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Engebretsen

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[54] **TRASH COMPACTOR WITH REMOVABLE LINER**

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[52] **U.S. Cl.** ..... **100/218,** 100/229 A, 220/8, 220/63 R

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

[58] **Field of Search** ..... 220/8, 63 R, 65, DIG. 25, 220/23.86; 100/229 R, 229 A, 246, 247, 252, 206, 218, 224, 225; 141/73, 80; 53/124 B

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[57] **ABSTRACT**

In a trash compactor which includes a ram for compacting waste materials deposited in the compactor, a two-piece, reusable liner is positioned within the compactor to receive the waste material and facilitate removal of the waste material after compaction thereof. Each of the sections is formed of a fairly rigid material, such as polyethylene, and each is provided on its outer surfaces with ribs which serve to both strengthen the liner sections and prevent the liner from sticking to the interior surfaces of the drawer. Each of these sections is constructed of integrally formed, upstanding sidewalls and a bottom wall with one side wall of each of the sections being just high enough to retain liquids within the liner while permitting their ready assembly and disassembly.

12 Claims, 10 Drawing Figures

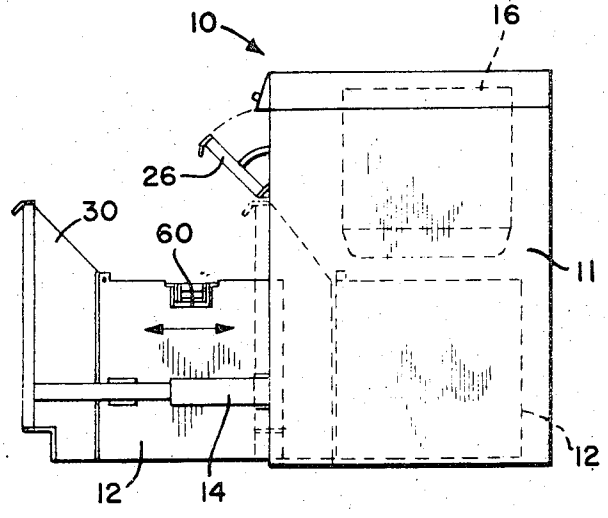


FIG-1

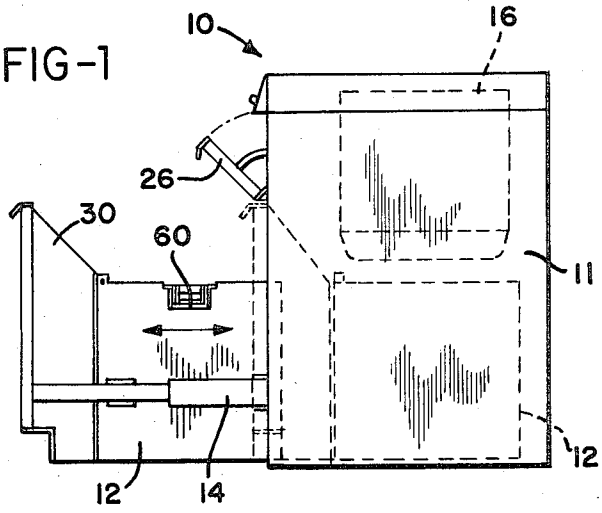


FIG-2

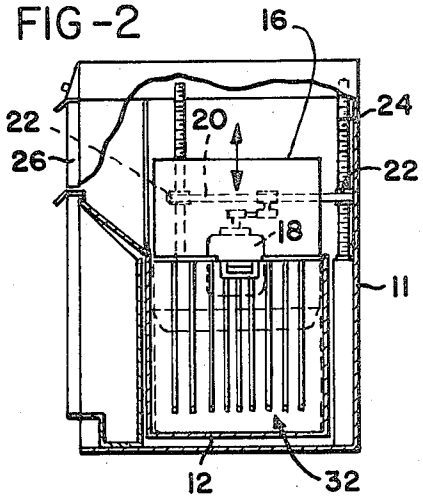


FIG-3

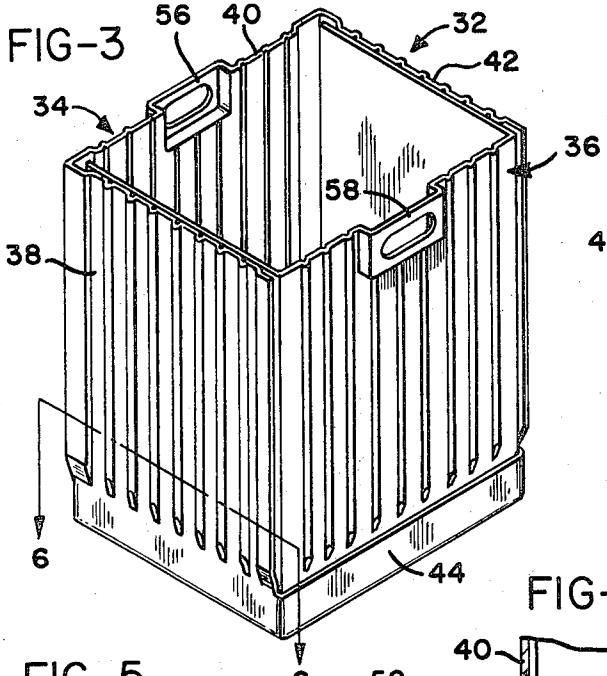


FIG-4

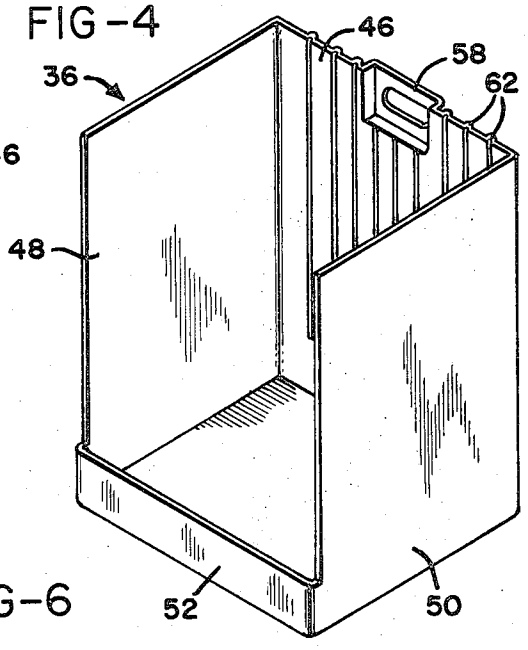


FIG-5

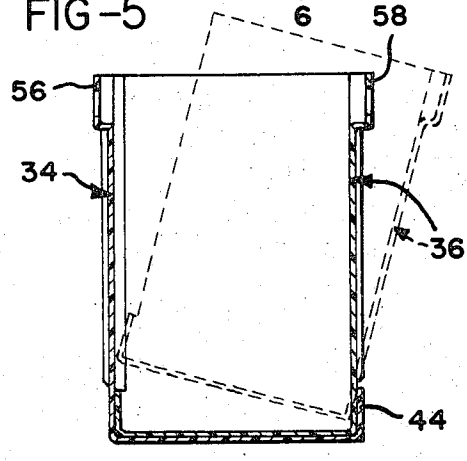
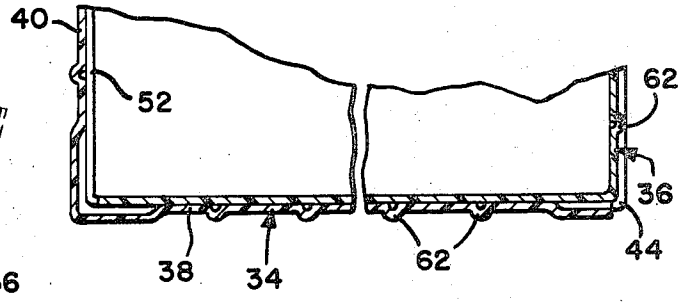


