United States Patent [19]

Engebretsen

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[45] **Dec. 10, 1974**

[54] **COMPACTOR WITH FIXED COMPACTION CHAMBER AND MOVABLE PLATE MEMBER**

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[73] Assignee: **The Hobart Manufacturing Company,** Troy, Ohio

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[52] **U.S. Cl.** ..... **100/229 A,** 100/218, 100/252

[51] **Int. Cl.** **B30b 15/32**

[58] **Field of Search** ..... 100/218, 229 A, 250, 255, 100/252, 226, 246, 240, 247; 220/15, 17; 206/45.16

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Attorney, Agent, or Firm—Biebel, French & Bugg

[57] **ABSTRACT**

A compactor of the type in which a flexible waste container, such as a plastic container, is removed bodily from the compaction chamber after filling. A movable plate is positioned between a side or bottom wall of the container and a corresponding wall of the chamber so that the forces exerted by the outwardly-bulging walls of the container against the chamber walls can be relieved to facilitate removal of the container from the compaction chamber.

3 Claims, 11 Drawing Figures

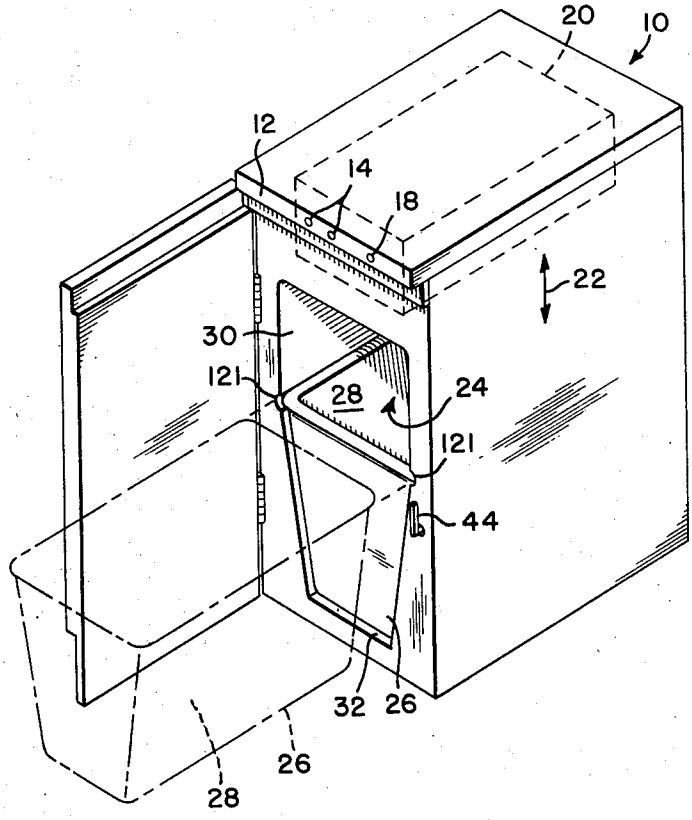


FIG-1

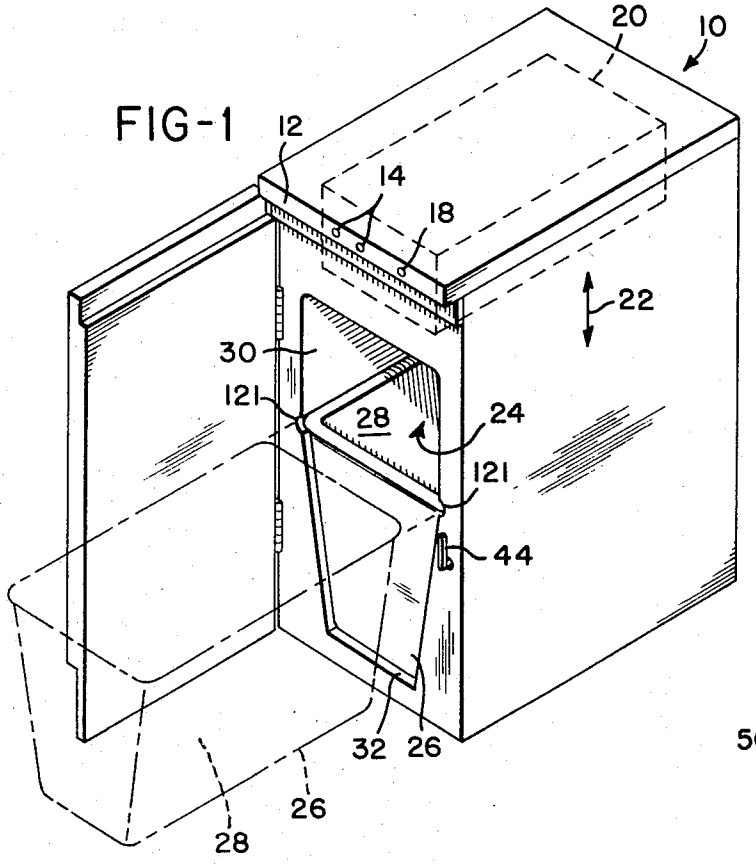


FIG-2

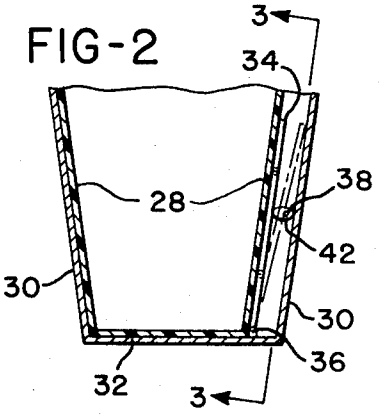


FIG-6

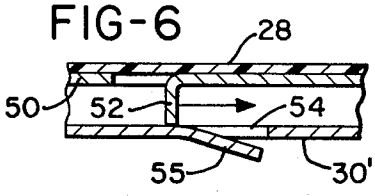


FIG-3

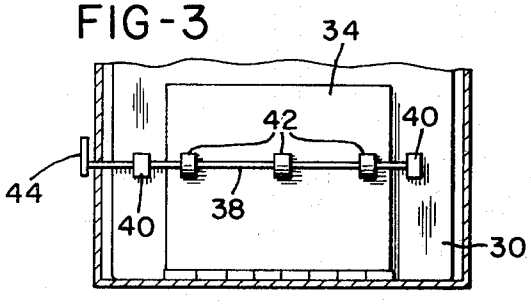


FIG-4

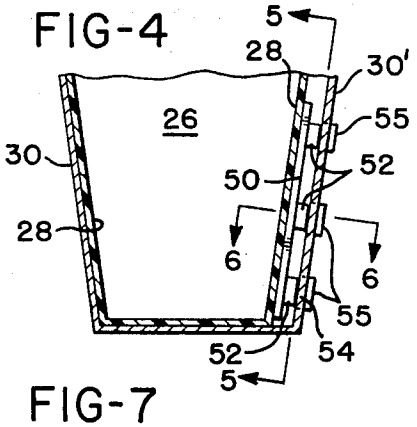


FIG-5

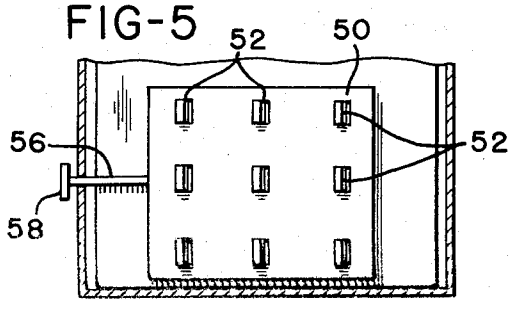


FIG-7

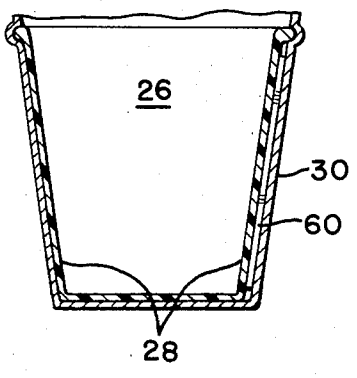


FIG-8

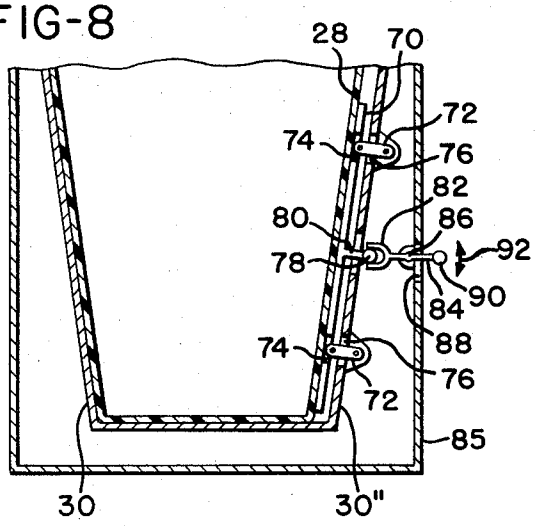


FIG-9

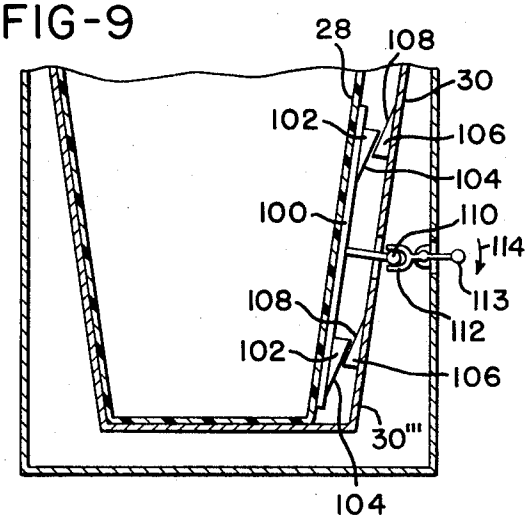


FIG-10

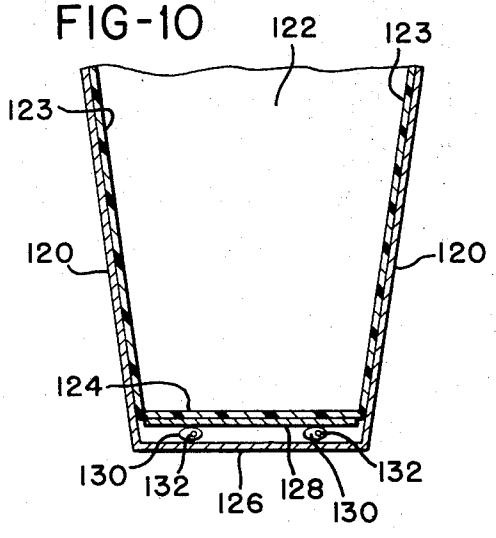
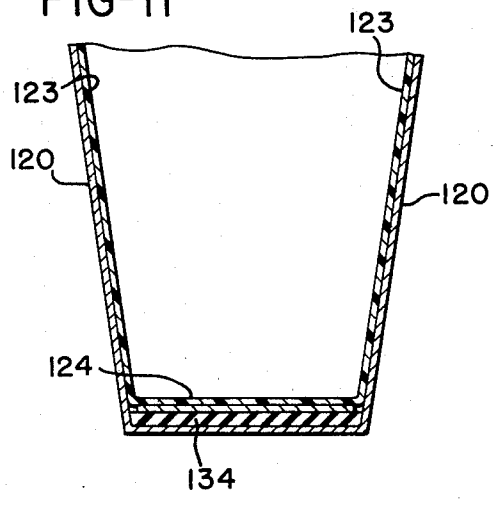


FIG-11



COMPACTOR WITH FIXED COMPACTION CHAMBER AND MOVABLE PLATE MEMBER

CROSS REFERENCE TO RELATED APPLICATION

COMPACTOR WITH MOVABLE BACKUP MEMBER, Ser. No. 260,966, filed June 8, 1972, by Einar O. Engebretsen.

BACKGROUND OF THE INVENTION

The above noted related application discloses a compactor in which a drawer-like receptacle may be rolled into and out of the compactor housing between a compacting position within the housing and a noncompacting position disposed outwardly of the housing. The drawer is provided with a movable backup member which must be disposed in spaced relationship to one wall of the drawer when the drawer is in the compacting position within the housing beneath a compacting ram, but which may be moved outwardly against one of the drawer side walls when the drawer is in the noncompacting position to facilitate the removal of compacted material from the drawer.

In another type of compactor, the compaction chamber, rather than being in drawer-like form, is fixed within the compactor housing and a flexible container, such as a plastic container, is positioned within the housing to receive material to be compacted therein.

With this latter type of compactor, it will be seen that the downward compaction forces exerted by the compacting ram on material received in the flexible container will usually cause the walls of the container to bulge outwardly. Since the container is flexible, it is usually formed such that the walls of the compaction chamber fit in closely underlying relationship to the walls of the container to provide the necessary support and resistance against the compaction forces exerted during a compacting stroke of the ram.

