United States Patent [19]

Peterson

[11] **3,835,767**

[45] **Sept. 17, 1974**

[54] **REFUSE COMPACTOR**

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[21] Appl. No.: **387,463**

Related U.S. Application Data

[63] Continuation-in-part of Ser. No. 254,067, May 17, 1972, abandoned.

[52] **U.S. Cl.** ..... **100/53,** 100/51, 100/227, 100/233, 100/266, 100/269 A, 100/295

[51] **Int. Cl.** **B30b 15/16**

[58] **Field of Search** ..... 425/405; 264/102; 100/233, 100/51, 53, 266, 90, 264 R, 265, 226, 227, 228, 240, 245, 295, 269 A

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Attorney, Agent, or Firm—Frederick E. Mueller

[57] **ABSTRACT**

A refuse container interiorly movably mounts a pressure plate to bear against the material being compacted, the container and plate defining a collapsable chamber. An endless seal carried at the periphery of the plate is responsive to a differential of external and internal pressures, induced by a vacuum pump that reduces the internal pressure of the enclosed volume of the collapsable chamber, to hermetically seal the chamber to effect compacting movement of the pressure plate. A vacuum breaker means is provided to equalize the internal and external pressures after completion of a compacting cycle, e.g., after a predetermined length of compacting stroke of the pressure plate, to permit retraction of the plate to a position of readiness for a successive compacting cycle. The process may be automatically controlled, e.g., by an electro-mechanical circuit. The container may be an element that is selectively separable from an assembly consisting of all the other elements of the invention.

