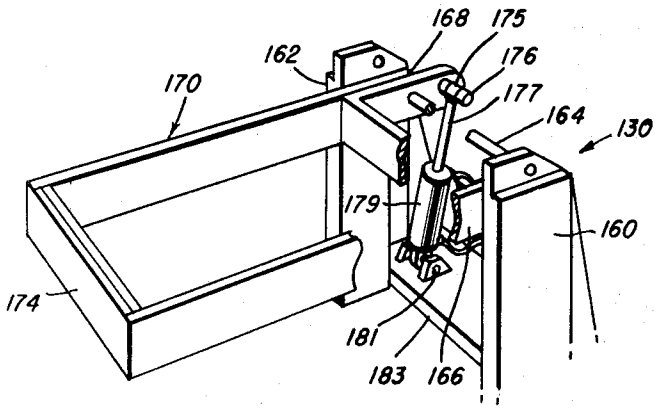


FIG. 9

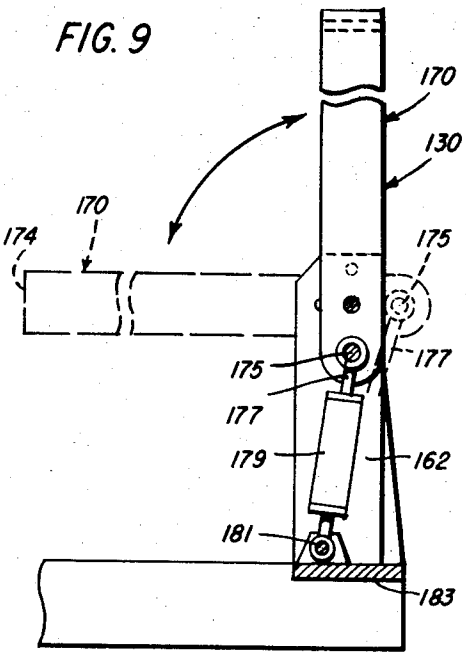


FIG. 11

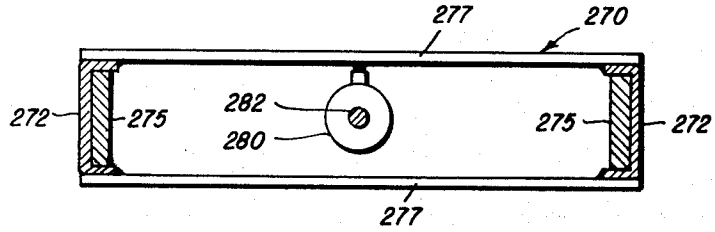
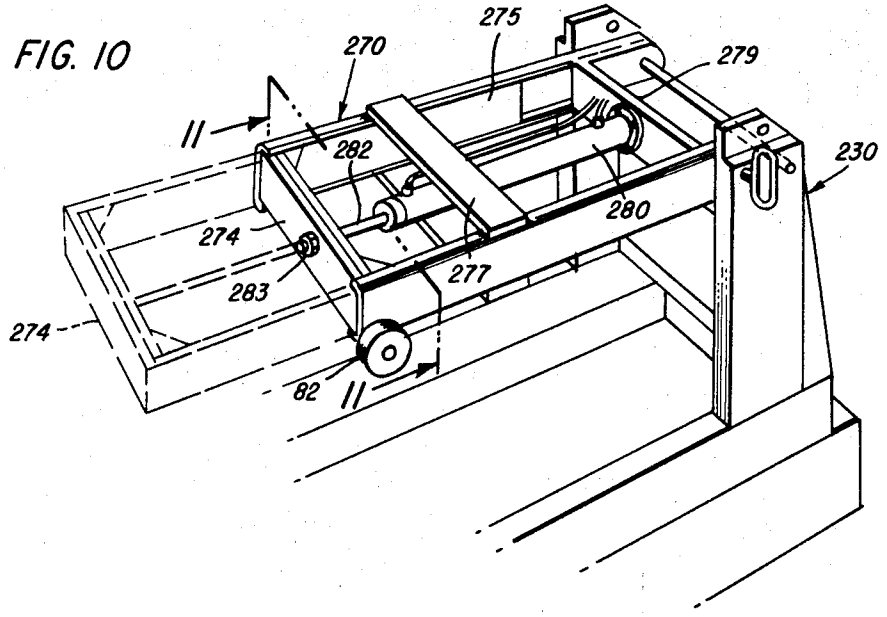


FIG. 10



EJECTION APPARATUS AND METHOD FOR EMPTYING REFUSE CONTAINERS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to refuse handling apparatus and particularly to means for assisting in unloading impacted, pivotal containers.