FIG-6



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FIG-7

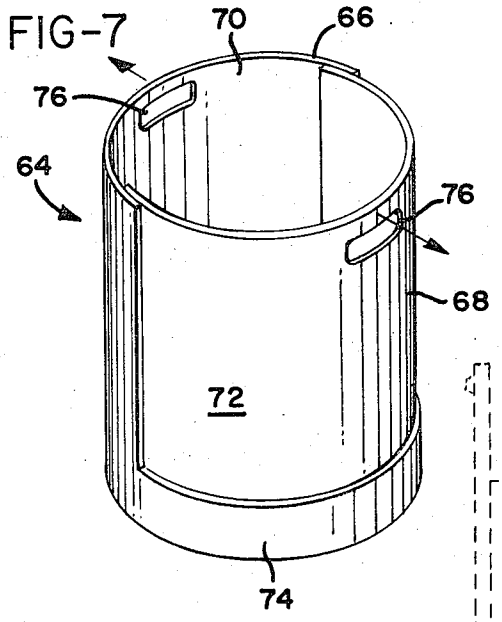


FIG-8

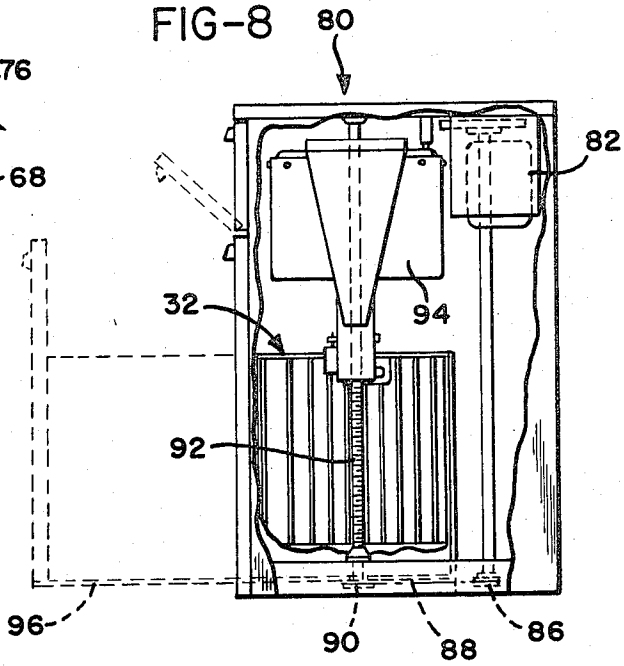


FIG-9

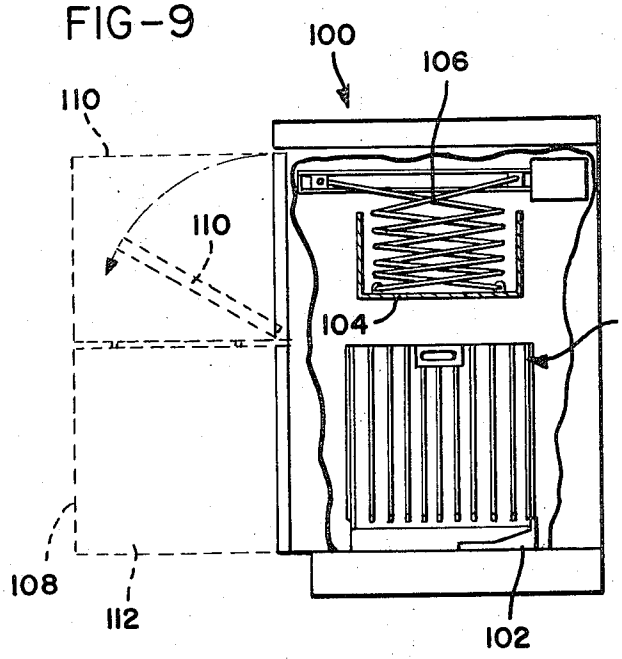
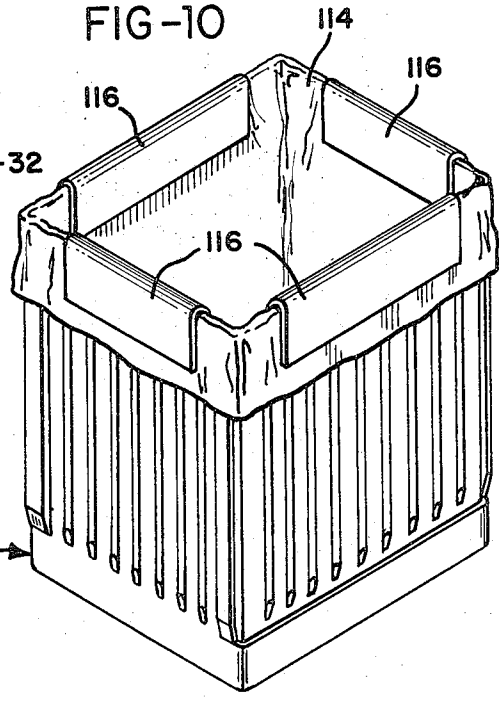