27 Claims, 20 Drawing Figures

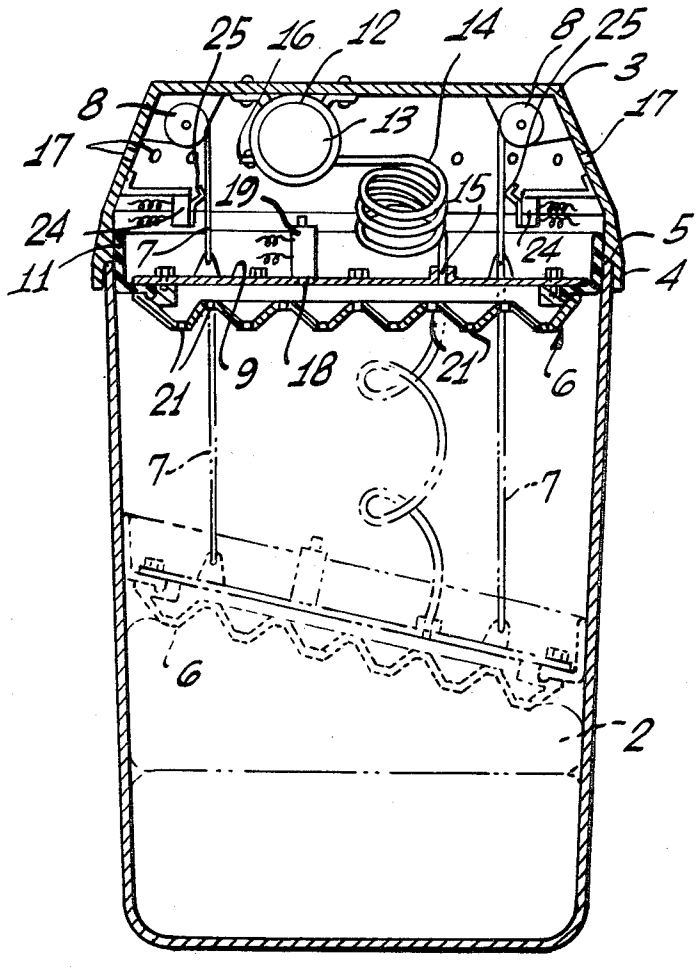


Fig. 1

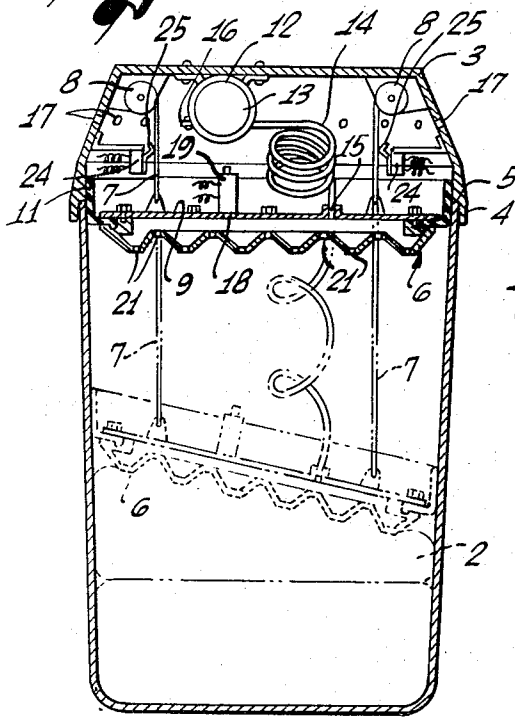


Fig. 2

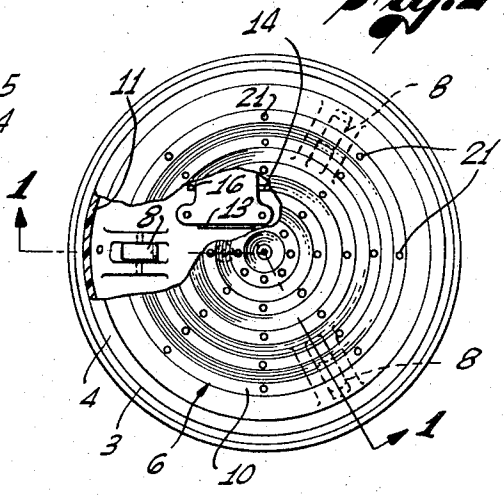


Fig. 3

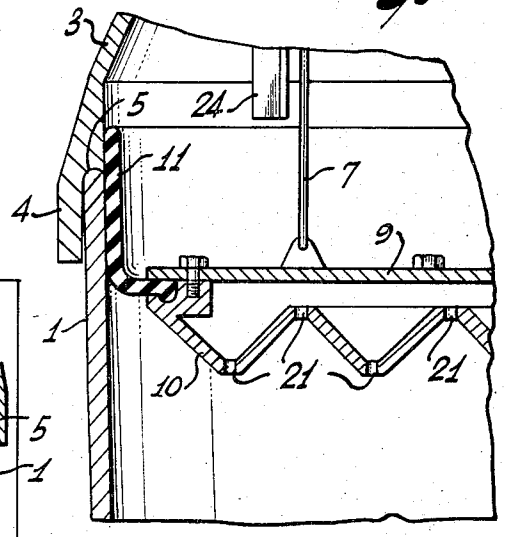