2. Description of the Prior Art

The problem of freeing impacted refuse in refuse containers at a land-fill or dump site has been recognized in the art as has been the problem of compacting the refuse to attain maximum pay load; see, for example, the following U.S. Pat. Nos.: 2,961,105, Shubin; 3,019,191, Draxler; 3,110,406, Roth; 3,489,302, Danzart; 3,230,868, Smith.

SUMMARY OF THE INVENTION

Apparatus for facilitating the emptying of pivotal, impacted refuse containers utilizing a winch-and-cable assembly, for example, to move a tiltable container onto a horizontally disposed ejector blade means to urge refuse out of the rear of the refuse container.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a side elevational view of a dump vehicle having a tiltable refuse container incorporating the invention, and showing by phantom lines how refuse is dumped;

FIG. **2** is an enlarged fragmentary, partially sectioned, elevation showing how the parts are initially moved to orient the ejector blade means toward an operative position;

FIG. **3** is a view similar to FIG. **2** showing the ejector blade in an operative position;

FIG. **4** is a view similar to FIGS. **2** and **3** showing how the refuse container is moved onto the ejector blade means;

FIG. **5** is a further enlarged fragmentary perspective view showing the ejector blade means in an operative position;

FIG. **6** is a further enlarged fragmentary perspective view of the rear of the refuse container;

FIG. **7** is a still further enlarged fragmentary section taken substantially on the plane of line **7—7** of FIG. **5**, and showing details of a removable anti-friction element used on the ejection blade means;

FIG. **8** is a fragmentary perspective view, with portions broken away, of another embodiment of the ejector blade of the invention showing power means for orienting the blade to an operative position;

FIG. **9** is a vertical section, on a slightly enlarged scale, showing how the ejector blade is moved from the operative phantom line position, to the stored position shown in solid lines;

FIG. **10** is a fragmentary perspective view of an extensible ejector blade and showing by means of phantom lines how extension thereof is accomplished; and

FIG. **11** is a section taken on line **11—11** of FIG. **10**.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring to the drawing in detail and first considering FIG. **1**, a vehicle **10** includes on its frame or chassis **12** a tiltable frame or pallet **14** having a tilt or pivot axis **16**.

Mounted on chassis **12**, in a conventional manner, is a power lift means **18** comprising a cylinder **20** pivoted at **22** and extensible ram **24** pivoted at **26** beneath the tiltable frame on pallet **14**.

the pallet **14** has reciprocatably or displaceably supported thereon a refuse container **28** and ejector blade means **30**.

The refuse container **28** can be cylindrical, rectangular, etc., and includes a rearwardly-opening opening controlled by panel **33**. When the pallet **14**, i.e., container **28**, is tilted as shown in FIG. **1**, at times impacted refuse will not gravitate out of the container. To assist dumping, i.e. obviate impaction, the ejector blade means **30** is utilized.

The ejector blade means **30** cooperates with a winch-and-cable assembly comprising a power winch **34** journaled on a transverse axis **36** on the pallet **14**. A cable **38** is wound on winch **34** and is payed over an idler **40** also journaled on a transverse axis of rotation **42**. The cable **38** has a reversed or forwardly directed run **44** which terminates in a hook or ring element **46**.

The refuse container **28** includes on its forward wall **48** a reinforced, protected indentation **50** in which is disposed an anchor or hook element **52** removably receiving the hook or ring **46**.

Considering FIGS. **2–4** in sequence, after the pallet **14** is tilted about axis **16**, as seen in FIG. **1**, the cable **38** is payed out to permit the container wall **48** to move rearwardly away from the ejector blade assembly **30**.

The container wall **48** includes a forwardly-opening opening **54** confronting the ejector blade assembly **30** and access thereto is controlled by a displaceable panel **56** hinged at **58** on the inner surface of wall **48** and depending in front of the opening **54**. Refuse *R* urged into the container piles behind panel **56**; see FIG. **4** as to how the panel is moved by the ejector blade means to assist in refuse ejectment.

The ejection blade means is mounted on the pallet adjacent the rear end thereof. This means comprises a suitably stable and reinforced support comprising spaced vertical members **60, 62** having a transverse axel **64** upon which are journaled bifurcated portions **68** of a frame member **70** comprising a plurality of mutually parallel members **72** connected by a transverse bight member or head element **74**. The bifurcations include, at **90°** intervals, transverse apertures (not shown) alignable with corresponding apertures **76, 78** (FIG. **3**) through which a lock or key element **80** is removably received; see FIG. **5** for example. With the key or lock **80** inserted through aperture **76** and corresponding aperture of one portion **68** of the frame member results in the ejection blade means being secured in its inoperative or "stored" position; see dotted line view in FIG. **2**.

