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Ippolito et al.

[11] **3,765,148**

[45] **Oct. 16, 1973**

[54] **CONTAINERS AND LINERS FOR USE IN COMPACTING SYSTEMS OR THE LIKE**

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[21] Appl. No.: **171,709**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 847,567, Aug. 5, 1969, abandoned.

[52] **U.S. Cl.** ..... **53/124 B,** 100/100, 100/229 A

[51] **Int. Cl.** **B65b 1/24**

[58] **Field of Search** ..... 53/24, 124 B; 100/100, 255, 229 A, 49; 280/79.2

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Attorney—Robert D. Flynn et al.

[57] **ABSTRACT**

A container for use with a compacting system includes spring loaded rectractable wheel mechanism on the bottom thereof to facilitate handling of the container. The wheels are automatically retracted during the compaction operation due to the pressure of compaction. A liner to enable disposable bags to be more expeditiously used is preferably square in shape and is fabricated of plastic material or the like. Located between the liner and an outer container is a disposable bag. After compaction is complete a portion of the container is swung open and the liner deforms due to residual compression force in the compacted material. This releases the compacted material from the liner and enables the liner to be easily lifted out, the result being that the compacted material remains in the disposable bag, the liner having protected the bag during compaction.

8 Claims, 9 Drawing Figures

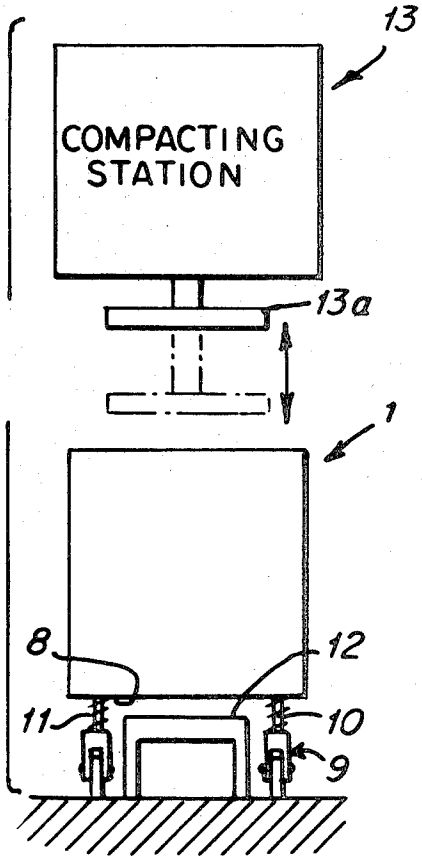


FIG. 1

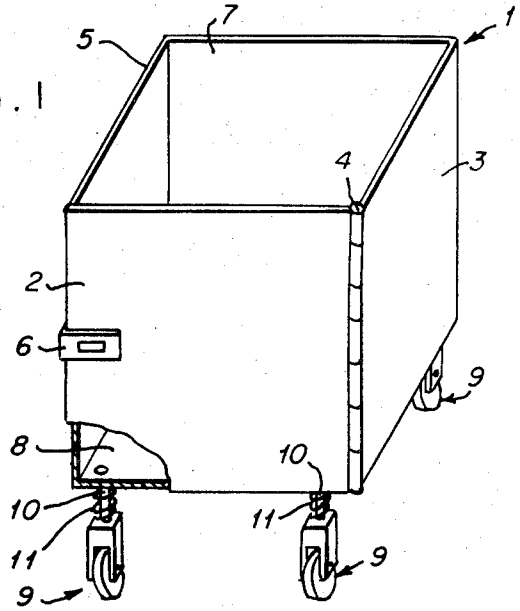


FIG. 2

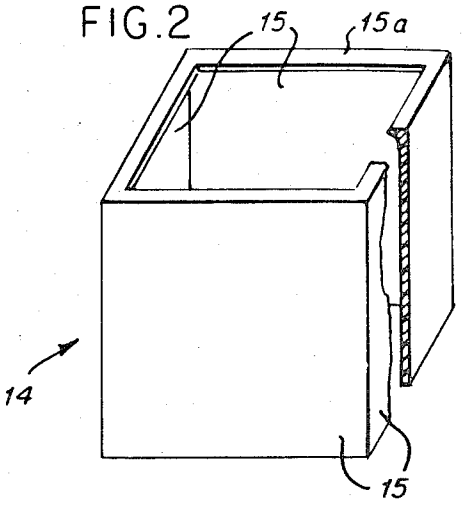


FIG. 3

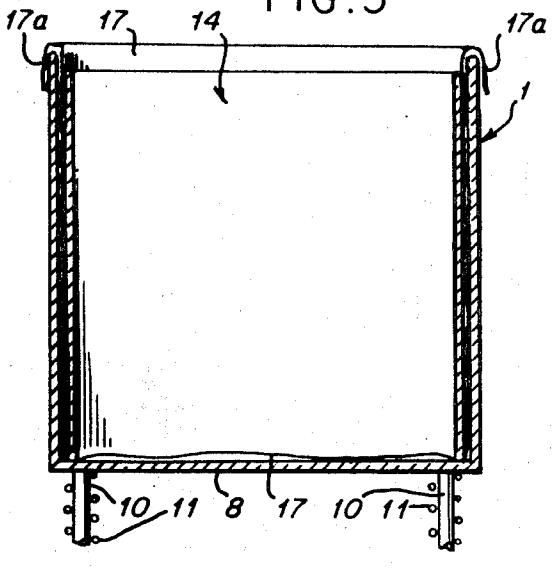


FIG. 4

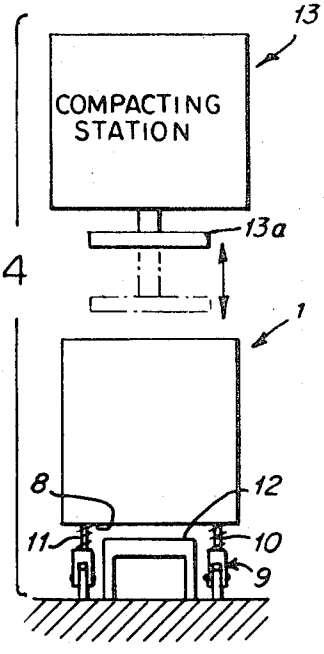


FIG. 7

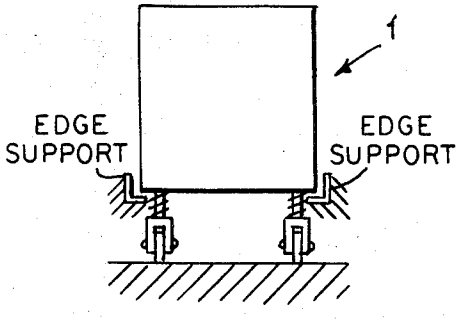


FIG. 5

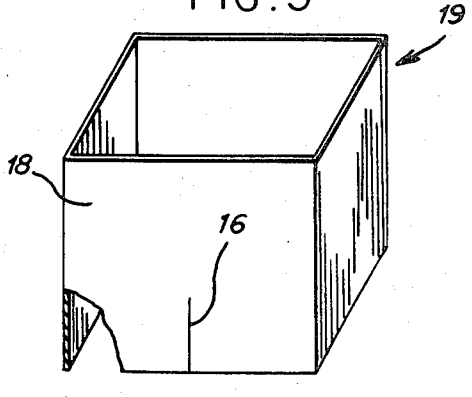


FIG.6b

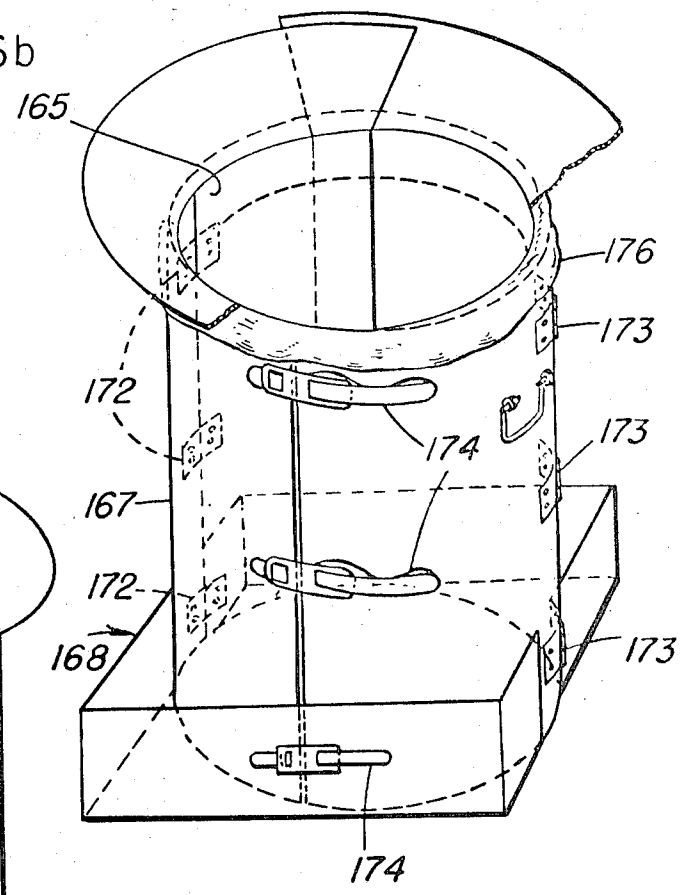


FIG.6a

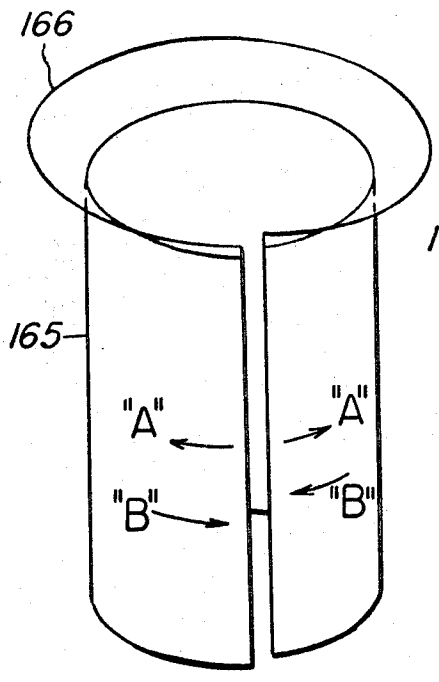
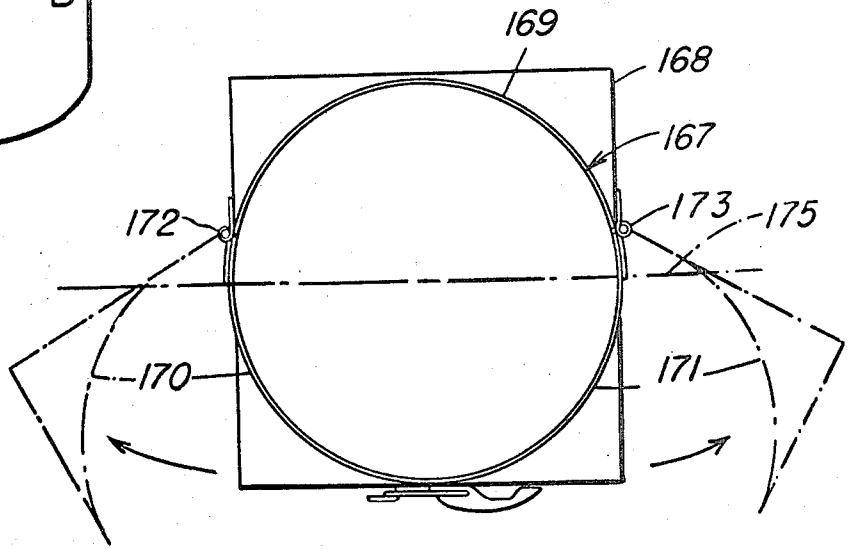


FIG.6c



CONTAINERS AND LINERS FOR USE IN COMPACTING SYSTEMS OR THE LIKE

This is a continuation-in-part of U.S. Ser. No. 847,567, filed Aug. 5, 1969, now abandoned.