FIG-10



TRASH COMPACTOR WITH REMOVABLE LINER

BACKGROUND OF THE INVENTION

The per capita production of waste material, particularly in the United States, has increased greatly in recent years and the problems of disposing of this increased waste material, which has been compounded by a sharp increase in population, has resulted in numerous proposals for solutions of this problem. One method proposed involves the compacting of such materials to reduce the volume thereof and thereby facilitate their disposition. In addition to compactors utilized on a more or less commercial basis, as in refuse collection trucks, other devices have been developed for use in compacting refuse at the point of origin.

Many of these units, which are typified by the home installed units, utilize disposable bags which are placed within the compactor to receive the refuse and into which the material is compacted. Such bags are generally of a special, laminated construction which incorporates layers for strength and other layers for moisture proofing. Since these bags are generally used only once they represent a continuing expense for the compactor user and possibly, detract from the acceptance of such units.

Other units of this type utilize a one-piece, more or less self-supporting container, into which the waste material is deposited and subsequently compacted. With this type of container, however, it will be seen that problems arise in removing the compacted material from the container. While tapering the container side walls may provide some alleviation of this problem, it will be seen that this results in a loss of container volume and of course, there may still be difficulty in removing the compacted materials particularly if it is wet or sticky.

SUMMARY OF THE INVENTION

The present invention comprises a compactor which utilizes a reusable, two-piece liner. The two sections which comprise the composite liner are formed of a substantially rigid, self-supporting material such as polyethlene. Each of the units includes integrally formed upstanding side walls and a bottom wall, with one side wall of each of these sections being just high enough to retain any liquids within the section but yet low enough to facilitate assembly of the sections and subsequent disassembly for removal of the compacted material therefrom.

Each of the sections also has ribs integrally formed on the outside thereof to both provide further strengthening of the unit and to prevent the sections from sticking to the interior of the drawer within which they are received. Handles are formed in each section and corresponding notches are formed in the upper edges of the side walls of the drawer so that the handles may readily be grasped when the drawer is pulled out to facilitate removal of the liner and the compacted material therein.

Because the liner is formed as two, substantially rigid sections, the compacted material is readily removed by separating the two liner sections.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevational view showing a compactor with the liner received therein;

FIG. 2 is a view similar to FIG. 1 but with the drawer retracted and parts broken away for clarity;

FIG. 3 is a perspective view of the assembled liner sections;

FIG. 4 is a perspective view of one of the sections shown in FIG. 3;

FIG. 5 is a cross-sectional view of the liner with one section of the liner shown in a tilted position in phantom lines;

FIG. 6 is a view taken on line 6—6 of FIG. 3;

FIG. 7 is a perspective view of a composite liner of cylindrical configuration;

FIG. 8 is a side view similar to FIG. 1 but showing a liner in a second type of compactor;

FIG. 9 is a view showing the liner of the present invention in a third type of compactor; and

FIG. 10 is a perspective view showing the liner with a disposable bag positioned therein.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As seen in FIGS. 1 and 2 of the drawings, a compactor 10 in which the liner of the present invention finds utility may include an upstanding cabinet 11 housing a receptacle 12 in the form of a drawer slidable on rails 14 between an accessible, noncompacting position shown in FIG. 1 and a compacting position shown in FIG. 2. Housing 11 also encloses a ram 16 carrying a motor 18 and driving a chain 20. Chain 20 wraps three, triangularly disposed ball nuts 22 (only two of which are shown in FIG. 2) which threadably engage stationary screw-threaded rods 24. The housing 11 is also provided with an upper door 26, pivotally mounted to move between the positions shown in FIGS. 1 and 2. Received within the receptacle or drawer 12 is a liner 32 which, as best seen in FIGS. 3 through 6, includes a pair of cooperating sections 34 and 36. Section 34 is formed of a substantially rigid material such as polyeythene and includes upstanding walls 38, 40, 42 and 44. Walls 38, 40 and 42 are of substantially the same height as the height of the sidewalls of the receptacle or drawer 12. Upstanding wall 44, however, is appreciably shorter than the remaining walls, as best seen in FIGS. 3 and 5 of the drawings.