Before going into the method of using the apparatus and/or disposing the ejector into an operative position as seen in FIGS. **4** and **5**, for example, in FIG. **7** there is shown anti-friction means **82**, comprising a laterally opening sleeve **84** secured on the inner surface of one member **72** and intersected by a spring-urged detent retainer-ball assembly **86** communicating with the bore of the sleeve. Removably received in the sleeve is the axel **88** of a roller or wheel element **90**; the axel **88** having a circumferential groove **92** receiving ball **94** of the assembly **86**. The anti-friction means **82** is normally

stored in sleeve **84**; see FIGS. **1, 2, 3** and **5** and facilitates raising and lowering of the ejection blade means. The ejection blade means is a relatively massive structure and is of considerable weight; typical dimensions being about 30 × 48 to be used with a refuse container of about 22 feet in length. In order to use the winch assembly, a cam track **96** includes an angular ramp portion **98** both in alignment with the wheel **90** on one side of the ejector blade member **72.**

Considering FIGS. **8** and **9,** an alternated embodiment of the ejector blade **130** comprises vertical members **160, 162** having a transverse axel **164** upon which is pivoted the bifurcated ends **166, 168** of a frame member **170** having a transverse bight or head element **174.** Either of the bifurcations (**166, 168**) and in this case **168** includes an extension to which is journaled one end **176,** spaced from axel **162** to provide a lever-arm, to a fluid operated ram **177** operatively disposed in a fluid motor cylinder **179** which in turn is journaled at **181** a transverse anchor plate **183** between the vertical members **160, 162.**

In this embodiment, just as the one previously described, the lock-pin apertures **76, 78** cooperating with lock-pin **80** are incorporated in the frame member **170** and vertical members **160, 162.**

Referring to FIGS. **10** and **11,** an extensible ejector blade **230** is of the type used in the arrangements of FIGS. **1–7** and **8, 9,** in this embodiment, the frame member **270** comprises mutually parallel side members **272** which have a channel shaped cross section as seen in FIG. **11.** The head **274** includes mutually parallel arms **275** telescopically received in the side members **272** and suitable transverse braces **277** extend at upper and lower portions of side members **272,** anchored at a base plate **279** is the housing of a fluid motor **280** including an extensible ram **282** fixed at **283** to the head **274.**

In this embodiment, an anti-friction wheel assembly **82** is disclosed; this functioning with a cam ramp **98** as in FIGS. **2–7** of the first-described embodiment. Clearly, the expedient of a fluid-motor power means arrangement can be utilized with the extensible ejector blade **230** as in FIGS. **8** & **9.**

The fluid operated power means **179, 177** could be replaced by a power-operated screw means (not shown) such being operatively connected between anchor plate **183** and the power-operated screw would be journaled at **176** in lever-arm relationship as the embodiment of FIGS. **8** and **9.**

METHOD OF OPERATION AND USE OF APPARATUS

The container **28** and ejection blade means **30** are normally in the solid line position of FIG. **1**; the cable run **44** is attached by ring **46** to hook **52.** Upon reaching a dump or land-fill site, the pallet **14** is tilted at **16** by means of the power lift means **18**; preferably, but not necessarily, fluid-pressure operated.

With the parts in the "tilted" position shown, the container **28** is prevented from gravitating by the cable and winch assembly. The rear or tail gate **33** is opened and the refuse R would normally gravitate. If the refuse is severely impacted, and will not drop out of the container the following procedure is used:

The anti-friction wheel **82** of the ejector blade **30** is engaged on track **96** above ramp **98.** The key **80** is removed from aperture **76** and released from member **70.**

As the container **28** gravitates through control of the winch assembly, the member **70** pivots downwardly as seen in FIG. **2,** for example. When the member **70** reaches a substantially horizontal position relative to pallet **14,** see FIG. **3,** the key **80** is inserted in aperture **78** as seen in FIG. **4.** The anti-friction means **82,** see FIG. **3,** is removed; see FIG. **4,** and the container **28** is drawn onto member **70,** per FIG. **4,** whereby the panel **56** is engaged by the distal end of member **70** and impacted refuse *R* is moved toward the rear open end of the container past the open panel **33.** The pressure exerted by the material pushed inwardly by panel **56** and ejector blade member **70,** as the container is drawn onto member **70,** results in refuse gravitating out of the tilted refuse container **28.**

After the container is emptied, the container is permitted to move forward (empty) to the position of FIG. **3.** The anti-friction means **82** is re-installed, resulting in the wheel **90** being in alignment with cam track ramp **98.** Drawing the container forwardly via the cable assembly, results in the ejector member **70** tilting upwardly about axel **64** after key **80** has been removed from aperture **78,** and when the container reaches the solid line position of FIG. **1,** the member **70** is once more locked in its stored position; thereafter the pallet **14** is lowered and the container is once more filled.