This invention relates to compacting apparatus, and more particularly to container and liner configurations which particularly adapt the compacting system for use with disposable bags.

A problem presently exists in the compacting art regarding how to utilize disposable bags such as plastic or paper bags, in the most efficient manner. As a practical matter, it is not suitable to compact the material directly in the disposable bag since due to the pressure built up during compaction, the bag will tend to be damaged. Also sharp and hard objects in the material to be compacted can damage the bags. It is not a practical solution to take already compacted material and to then insert same into a disposable bag. This would be a difficult and time consuming operation and, when the compacted material is garbage or other refuse, the operation of loading the compacted material in a disposable bag would be unsanitary and messy.

Another problem which exists in the present compacting systems resides in facilitating of the containers used in the compacter both prior to and after compaction of the material to be compacted. The problem is less acute prior to compaction since the unloaded container is not as heavy and is more easily moved about. But even unloaded, the containers may be rather heavy and bulky to handle. However, after compcation, the loaded container is quite heavy and handling thereof is difficult. A known solution is to utilize a dolly or a hand truck to handle and move about the loaded container. While these known devices facilitate handling of the containers, it has been found that a more satisfactory solution is desirable.

An object of the present invention is to provide container liners which are inexpensive to produce, which are easily handled and wherein setting up of the container-liner apparatus prior to compaction is facilitated.

Another object of the present invention is to provide a container liner which enables disposable bags to be used in a compactor.

A further object of this invention is to provide an improved container for use in compacting systems which facilitates handling thereof prior to and after compaction of material.

A further object of this invention is to provide such an improved container which is particularly adaptable for use with container liners in conjunction with disposable bags.

SUMMARY OF THE INVENTION

According to the present invention, a removable liner is provided for use with a container having an operable door or the like therein. The liner comprises a continuous tube-shaped member which is adapted to be received by the container and within which material is compacted. Upon opening of the door of the container, the liner bulges outward to release from the compacted material. The liner may then be easily removed from the container, the compacted material remaining in the container. In a preferred embodiment, a disposal bag is interposed between the container and

liner so that upon removal of the liner, the compacted material remains within the disposable bag.

According to one aspect of the invention, the tube-shaped member has a square cross-section and a continuous circumferential wall section. The walls bulge outward when the door is opened to release the compacted material.

According to another aspect of the invention, a substantially cylindrical liner is split in its longitudinal direction and the liner is "coiled" against the residual tension of the material so that the split ends thereof overlap. The "coiled" liner is located within a disposable bag, which is located in a container which is openable to release the liner.

According to still another aspect of the present invention, a container for use in compacting systems and the like includes a housing which is adapted to receive material to be compacted therein. Secured to the bottom of the housing and supporting the housing is a plurality of spring loaded wheels. The bias force of the springs is sufficient to maintain the housing in its raised position except during application of downward pressures (such as during a compaction operation) exceeding the weight of a full load of material in the housing. In a preferred embodiment, the housing includes an openable door portion.

The above and further objects of the present invention will become more apparent from the following detailed description of preferred embodiments taken in conjunction with the accompanying drawings in which:

FIG. 1 is a schematic illustration of a movable container according to the present invention;

FIG. 2 is an illustration of a container liner according to the present invention;

FIG. 3 illustrates a container and liner configuration used in conjunction with disposable bags;

FIG. 4 illustrates a container of the present invention as used with a compacting system;

FIG. 5 illustrates a modified embodiment of the container liner of FIG. 2;

FIGS. 6*a*, 6*b* and 6*c* illustrate another liner configuration according to the present invention; and

FIG. 7 illustrates a modified container support.

FIG. 1 illustrates a square container 1 which includes a panel 2 hingedly coupled to the panel 3 of the container 1 by means of a hinge 4. The panel 2 closes against the panel 5 of the container 1 and is secured in the closed position by means of a buckle, clamp or other locking arrangement 6. The particular design of the locking arrangement 6 is a matter of design and convenience and may take various forms other than shown in FIG. 1. Also, the container 1 may include panels or walls 5 and 7 being integral with each other and panel walls 2 and 3 being integral with each other, a hinge, such as hinge 4, being located between panels 3 and 7 of the container. When this modified configuration is used, the structure has less rigidity when the panels 2 and 3 are swung open.