Fig. 4

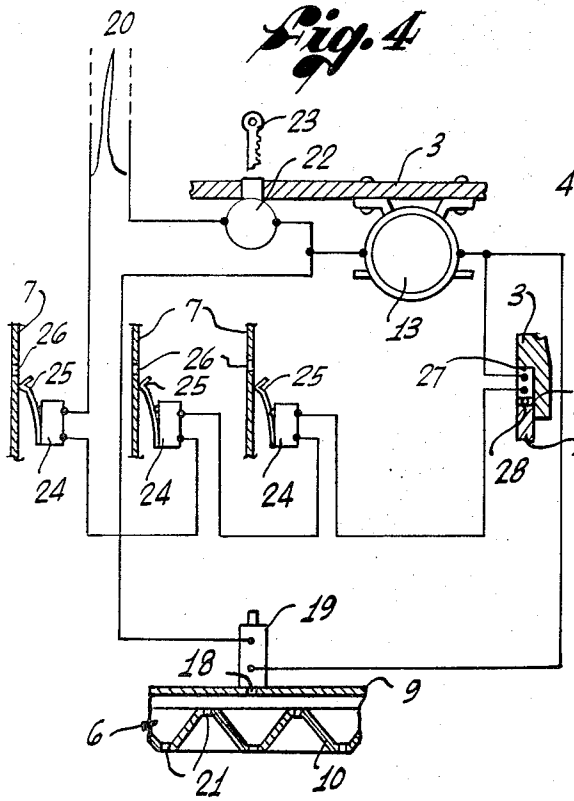


Fig. 4a

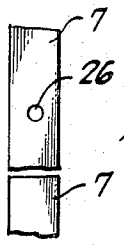


Fig. 5

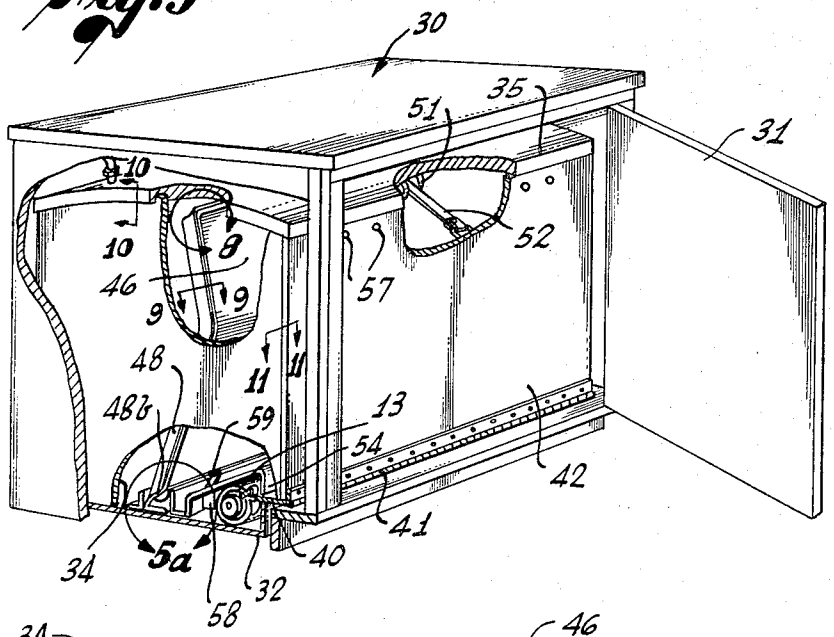
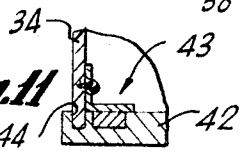