The second section 36, like the first section 34, is also formed of a substantially rigid material such as polyethylene. Sections 36 also include upstanding walls 46, 48 and 50 which are substantially the same height as that of the receptacle 12. Disposed in spaced parallel relationship to the wall 46 is a second upstanding wall 52 which, as best seen in FIG. 4, is appreciably shorter than the height of the wall 46 and is approximately the same height as the height of the wall 44.

The section 36, like the section 34, is preferably molded in one piece construction with all four upstanding walls and the bottom wall 54 formed integrally with each other. It will also be noted that the liner is provided with handles 56 and 58 formed in the sections 34 and 36, respectively. Additionally, the drawer or sliding receptacle 12 is provided with a notch 60 in each of its upper edges of its sidewalls, only one of which is shown in FIG. 1, with the handles 56 and 58 aligned with and accessible through notches 60. Finally, it will be noted that each of the sections is provided with ribs 62 integrally formed on the exterior surfaces of the liner sections and extending from the tops thereof to points spaced from the bottom walls thereof.

In operation the two sections **34** and **36** are assembled, as shown in FIG. **3**, and inserted in the drawer or sliding receptacle **12** with the handles thereof accessible through the notches **60** in the side walls thereof. Small articles of waste material may be deposited in the compactor by pivoting the door **26** downwardly to the position shown in FIG. **1**. The smaller articles of waste material will lie on the inclined surface **30** of the drawer **12** within the compactor until such time as the drawer or receptacle **12** is moved outwardly toward the position shown in FIG. **1**, at which time the articles will drop into the liner **32**. Larger pieces of waste material are deposited in the liner by sliding the receptacle **12** outwardly to the position shown in FIG. **1**.

After a quantity of material has accumulated in the liner the ram **16** is actuated by energizing the motor **18**. This drives the chain **20** wrapping the ball nuts **22**, which causes the entire unit to move downwardly on the stationary screw-threaded rods **24** and enter the liner **32** to compact the material therein. After compacting the material the ram **16** moves upwardly, permitting either more material to be placed in the liner or removal of the compacted material from a compactor. In the latter case, the drawer or receptacle **12** is again moved outwardly to the noncompacting position shown in FIG. **1** and the liner is removed therefrom by grasping the handles **56** and **58**.

In this regard it should be noted that not only do the ribs **62** strengthen the liner sections but they also prevent the liner from sticking to the interior surface of the drawer. After the liner is removed from the drawer the section **36** may be tilted from the section **34** as shown in phantom lines of FIG. **5** of the drawings. It will be seen that the short wall **44** of the section **34** facilitates this operation, while the short wall **52** of the section **36** thereafter permits the ready removal of the compacted material from the liner section **36**.

Usually the material will be compacted to the extent that it can be disposed of as a single mass in any collection facility. Although the walls **44** and **52** are low enough to permit the sections to be readily assembled and disassembled, they are also high enough to insure that any liquid contained in the waste material is retained in the system and does not seep down into the drawer or is otherwise spilled when the sections are separated. After cleaning, if necessary, the liner sections are reassembled to form the composite liner of FIG. **3**, placed in the open drawer **12**, and the drawer slid back into the housing **10** to the compacting position to repeat the operation described above.

It will be appreciated that while a liner of substantially rectangular cross section having the upstanding walls thereof extending normal to its bottom wall will provide the greatest volume, it may be desirable in some situations to utilize a liner having a cross-sectional configuration other than rectangular. For example, if the ram of the compactor was circular in configuration it would generally be desirable to utilize a cylindrically shaped liner. This is illustrated in FIG. **7** of the drawings wherein a cylindrically shaped liner **64** is illustrated formed of two sections **66** and **68**. Each of the sections includes upstanding wall portions **70** and **72**, respectively, their bottom wall portions extending normally to the upstanding wall portions, similarly to the embodiment described above. Additionally, the upstanding wall portions include reduced portions, only one of which is shown at **74** although it will be appreciated that the section **72** has a similar reduced portion flanked by the full height portion **76**. As in the previous embodiment, when it is desired to remove the liner from the compactor the handles **76** will be grasped and the sections moved apart in the direction indicated by the arrows.