Secured to the bottom panel 8 of the container 1 are wheels 9. Wheels 9 are retractably coupled to the bottom wall 8 by means of rods 10 and springs 11. The spring biases the wheel 9 to the extended position shown in FIG. 1. As weight is applied to the container in the vertical downward direction during compaction, the container 1 will be lowered against the bias force of the springs 11.

When the container 1 of FIG. 1 is utilized in a compacting system, such as shown in FIG. 4, the container 1 is located over a fixed raised platform 12 which is located under the compacting station 13 of the compacting apparatus. The remainder of the compacting apparatus is not shown herein and should be apparent to those ordinarily skilled in the art. During compaction (that is when the ram 13*a* of the compacting station 13 is lowered to compact material within the container 1), the container 1 is caused to be lowered against the bias force of springs 11 until the lower surface 8 thereof rests on fixed platform 12. Thus, during compaction of material, the platform 12 bears substantially all of the force of compaction, thereby enabling less expensive and lighter weight wheel and spring mechanisms (10 and 11) to be used. Also, it is not necessary to fabricate the lower surface 8 of container 1 to bear the forces of compaction. The retractable spring loaded wheel mechanism and the lower surface 8 of the container 1 need not bear large amounts of weight due to the use of the raised platform 12 under the compacting station which the wheels will straddle. Platform 12 is designed in conjunction with the wheel spacing on container 1 to enable the container 1 to be easily rolled into place. The springs 11 are designed with sufficient spring force to keep the container 1 in the uppermost position to provide a clearance between the platform 12 and the lower surface 8 of the container even after the container is fully loaded with compacted material. This facilitates removal of the container 1 from the compacting system by merely rolling the container away. The container is then easily handled throughout the remainder of its use without the necessity of using dollys, handtrucks or the like.

The complete unit is self-contained in the present invention. It should be clear that the container 1 is shown in a square configuration for illustrative purposes only. It should be clear that it may take other convenient forms, such as round or polygonal, depending upon the application and upon the characteristics of the remaining apparatus with which it is used. For example, the container may be round and a segment thereof may be hingedly coupled to form an openable door. Further, instead of using a central support platform 12 as shown in FIG. 4, the container 1 could be supported during compaction by edge supports, such as supports fixed to the compacting apparatus per se. This is shown in FIG. 7.

Referring now to FIG. 2, there is shown a liner configuration 14 for use with a square container such as that shown in FIG. 1. This particular liner 14 is essentially a square tube which is open at the top and bottom. The liner 14 is dimensioned so that a small clearance (such as approximately 1 inch on all four sides) is provided between the liner and the container within which it is placed. Since the liner 14 is a one piece structure (it is continuous about the periphery thereof) insertion thereof into a container and into a disposable bag such as a plastic bag, paper bag, or the like, is facilitated.

FIG. 3 illustrates the use of the liner 14 (FIG. 2) and the square container 1 (FIG. 1) configuration of the present invention in conjunction with a disposable bag. In FIG. 3, the container wheels are not shown — they may be as shown in FIGS. 1 and 4. The liner 14 is inserted within a bag 17, and the liner and bag are then placed within the container 1. The upper free ends 17*a* of the bag 17 are preferably folded outward to overlap the upper edges of container 1 to hold the bag 17 in position. The container 1 is then rolled to the compacting station to receive material to be compacted. The container 1 and liner 14 of FIG. 3 are preferably the same as is shown in FIGS. 1 and 2, respectively, reference being made to these latter Figures for details of construction.

Alternatively, the container and liner configuration may be set up by first inserting the disposable bag 17 within the container 1 and folding the upper free edges 17*a* of the bag 17 over the upper edge of the container 1 in the outward direction. Then, the liner 14 may be inserted within the bag 17, thereby completing the setting-up operation.