The embodiment of FIGS. **8** and **9,** will replace the cam ramp expedient previously described, as would the power operated screw (not shown). In this embodiment, the container **28** is controlled as previously described, i.e., through the cable and winch assembly, however the ejector blade is raised and lowered through the expedient of power operated means, in this instance by operating the fluid motor **179** through suitable controls, not shown.

Referring to FIGS. **10** and **11,** in the event greater depth of penetration of the ejector blade is required, the ejector blade head **274** of the assembly **270** can be extended (see FIG. **10**) via the fluid motor **280.**

What is claimed is:

1. Apparatus for handling and dumping refuse, comprising in combination:

a support member having a forward and rear end;

a refuse container displacably-supported on said support member;

ejector blade means at the forward end of said support member exteriorly of said container;

said ejector blade means including a support assembly including a displacable body member;

means operatively connected to said body member for alternatively orienting the body member in a stored position outside the container or in a rearwardly-disposed operative position for introduction into the container upon forward movement of the container onto said body member;

said refuse container on said support member having means for moving said container toward and away from said ejector body member,

said refuse container having a rearwardly-opening portion through which refuse is dumped,

said container having a forwardly-opening portion for receiving said body member therethrough when the container is moved onto the body member which is in an operative position; and

power means operatively connected to said refuse container for moving said container onto said body member whereby said body member moves

through said forwardly-opening portion of the container and impacted refuse is urged out of said container.

2. Apparatus for handling and dumping refuse, comprising in combination:

a support member having a forward and rear end;

ejector blade means at the forward end of said support member;

said ejector blade means including a support assembly for alternatively orienting the ejector blade means in a stored position or a rearwardly-disposed operative position;

a refuse container on said support member having means permitting movement of said container toward and away from said ejector blade means,

said refuse container having a rearwardly-opening portion through which refuse is dumped,

said container having a forwardly-opening portion for receiving said ejector blade therethrough when the ejector blade means is in an operative position; and

power means operatively connected to said refuse container for moving said container toward said ejector blade means and through said forwardly-opening portion of the container whereby impacted refuse is urged out of said container,

said ejector blade means comprising an elongated body member extending transversely of said container,

means pivoting said body member on a transverse axis of rotation, and

lock means alternatively retaining said body member in a vertical-stored or horizontally-operative position relative to said support member.

3. The structure as claimed in claim **2** in which said container includes a cam track confronting the free end of said body member opposite means pivoting said body member,

said body member including anti-friction means at said free end for facilitating raising and lowering the body member.

4. Apparatus for handling and dumping refuse, comprising in combination:

a support member having a forward and rear end;

ejector blade means at the forward end of said support member;

said ejector blade means including a support assembly for alternatively orienting the ejector blade means in a stored position or a rearwardly-disposed operative position;

a refuse container on said support member having means permitting movement of said container toward and away from said ejector blade means,

said refuse container having a rearwardly-opening portion through which refuse is dumped,

said container having a forwardly-opening portion for receiving said ejector blade therethrough when the ejector blade means is in an operative position; and

power means operatively connected to said refuse container for moving said container toward said ejector blade means and through said forwardly-opening portion of the container whereby impacted refuse is urged out of said container,

said container including a hinged access panel depending over the forwardly-opening portion and displaceable inwardly by said ejector blade means when the container is moved onto said ejector blade means.

5. The structure as claimed in claim **1** in which said refuse container is pivotally mounted on a transverse pivot axis rearwardly of said support member.

6. The structure as claimed in claim **1** in which said power means comprises a power winch-and-cable assembly including a hook on said container for receiving said cable, and an idler element journaled on a transverse axis rearwardly of said container.

7. The structure as claimed in claim **2** in which said ejector blade means comprises an extensible portion for increasing its length whereby the depth of penetration of said ejector blade means into the refuse container is increased.

8. The structure as claimed in claim **7** in which said extensible portion includes power means for extending the same.

9. The structure as claimed in claim **1** in which power operated means is operatively connected to said body member for orienting it in an operative position or a stored position.

10. The structure as claimed in claim **9** in which said power operated means comprises a motor assembly operatively connected to a lever-arm portion of said ejector blade means.

* * * * *