FIG. **8** shows an additional type of compactor in which the sectional liner of the present invention finds utilization. In the compactor **80** shown in FIG. **8** of the drawings a motor **82** drives a shaft **84** having sprocket **86** mounted on the lower end thereof. Sprocket **86** drives a chain **88** which wraps a pair of sprockets, only one of which is shown at **90**. Each of these sprockets **90** are fastened to the lower ends of spaced, parallel drive screws **92** mounted on opposite sides of the compactor **80**. The ram **94** is provided with threaded couplings on each side thereof threadably engaging the drive screws **92** so that upon energization of the motor **82** the ram **94** is caused to move upwardly and downwardly within the compactor housing. A drawer **96**, shown in dotted lines in the open position, receives the composite, two-piece liner, such as the liner **32** if the ram is of rectangular configuration.

As noted above the composite liner of the present invention may be used in any of several different types of compactors. FIG. **9** shows still a further type of compactor which may advantageously utilize a liner, such as the liner **32** or **64**. In the compactor shown in FIG. **9** a drawer for holding the liner is dispensed with and the liner merely placed in the compactor with means, illustrated somewhat diagramatically in FIG. **9** as a stop member **102**, provided to position the liner within the compactor **100** correctly with respect to the ram **104**. Additionally, it will be noted that the ram **104** will be powered by a scissors jack arrangement **106**. It will also be noted that the door **108** to the compactor is of composite construction, including upper and lower sections **110** and **112**, respectively. The two sections are hinged along one vertical edge of the compactor and may be opened together to the dotted line position shown in FIG. **9**. In this position the liner, **32** in FIG. **9**, but it may of course be of the type shown in FIG, **7**, can be removed from the compactor, emptied and replaced. Usually, however, when it is desired to merely deposit waste materials in the liner the upper door **110** may be pivoted downwardly about its horizontal hinge connection to the lower door section **112** as shown in dotted lines and indicated by the arrow in FIG. **9** of the drawings.

One advantage of the liner of the present invention is, of course, the fact that it is reusable and, therefore, less expensive over a period of continued use than replaceable bags. However, if the user of the compactor finds it desirable the liner of the present invention can of course be used as a support for disposable bags. Thus, as seen in FIG. **10** of the drawings, a bag **114** or other covering of flexible material may be droped over the inner surface and upper edges of the liner and, if further desired, secured in place by means such as the U-shaped clips **116**. Although not affording the cost advantage gained by using the liner alone, this approach does provide the advantage, as compared to the use of bags above, in that the removal of the bags from the compactor is facilitated and the strength of the bags necessary is somewhat less than that that would be necessary if the bags were used without additional support.

From the above it will be apparent that the present invention provides a compactor utilizing a reusable liner which is substantially self-supporting and formed of separate sections to facilitate the removal of a compacted material therefrom.

While the forms of apparatus herein described constitutes 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 which is defined in the appended claims.

What is claimed is:

1. Trash compacting apparatus of the type described comprising:
- a. a compactor housing,
- b. a ram mounted in said housing,
- c. a drawer slidably mounted in said housing and movable between a compacting position within said housing opposite said ram and a noncompacting position displaced from said compacting position,
- d. a liner received in said drawer and movable therewith between said compacting and noncompacting position,
- e. said liner being comprised of a plurality of substantially rigid, liquid impervious, separable liner sections positioned in said drawer with portions thereof in overlapping relationship to each other defining said liner, and
- f. means for reciprocating said ram into and out of said liner to compact material therein.

2. The apparatus of claim **1** wherein:
- a. said liner comprises two independent said sections having similar portions disposed in overlapping relationship to each other.

3. The apparatus of claim **1** wherein:
- a. said liner sections each include upstanding wall portions and a bottom portion, and
- b. one of said sections is received in the other of said sections with said bottom portion of said one section overlying said bottom portion of said other section.

4. The compactor of claim **1** further comprising:
- a. means defining strengthening ribs formed integrally on at least the exterior surfaces of said composite liner when said sections thereof are in said interengaged relationship.