Fig. 11



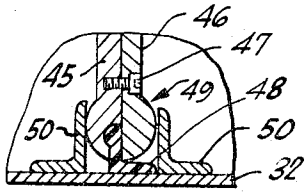


Fig. 7

Fig. 8

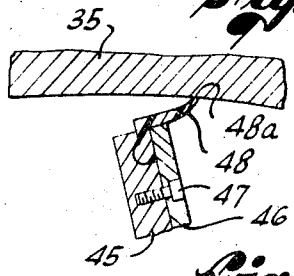


Fig. 6

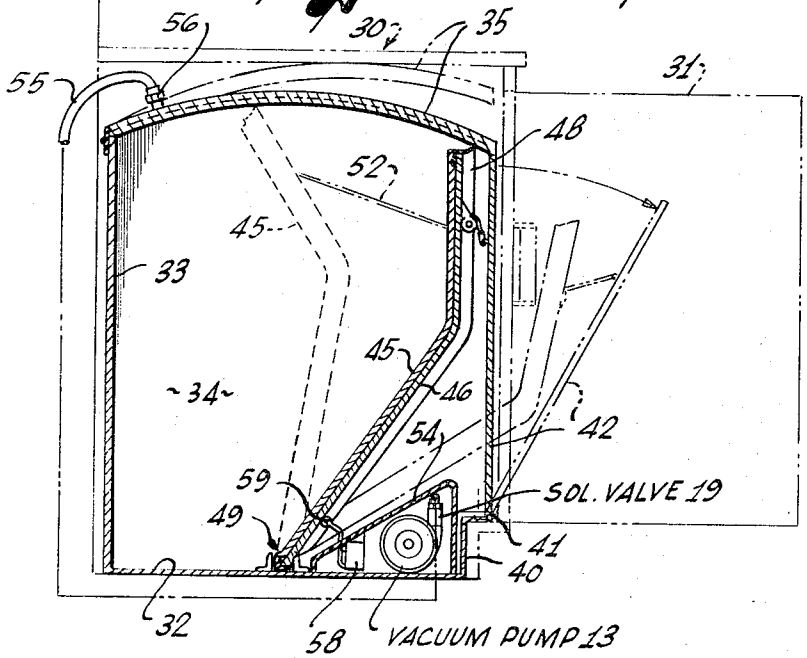


Fig. 9

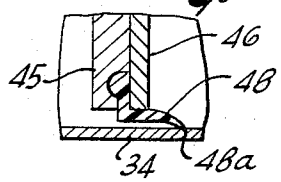
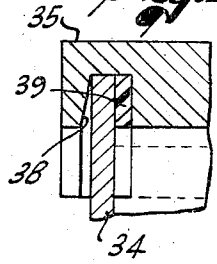