A difficulty that has been encountered with this type of unit is removal of the container to empty the compacted material therefrom. This problem is compounded by the fact that the container is usually of tapered configuration, tapering inwardly from its upper end to its bottom wall. As a result, the container tends to become wedged into the correspondingly tapered compaction chamber.

SUMMARY OF THE INVENTION

In accordance with the present invention, means is provided for relieving the forces which tend to wedge the flexible container of a fixed compaction chamber compactor within the compaction chamber. This is accomplished by providing a plate member which is positioned between either opposed side wall of the container and the fixed compaction chamber or a bottom wall of the container and an opposed bottom wall of the chamber.

In accordance with one embodiment of the invention, the plate member is cam actuated with the cams being of either the roller type eccentrically mounted on a rotatable shaft or of the wedge type in which the opposed inclined surfaces of wedges mounted on the plate member and a wall of the compaction chamber slide relative to each other to relieve outward forces generated by compaction of the material in the container.

In another embodiment of the invention, the plate member is supported by means of a linkage system and a handle is provided for pivoting the plate about the pivot points of the links of the system to cause an upward and outward displacement of the plate member with respect to a side wall of the container, to again, relieve forces generated by outward bulging of the flexible container.

In a further embodiment of the invention, the movable plate member is provided with outwardly projecting tabs which engage a surface of the compaction chamber wall during compaction operations, but which may be displaced into corresponding openings in the compaction chamber wall to provide a clearance between the container and the compaction chamber to facilitate removal of the former.

In its simplest form, the present invention comprises a slidable plate member which is merely positioned between opposed side walls of the container and the compactor and is slidably removed from the compaction chamber prior to removal of the container to provide the desired clearance between the container side walls and the chamber side walls.

In still another embodiment of the invention, the plate member is positioned beneath the bottom wall of the tapered container, and a resilient member, such as a rubber pad, is positioned beneath the plate member and above the bottom wall of the compaction chamber. With this configuration, the rubber pad will compress during compaction but will spring back during the retraction of the ram to move the container upwardly and thereby relieve the forces exerted by the outwardly bulging container on the underlying compaction chamber walls.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a perspective view of a compactor incorporating one embodiment of the present invention and showing the container in phantom lines displaced from its compacting position;

FIG. **2** is a cross-sectional view through the compactor of FIG. **1**;

FIG. **3** is a view taken on line **3—3** of FIG. **2**;

FIG. **4** is a cross-sectional view through a compactor showing a second preferred embodiment of the invention;

FIG. **5** is a view taken on line **5—5** of FIG. **4**;

FIG. **6** is a view taken on line **6—6** of FIG. **4**; and

FIGS. **7–11** are cross-sectional views through additional embodiments of the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference to FIG. **1** of the drawings, it will be seen that a compactor of the type described above includes a compactor housing **10** having a control panel **12** with the usual control switches or buttons, such as START and STOP buttons **14**, and a key switch **18**. A ram **20** is mounted in an upper portion of the housing and is movable in the direction indicated by the arrow **22** by any suitable mechanism. This mechanism does not form part of the present invention and may be of any conventional design.

The lower portion of the housing **10** includes a compaction chamber **24** within which is received a container **26** which is movable bodily from a compacting position within the compaction chamber beneath the

ram 20 and the noncompacting position shown in phantom lines displaced outwardly of the compactor. The container 26 is formed of a self-supporting but flexible material, such as polyethylene or the like, and to support the side walls 28 of the container during compaction, the underlying side walls 30 of the compaction chamber and the bottom wall 32 thereof are positioned in contact with the corresponding side and bottom walls of the container. As a result, the forces exerted by the ram 20 will tend to a wedge the container 26 into the compaction chamber 24 and render removal of the container from the compaction chamber difficult.

This problem is obviated in accordance with the present invention by positioning a plate member 34, as seen in FIGS. 2 and 3, intermediate relationship to a side wall 28 of the container 26 and an opposed side wall 30 of the compactor. The plate member 34 is pivoted adjacent its lower end, as at 36. A shaft 38 is mounted on bearings 40 on a side wall 30 of the compaction chamber and carries a series of eccentrically mounted cam rollers 42. The outer end of the shaft 38 projects outwardly of the housing, as seen in FIGS. 1 and 3 of the drawings, and carries a handle 44. With the above construction, it will be apparent that by rotating the handle 44 in one direction, the cam rollers 42 will cause the plate 34 to pivot about its lower end into supporting relationship with a side wall 28 of the container 26. After material has been compacted within the container 26, the handle 44 is rotated in an opposite direction to allow the plate 34 to pivot outwardly, thereby relieving forces generated by the outwardly bulging walls of the container and permitting ready removal of the container from the compaction chamber.