5. Trash compacting apparatus of the type described comprising:
- a. a compactor housing,
- b. a ram mounted in said housing,
- c. a plurality of self-supporting, separable liner sections cooperatively defining an open mouth liner adapted to receive items of trash,
- d. means for positioning said liner in a compacting position within said housing with the open mouth of said liner opposite said ram,
- e. said liner sections each including upstanding wall portions and a bottom portion,
- f. at least one upstanding wall portion being of appreciably less height than the height of the remainder of said liner,
- g. one of said sections being received in the other of said sections with said bottom portion of said one section overlying said bottom portion of said other section and with said lower wall portions opposite each other when said liner is in said compacting position to form a complete side enclosure,
- h. means for reciprocating said ram into and out of said liner through said open mouth thereof to compact material therein, and
- i. means providing access to said liner for removal thereof from said housing to unload compacted trash from said liner.

6. The apparatus of claim **5** further comprising:
- a. rib means formed integrally with at least the outer surfaces of said liner and strengthening said sections to provide a self-supporting composite liner.

7. The apparatus of claim **6** further comprising:
- a. handle means formed in each of said liner sections to permit said liner sections to be removed from said housing and facilitate separation thereof for removal of compacted trash therefrom.

8. Trash compacting apparatus of the type described comprising:
- a. a compactor housing,
- b. a ram mounted in said housing,
- c. a plurality of self-supporting, separable liner sections cooperatively defining an open mouth liner adapted to receive items of trash,
- d. means for positioning said liner in a compacting position within said housing with the open mouth of said liner opposite said ram,
- e. said positioning means including a receptacle receiving said liner and means for moving said receptacle with said liner therein between said compacting position and a noncompacting position,
- f. handle means associated with said liner to permit said liner to be removed from said receptacle,
- g. means defining notches in said receptacle in alignment with said handles,
- h. means for reciprocating said ram into and out of said liner through said open mouth thereof to compact material therein, and
- i. means providing access to said liner for removal thereof from said housing to unload compacted trash from said liner.

9. Trash compacting apparatus of the type described comprising:
- a. a compactor housing,
- b. a ram mounted in said housing,
- c. an open mouth liner adapted to receive items of trash,
- d. said liner comprising a pair of substantially rigid sections each including a bottom wall and upstanding side and front and back walls,
- e. one side wall of each section being of appreciably less height than height of the remaining upstanding walls of said section,
- f. said liner being disposed in said housing with said bottom walls in overlying relationship and said one side wall of each flanked by a side wall of the other of the same height as said front and back walls,
- g. means for positioning said liner in a compacting position within said housing with the open mouth of said liner opposite said ram,
- h. means for reciprocating said ram into and out of said liner through said open mouth thereof to compact material therein, and
- i. means providing access to said liner for removal thereof from said housing to unload compacted trash from said liner.

10. In a trash compactor including a compactor housing, a ram mounted in said housing for reciprocal movement therein and means for providing access to the interior of said housing, the improvement comprising:

a. a plurality of self-supporting, interengaging liner sections received in said interior of said housing and cooperatively defining a composite, open mouth liner adapted to receive items of trash and said ram during said reciprocal movement thereof,

b. said sections including shorter upstanding wall portions of appreciably less height than the remainder of said sections,

c. said shorter wall portions being overlapped by said remainder of said sections of greater height to provide a complete side enclosure, and

d. means for positioning said composite liner within said interior of said housing in a compacting position with the open mouth thereof opposite and enterable by said ram.

11. In trash compacting apparatus having:

a. a compactor housing,

b. a ram mounted in said housing,

c. a drawer slidably mounted in said housing and movable between a compacting position within said housing opposite said ram and a non-compacting position displaced from said compacting position,

d. means for reciprocating said ram into and out of said drawer,

e. a liner received in said drawer and movable therewith between said compacting and non-compacting position,

f. said liner being comprised of a plurality of substantially self-supporting separable liner sections positioned in said drawer with portions thereof in overlapping relationship defining a complete trash receiving container.

12. Trash compacting apparatus comprising:

a. a compactor housing including walls forming a trash receiving receptacle,

b. a ram mounted in said housing,

c. a plurality of self-supporting, separable liner sections arranged in overlapping relationship and cooperatively defining an open mouth liner having a bottom and side walls and adapted to receive items of trash,

d. means for positioning said liner in a compacting position within said housing in supportive contact with said walls of said receptacle and with the open mouth of said liner opposite said ram,

e. means for reciprocating said ram into and out of said liner through said open mouth thereof to compact material therein, and

f. means providing access to said receptacle for removal of said liner from said housing to unload compacted trash from said liner.

* * * * *