Fig. 10



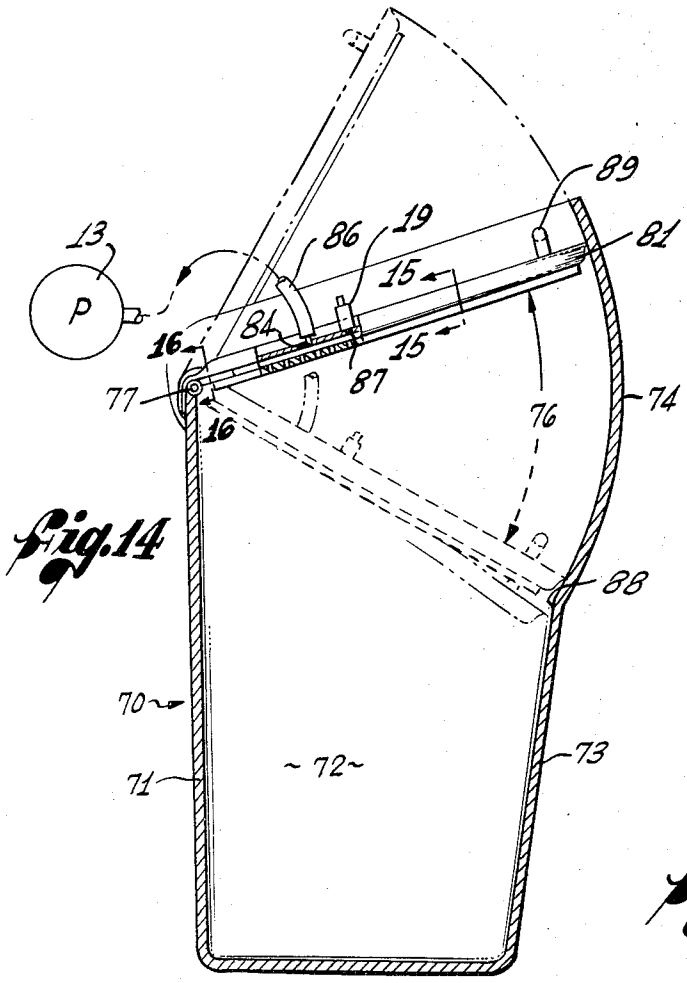


Fig.14

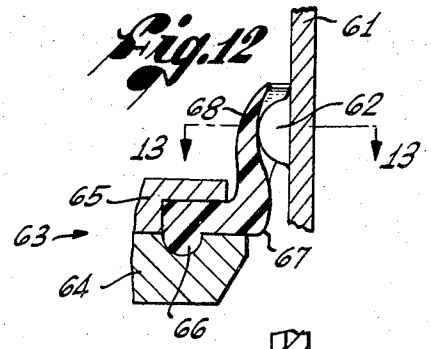


Fig.12

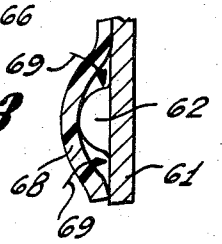


Fig.13

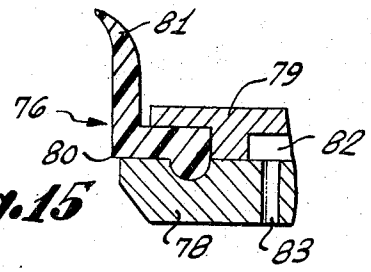


Fig.15

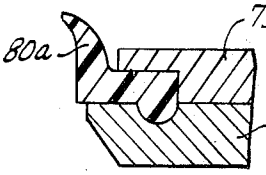


Fig.16

Fig.5a

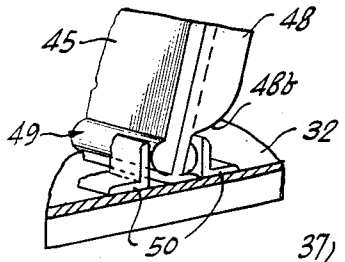


Fig.10a

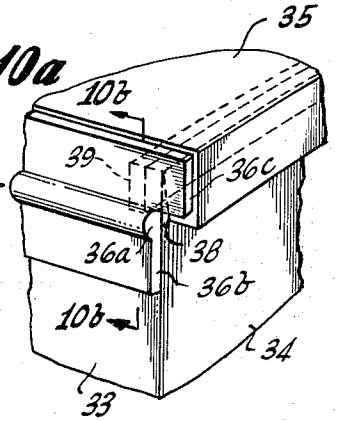
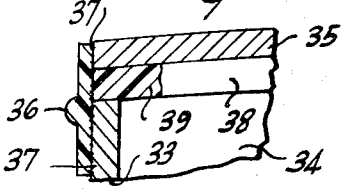


Fig.10b



REFUSE COMPACTOR

BACKGROUND OF THE INVENTION

This is a continuation in part of my application Ser. No. 254,067, filed May 17, 1972 now abandoned.

This invention relates to refuse compactors adapted principally to providing compacting of garbage in a domestic garbage can or receptacle but which may also be utilized for the waste of commercial and industrial establishments.

Heretofore it has been proposed to employ super atmospheric pressure means expandable downwardly from the cover for compacting the refuse in the can. Such devices become expensive and in some instances possibly dangerous in the event of the development of excess air pressure. They require specially constructed cans and covers with attachments to secure the two together and withstand the pressures developed. The source of compressed air has generally been connected by a hose to the cover which was susceptible to disconnection by children or other users.

SUMMARY OF THE INVENTION

According to the present invention, the trash container internally mounts a movable pressure plate, these two elements defining a collapsable chamber. The plate peripherally mounts an endless seal that contacts or is engagable with the inner walls of the container for defining a hermetic seal for the chamber during a compaction stroke of the plate. The can or container is evacuated of air to effect a hermetic sealing action of the seal and to provide the necessary motive power for moving the pressure plate in a compaction stroke against an opposing wall of the container. The entire power unit may constitute an assembly separate from the container, e.g., it may be contained within a cover for a can, and needs only suitable electrical connections thereto. To effect interruption of the compacting cycle and to permit subsequent retraction of the pressure plate, a vacuum breaker means may be employed, either as a part of the control circuit or as a mechanical means independent of the control circuit that interrupts contact of the seal with the inner wall of the container after a predetermined length of stroke of the pressure plate. The pressure plate may be positively constrained through a cycle of compaction and retraction strokes by a rigid guide means or it may be relatively freely mounted to provide for a reasonable tilting of the pressure plate as may be determined by the load of refuse in the can. Constantly tensioned springs may be employed to move the pressure plate to a retracted position after the vacuum within the container has been relieved. Automatic means may be employed to limit the movement of the pressure plate and/or determine the compacting stroke thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. **1** is a vertical central section through a can and cover with the pressure plate disposed in its retracted upper position and, in phantom, in an extended compacting position.

FIG. **2** is a bottom plan view of the pressure plate with parts broken away and sectioned to show the power unit and various parts in the cover.

FIG. **3** is an enlarged detail sectional view of one form of the sealing means and its environment.

FIG. **4** is a wiring diagram showing the controls for actuating the motor and determining the compacting operation.