Turning now to FIGS. 4 and 5 of the drawings, a second preferred embodiment of the invention will be described. As in the embodiment described in FIGS. 1–3 of the drawings, a container 26 is utilized having side walls 28, one of which is shown in FIG. 4 as being supported by a side wall 30 of the compaction chamber. The other side wall of the container is supported in the position shown in FIG. 4 of the drawings by a plate member 50 having a series of tabs 52 projecting outwardly therefrom in engagement with another side wall 30′ of the compaction chamber. The compaction chamber is provided with a series of openings 54 corresponding in number and position to the tabs 52 on the plate member 50 and inclined tabs 55 extend from an edge of each of the openings as seen in FIG. 6 of the drawings. The tabs 55 are inclined towards the rear of the compactor and the plate member 50 has fixed thereto a rod 56 having a handle 58 which, like the handle 44, projects outwardly of the housing 10. With this construction, it will be seen that by pushing rearwardly on the handle 58, tabs 52 will ride along the tabs 55 and into the openings 54, allowing the plate member 50 to displace outwardly from supporting engagement with the walls 28 of the container. With the plate member positioned in this manner, it will be apparent that the container may be readily removed from the compaction chamber. When the container 26 is replaced, there will, of course, be no more than minimal outward forces, such as those caused by permanent deformation of the container, so that by pulling the handle 58 outwardly or forwardly of the compactor, the tabs 52 will ride up the inclined tabs 55 to again move the plate member into engagement with side wall 28 of the container.

In the embodiment shown in FIG. 7 of the drawings, a container 26 is again positioned within a compaction chamber 24 with the side walls 28 thereof in overlying relation to the side walls 30 of the compaction chamber. A plate member 60, which may correspond approximately in size and shape to the side wall 28 beneath which it is positioned, is slidably received between opposed side walls 28 and 30 of the container and compaction chamber, respectively. If desired, the plate 60 may be provided with relieved portions or openings therethrough, to facilitate its removal from the position shown in FIG. 7 between the opposed walls of the container and chamber. After it is removed by sliding it outwardly of the housing, it will again be apparent that a clearance is provided between the container and the compaction chamber so that removal of the container becomes relatively effortless.

In FIG. 8 of the drawings, a plate member 70 is mounted on the walls 30 and 30″ of the housing by means of a linkage system including a plurality of links 72. Each of the links 72 may be pivoted in slots 74 formed in the plate member 70 and in corresponding openings 76 formed in the wall 30″ of the compaction chamber. A rod member 78 is mounted on the outer surface of the plate member 70 by means of a pair of outwardly projecting bars, one of which is shown at 80. A yoke 82 straddles the bar 80 and is carried on the inner end of a shaft 84 pivotally mounted on an outer wall 85 of the compactor by means of a pivot connection 86. The outer end of the shaft 84 projects through an opening 88 formed in the wall 85 and carries a handle 90 which is engageable from the outside of the compactor. Thus, by pivoting the handle 90 in the direction indicated by the double headed arrow 92, the plate member 70 can be caused to shift by means of the links 72 between a position underlying a wall 28 of the container and a second position displaced upwardly and outwardly thereof. In this latter position, it will be apparent that forces exerted by the outwardly bulging walls of the container are relieved to facilitate its removal.

FIG. 9 shows still another preferred embodiment of the invention. As seen in FIG. 9, a plate member 100 is positioned intermediate a side wall 30‴ of a compaction chamber and a wall 28 of the container. The plate member 100 contains cam members 102 in the form of wedges having upwardly and outwardly inclined surfaces 104. The wall 30‴ carries cam members 106 having inwardly and downwardly inclined surfaces 108 adapted to engage the surfaces 104. A rod 110, similar to the rod 78, is mounted on the outer surface of the plate 100 and is engaged by a yoke 112 pivotally mounted in the same manner as that described with respect to FIG. 8 of the drawings. With this construction, it will be seen that moving the outwardly projecting handle 113 in the direction indicated by the arrow 114 will cause the plate member to move upwardly and outwardly with the inclined surfaces of its cam members 102 riding on the opposed inclined surfaces of the cam members 106, thereby relieving the outwardly exerted forces and permitting the container to be removed readily from the compaction chamber.