After the liner and container apparatus has received a full load of compacted material, the container is rolled out of the system and unloaded. The unloading procedure is as follows. First the door 2 (see FIG. 1) of the container 1 is opened, thereby allowing at least one side 15 (see FIG. 2) of the liner 14 to bulge outwardly to release the material which has been compacted. The liner 14 may then be easily lifted out, leaving the compacted material in the disposable bag. 17.

It has been found that after material has been compacted in the liner 14 and after the door of the container 1 (such as door 2 of FIG. 1) is opened, the residual pressure built up within the liner 14 due to the compaction of the material therein will force the central portions 14 of the walls of liner 1 in the outward direction, thus relieving built up pressure in the liner. The central portions of the liner 14 bulge outward relieving the tight fit of the compacted material therein and it has been found that the liner 14 may then be easily lifted out in the upward direction to release same from the compacted material. Thus the compacted material is caused to remain in the bag 17 within the container in a neat and sanitary manner without causing damage to the bag 17. Liner 14 is bottomless. Practical tests have shown that no damage is caused to the bottom of a disposable bag 17 during compaction. However, if the sides of the bag were exposed during compaction, damage would most likely result to the bag 17. Thus, the provision of the bottomless liner satisfies practical requirements for compacting systems.

Referring to FIG. 5, there is shown a modified liner configuration similar to that of FIG. 2. In FIG. 5 a slit 16 is provided on at least one wall 18 of the liner 19. The vertical length of the slit 16 is preferably less than the height of the wall 18 of the liner 19 for ease of handling. In certain situations where the bulging out of the walls of the liner due to the residual pressure of the compacted material after the door of the container is opened, is not sufficient to release the compacted material, the provision of the slit 16 will enable the liner 18 to be more easily released from the compacted material. Thus, slit 16 will enable more easy removal of the liner in certain situations. Since the length of the slit 16 is only a portion of the height of the wall of the liner, the liner is still easily insertable within a disposable bag or the like during the set-up of the compacting apparatus.

It has been found that providing an opening wall comprising only a single wall 2 in the container 1 allows sufficient bulging of the liner to release the compacted material so that the liner may be easily removed. As mentioned above, after removal of the liner, all of the

compacted material remains in the disposable bag **17**. The loaded bag **17** may then be closed off at the upper portions thereof and the loaded bag **17** may be easily removed from the container **1** without necessitating lifting thereof. Since the door **2** of the container is open, the loaded bag **17** may merely be slid out of the container and disposed of in the normal manner.

Depending on the type of material being compacted, it may be advantageous to provide a container **1** wherein two of the walls thereof are hingedly coupled to the other two. In this case, when the door (which comprises two walls of the container) is opened after compaction, two sides of the liner within the container are unobstructed and greater bulging out of the sides thereof can be achieved. This will provide improved releasing of the compacted material from the liner and will further facilitate removal of the liner in certain instances. However, in compacting systems receiving refuse or garbage of the ordinary residential type, it has been found that a container having a single panel door (such as is shown in FIG. **1**) provides adequate results.

It should be clear that the liner and container may take configurations other than those shown in the drawings. For example, the liner and container may take a triangular shape, other polygonal shapes or any other suitable shape. The only limitation on the shapes of the liner and container is that the wall of the liner should be of sufficient dimension to allow the wall to adequately bulge after the door of the container is opened to allow easy removal of the liner from the material that has been compacted. Depending upon the material being compacted, the pressure of compaction and the size of the container, the specific shape of the container and the number of panels of the container which are to be hingedly openable to enable release of the liner may be easily determined.

Also, it is pointed out that the particular material from which the liner is made will affect the particular design of the liner and container to insure satisfactory release thereof from the material that has been compacted. Factors such as the length of the panels comprising the liner and container, the type of material being compacted, the pressure of compaction, the height of the liner, the thickness of the material comprising the liner, and the like must be considered in actual design of a particular embodiment to enable adequate release of the liner from the material that has been compacted after the container has been opened.

A practical liner of square configuration and providing very satisfactory results is as follows:

type of material: low density polyethelene
length of walls: 23½ inches
height of walls: 30 inches
thickness of material: ⅛ inch
length of container wall: 24

FIG. **6***a* illustrates another liner **165** according to the present invention. The operation of liner **165** will be described in conjunction with a preferred system using disposable bags, but it should be clear that liner **165** could be used without same.