FIG. **4**–*a* is an elevational view of a portion of a retraction tape for the pressure plate.

FIG. **5** is a perspective view of another embodiment of the invention, with portions thereof being cut away to reveal interior details of construction.

FIG. **5**–*a* is a perspective view of the hinge structure shown in FIG. **5**.

FIG. **6** is a front to rear sectional view of the apparatus of FIG. **5**.

FIG. **7** is a sectional view on a larger scale, illustrating one embodiment of a rigid guide means for the pressure plate.

FIG. **8** is a sectional view of the area **8** of FIG. **5**.

FIG. **9** is a sectional view taken on the line **9**—**9** of FIG. **5**.

FIG. **10** is a partial sectional view taken on the line **10**—**10** of FIG. **5**.

FIG. **10***a* is a partial, rear quarter perspective view of the container cover hinge structure of the device of FIG. **5**.

FIG. **10***b* is a sectional view on the line **10**b-**10**b of FIG. **10***a*.

FIG. **11** is a sectional view taken on the line **11**—**11** of FIG. **5**.

FIG. **12** is a partial vertical sectional view schematically illustrating an embodiment of a mechanical vacuum breaker means.

FIG. **13** is a sectional view taken on the line **13**—**13** of FIG. **12**.

FIG. **14** is a vertical central section through another embodiment of the invention employing yet another form of mechanical vacuum breaker means.

FIG. **15** is a sectional view on the line **15**—**15** of FIG. **14**.

FIG. **16** is a sectional view on the line **16**—**16** of FIG. **14**.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Refering to the drawings, FIGS. **1**–**4** illustrate the invention as embodied in a back door domestic refuse compactor, including a can **1**, disposed with an open top for receiving bags **2** of garbage and refuse or the like. A cover **3** has a circumferential skirt **4** adapted to fit upon the upper edge or rim **5** of the can. A pressure plate **6** is disposed horizontally in the can **1** and suspended therein from cover **3** by means of three reeled tapes **7** biased by a constant tension spring roll construction **8** to lift the pressure plate to its uppermost position when not being actuated to compact refuse in the can.

The pressure plate **6** comprises a generally flat circular disc **9** to which the lower ends of tapes **7** are attached, and a generally corrugated face plate **10** spaced downwardly therefrom and secured at its circumferential edge to disc **9**. The outer circumferential edge of pressure plate **6** in the embodiment of FIGS. **1**–**3** is sealed against the inner wall of can **1** by a yieldable rubber-like member **11** of generally a piston cup type with one edge thereof secured between the edge portion of disc **9** and the edge portion of face plate **10** and with the flanged side of member **11** bearing against the wall of the can **1** and allowing for tilting of the pressure

plate as shown in phantom in FIG. 1 by reason of an offset load of refuse in the can.

The springs 8 of the constant tension type are sufficiently strong to retract the pressure plate 6 to its uppermost position after a compacting operation and to retain the pressure plate in the retracted position until the next compacting operation.

Compacting is effected by evacuating the air in the can from beneath the pressure plate whereby the latter is forced downwardly upon the refuse by the atmospheric pressure above the pressure plate. For this purpose an electric motor 12 and a vacuum pump 13 are carried by the cover 3 in the space between it and the pressure plate 6. The input to vacuum pump 13 is connected by a quantity of flexible tubing 14 to an opening 15 in disc 9, the tubing 14 providing for extension as the pressure plate moves downwardly in can 1 increasing the distance between pump 13 and opening 15. The discharge 16 of pump 13 opens directly into the space between cover 3 and the pressure plate 6. A suitable series of openings 17 in cover 3 connects the space between cover 3 and pressure plate 6 freely to the outside atmosphere.

A relief opening 18 extends through disc 9 and normally connects the space within can 1 to the outside atmosphere above the disc. Opening 18 is closed during operation of pump 13, as by a solenoid valve 19 connected in the power line 20 to the motor 12. The space beneath disc 9 is freely connected through a plurality of openings 21 in face plate 10 to the space inside can 1 so that, when the pump 13 is actuated, air within can 1 is drawn upwardly through openings 21, opening 15, tubing 14, and pump 13, and is discharged at 16 to the space between the cover 3 and disc 9 and from thence through openings 17 to the outside. At the same time, relief opening 18 is closed by valve 19 whereby the atmospheric pressure on disc 9 forces the latter downwardly in can 1 to compact the refuse therein.