In the embodiment of the invention shown in FIG. 10 of the drawings, the side walls 120 of a compaction chamber need not be provided with the grooves shown in FIG. 1 of the drawings at 121, and the container 122

need not be provided with a rib extending along each of the upper edges of the side walls **123** thereof. Between the bottom wall **124** of the container and the bottom wall **126** of the compaction chamber, a plate member **128** is positioned engaged by a series of cam rollers **130** which are eccentrically mounted on shafts **132.** The shafts **132** may extend outwardly of the housing, similarly to the shaft **38,** and be provided with a handle for rotating the shaft in bearings (not shown) to cause the cams to move the plate member **128** relative to the bottom wall **126** of the compaction chamber. Thus, after material has been compacted within the compaction chamber, the cam rollers are rotated by means of the shafts upon which they are mounted to cause the container to move upwardly within the compaction chamber and overcome any wedging action to facilitate its removal from the compactor.

The embodiment of FIG. **11** is somewhat similar to that shown in FIG. **8.** In the embodiment of FIG. **11,** however, the cams **130** and structure associated therewith are replaced by a resilient member, such as pad **134** of rubber or the like. As a result, when the compacting ram moves downwardly into the container, it will tend to wedge the side walls **123** thereof into tight engagement with the walls **120** of the compaction chamber. However, when the ram moves to its retracted position, the natural resiliency of the member **134** will exert a force against the bottom wall **124** of the container, moving the container upwardly within the compaction chamber and relieving the outwardly acting forces which tend to retain the container within the compaction chamber.

From the above, it will be seen that the present invention provides means for relieving the forces tending to retain a flexible container within the fixed compaction chamber of a compactor.

While the forms of apparatus herein described constitute preferred embodiments of the invention, it is to be understood that the invention is not limited to these precise forms of apparatus, and that changes may be made therein without departing from the scope of the invention.

What is claimed is:

1. A compactor comprising:

a. a compactor housing,

b. means defining a fixed compactor chamber within said housing,

c. a deformable container received within said chamber and movable between a compacting position within said chamber and a noncompacting position displaced from said compacting position,

d. a ram mounted within said housing for reciprocating movement into and out of said container when said container is positioned in said compacting position,

e. said ram thereby being adapted to compact material deposited in said container causing bulging of said container into engagement with opposed portions of said chamber,

f. a movable plate member positioned between said container and said chamber for relieving pressure between said container and said opposed portions of said fixed chamber,

g. tab means on one of said plate members and said chamber and projecting therebetween,

h. means defining openings in the other of said plate member and said chamber disposed to receive said tab means upon shifting movement of said plate member, and

i. means for shifting said plate member between positions wherein said tab means is received in said opening means and displaced therefrom, thereby moving said plate member alternately between positions toward and away from said chamber and said container to facilitate displacement of said container from said compacting position to said noncompacting position.

2. The compactor of claim **1** further comprising:

a. inclined tabs extending angularly outwardly from adjacent said openings and engageable by said tab means upon shifting movement of said plate member.

3. A compactor comprising:

a. a compactor housing,

b. means defining a fixed compactor chamber within said housing,

c. a deformable container received within said chamber and movable between a compacting position within said chamber and a noncompacting position displaced from said compacting position,

d. a ram mounted within said housing for reciprocating movement into and out of said container when said container is positioned in said compacting position,

e. said ram thereby being adapted to compact material deposited in said container causing bulging of said container into engagement with opposed portions of said chamber,

f. a plate member interposed between a wall of said container and an opposed wall of said chamber,

g. first tabs projecting outwardly from said plate member away from said wall of said container toward said wall of said chamber,

h. a plurality of openings formed through said wall of said chamber corresponding to said first tabs projecting from said plate member, whereby said first tabs are receivable in said openings,

i. inclined tabs associated with each of said openings and extending angularly outwardly away from said wall of said chamber, and

j. handle means adapted to shift said plate member generally parallel to said walls of said container and said chamber to allow said first tabs to project through said openings in engagement with said inclined tabs, thereby relieving pressure between said container and said chamber and facilitating displacement of said container from said compacting position to said non-compacting position.

* * * * *