Referring to FIG. **6**a-**6**c the liner **165** is constructed of of springy material which tends to spring or "bulge" outward in the direction of the arrows A. A flange **166** is optionally secured thereto or formed as an integral part thereof. The container **167** (FIGS. **6***b* and **6***c*) within which the liner is inserted has a square base **168** (for ease of movement throughout the system). The container and base are constructed of three parts: a rear portion **169**; and two front portions **170** and **171**, each of which are hingedly coupled to rear portion **169** by means of hinges **172** and **173**, respectively. Front portions **170** and **171** are releasably coupled together by quick release buckles **174**, the designs of which are conventional. The hinges **172** and **173** are located behind the center line **175** of the container (see FIG. **6***c*) to enable the liner **165** to be easily removed. The container may have spring loaded wheels as shown in FIG. **1**.

In operation, a disposable bag **176** is placed in container **167**. Then the liner **165** is pressed together or "coiled" in the direction of the arrows B (see FIG. **6***a*) and inserted within bag **176** in container **167**. It should be apparent that the liner **165**, in its free and expanded (or bulged) state has a diameter larger than the inner diameter of the container. Also, the bag **176** is larger than the liner **165** in its free expanded state. The reason for this will become apparent in view of the following description.

After the container and liner are filled with compacted material and ejected by the system to a disposal station, the quick release buckles **174** are opened and the front portions **170** and **171** of container **167** are opened to the position shown by the dot-dash lines in FIG. **6***c*. Since the hinges **172** and **173** are beyond the center line **175**, the liner **165** is no longer restrained by the walls of container **167** and will spring outward in the direction of the arrows A of FIG. **6***a* to release the compacted material. The liner is then easily lifted out of the disposable bag **176**, leaving the compacted material remaining in bag **176**. The bag **176** filled with compacted material is then disposed of.

Preferably the liner **14** of FIG. **2** includes an inwardly directed flange **15***a* for reinforcement. Flange **15***a* also serves as a handle member to facilitate removal thereof from the container and bag, and to deflect material back into the liner when the ram is raised after a compaction operation.

As used herein, the term "tube" or "tubular" denotes an elongated hollow element of any suitable cross-sectional configuration, such as square, rectangular, oval, circular, etc. Of course, the container must be shaped accordingly to accommodate a particular shaped liner.

What is claimed is:

1. A container for use in compacting systems and the like comprising:

a solid bottomed housing for receiving material to be compacted therein, said housing comprising an open top outer container having a releasable peripheral side wall portion, a liner which is adapted to receive a bag member thereover and in which material is to be compacted, said liner shielding said bag member from damage during compaction and comprising a one-piece, flexible, hollow, open-bottomed, tubular-shaped member having walls which, upon releasing of said releasable portion of said outer container after said material is compacted, flex outwardly and release from the compacted material therein; and

a plurality of spring supported wheels supporting said housing, the bias force of said springs retaining said housing in a raised position under the weight of a full load of material in said housing and allowing said housing to lower during application of down-

ward forces substantially exceeding the weight of a full load of material in said housing.

2. Apparatus according to claim 1 wherein said releasable portion of said housing includes an openable door portion in the side walls thereof.

3. Apparatus according to claim 2 wherein said door portion is hingedly mounted to a side wall of the housing.

4. Apparatus according to claim 1 wherein said compacting system includes a compacting station having support means for supporting said container during compaction, such that upon application of compacting forces, said container is lowered against the bias force of said springs and said support means bears substantially all of said force of compaction.

5. Apparatus according to claim 4 wherein said support means is located below the lower surface of said container.

6. Apparatus according to claim 5 wherein said support means is located substantially centrally below said container and supports a substantial portion of the bottom of said container during application of downward forces.

7. Apparatus according to claim 5 wherein said support means is located at at least two side edges of said bottom of said container.

8. Apparatus according to claim 1 wherein said liner has a continuous peripheral wall section.

* * * * *