The face plate 10 is corrugated and openings 21 are distributed therein at both the top and bottom of the corrugations to prevent clogging of the vacuum path by refuse and to provide for drainage in the event any liquid from the refuse should enter the space between disc 9 and face plate 10.

Refering to the electrical circuit of FIG. 4, the motor 12 is connected to a power source, preferably the usual 115 volt line available in most houses, by a suitable dual line 20. A timer switch 22 in line 20 is closed by manipulation with a key 23 and is adapted to hold in a closed position for a given length of time after initiating a compacting operation, and to reset the switch open until it is desired to initiate another compacting operation.

A safety micro-switch 24 is provided in line 20 to open the motor circuit in the event one of the tapes 7 reaches a given extremity of downward movement indicating that the pressure plate 6 may have been tilted to its limit or may have moved as far down in can 1 as desired. For this purpose, micro-switch 24 has a lever 25 bearing against the corresponding tape 7 and disposed to drop into a slot 26 in the tape at the position of the latter for actuating the switch to open the line 20.

An additional one or more micro-switches 27 in line 20 are disposed to be actuated to close the line only when cover 3 is properly located on can 1. For this purpose the micro-switches 27 are disposed in spaced relation around the peripheral edge of cover 3 with their actuating plungers 28 adapted to engage the top of the rim of the can 1. If the cover 3 should not be located properly on can 1 at least one of the micro-switches will remain open, thereby preventing actuation of motor 12.

FIGS. 5–11 depict an illustrative embodiment of the invention as adapted for mounting within a compartment of a kitchen cabinet 30 that is normally closed by a cabinet door 31. In this case, the can of the refuse compactor is a container of substantially rectangular cross-sectional configuration and, also, incorporates a hinge for positively guiding the pressure plate and to give leverage to the plate.

More particularly, in this embodiment the refuse container comprises a box-like structure including a floor pan 32, having a rear wall 33 and a pair of confronting side walls 34. An arcuate cover 35 is externally connected by a combined seal and hinge 36 to the upper rear edge of the rear wall 33. This strip may have the profile seen in FIGS. 10*a* and 10*b*, comprising an enlarged central bead 36*a* bordered by hinge leaf portions 36*b* and *c*. The strip may be formed of rubber or a synthetic plastic. While not fully illustrated, it will be understood that the strip extends for the entire width of the refuse container and is secured in airtight relationship, throughout its length, to the rear edge of cover 35 and the upper rear face of back wall 33, as by means of adhesive 37.

As is shown in FIGS. 10 and 10a, the underside of the cover 35 is formed along opposite edges with open ended grooves 38 which receive the upper edges of the pair of side walls 34 when the cover 35 is in a lowered position. In order to effect an air tight seal at the junctions of the rear wall 33 and the side walls 34 with the cover 35, the grooves 38 also seat elongate strips 39 of an impervious material adapted to provide seals throughout the length of the grooves 38. As is shown in FIG. 10b, the rear ends of the seal strips 39 abut and make sealing contact with the hinge seal 36.

The floor pan 32 of the trash receptacle may be stepped upwardly, as indicated at 40, in order to conform to the configuration of the usual kick-space construction of a kitchen cabinet. The step structure 40 is provided along its forward edge with a hinge 41 that mounts a front door 42 which is normally held closed in an upstanding vertical position by a pair of magnetic latches, as indicated at 43 in FIG. 11. In order to lend rigid reinforcement to the opposite sidewalls 34 of the container, the inner face of the door 42 is formed along opposite vertical sides with grooves 44 for mating engagement with the forward vertical edges of the side walls 34.

In this embodiment of the invention the pressure plate is made essentially rectangular in planform. It may, for example, comprise a rigid assembly of a rigid pressure plate 45 having a congruently shaped cover plate 46 secured thereto by a plurality of fastener means 47. In order to effect a continuous or endless peripheral air seal around the pressure plate 45, an endless lip seal member 48 is secured between the edge portions of the pressure plate 45 and cover plate 46.

As is shown in FIGS. 5*a* and 7, the lower marginal edge portions of the pressure plate 45 and cover plate 46 together define a cylindrical hinge bearing 49 on which the pressure plate assembly is rockably supported on the lower lip of the seal 48. In order to confine the hinge 49 to a desired hinge axis location, a par-

allel pair of angle iron members **50** are rigidly secured to the floor pan **32** of the trash container with the hinge **49** confined between the upstanding flanges thereof. As is indicated in FIG. **6**, the hinge axis location may be approximately midway between the rear wall **33** and door **42** of the container. As will now be apparent, the upper horizontal edge of the pressure plate assembly and the corresponding lip of the seal **48** are thus swept through arcs having a center on the hinge axis and the underside of the cover **35** is downwardly concave on an arc similarly centered.

The hinge mounting for the pressure plate assembly provides a fulcrum against which the pressure plate **45** may act as a lever, thus giving a mechanical advantage to the pressure plate in compacting refuse within the enclosed volume of the container. At the same time, the hinged connection provides a positive guide means constraining the pressure plate assembly to reciprocation in the desired arc.

The rigid pressure plate **45** has a planform shape and area to nearly fully occupy the cross-section of the container but with sufficient peripheral clearance to mount the seal **48** for engagement with the inner surfaces of the container. The seal **48** is made of an impervious material, preferably a synthetic plastic having a low coefficient of friction, which is flexible and may, also, be resilient. In the drawings, the typical cross-sectional profile of the seal **48** is illustrated in an essentially relaxed condition and comprises a relatively thick base section, the opposite surfaces of which converge, diminishing in thickness to terminate in a very thin land **48***a*. Preferably, the endless seal **48** is cast or molded to include a relaxed planform area which is at least as great as the internal cross-sectional configuration of the container with the land **48**a in engagement with the inner surfaces of the container.

Upon being subjected to a reduced internal pressure within the enclosed volume of the container, the lip of the seal **48,** by virtue of its tapered cross-sectional profile, is more readily flexibly deformable into air sealing engagement with the inner surfaces of the container and the land **48***a* is sensitive to relatively small pressure differentials to immediately define a continuous hermetic seal upon initiation of the evacuation of air from the enclosed volume. After the enclosed volume of the container has been vented to atmosphere, equalizing the opposed air pressures on the lip seal **48,** the pressure plate **45** may be retracted without risk of reversely curling the lip **48,** which is reinforced against such curling by the relatively thick base portion thereof.

As is best indicated in FIG. **5***a*, the cross-sectional profile of the seal **48** is typical throughout the length of the seal except at the lower ends of its vertical sides. As is indicated at **48***b*, the width of the lip gradually diminishes to define a relatively stubby lip having relatively broad area contact with the inner surfaces of the side walls **34** in the area of the junction between the hingedly supported pressure plate **45** and the floor pan **32,** defining a friction seal and minimizing reliance on flexibility of the seal material to accomplish air tight sealing of the enclosed volume of the container.

In vertical sectional profile the pressure plate assembly comprises two angularly related sections such that when the assembly is in retracted position, indicated in solid outline in FIG. **6,** the upper section is in substantially a vertical plane and supported against the door **42.** As is shown in FIG. **5,** a constant tension spring roll construction **51** is secured to the front side of the pressure plate assembly and mounts a tape **52** having one end secured to the inside of the door **42.** Thus, as the pressure plate assembly undergoes a compaction stroke, the springs of the device **51** are tensioned so that upon release of the vacuum within the container the springs effect a return of the pressure plate assembly from the extended position depicted in FIG. **5.**

Compacting of refuse is effected by evacuating air from within the collapsable chamber defined by the container and the pressure plate assembly whereby the latter is forced horizontally towards the rear wall **33** by atmospheric pressure. The system of FIG. **4** may be adapted to this purpose, with vacuum pump **13** mounted on the floor pan **32** in the space between the pressure plate assembly and the door **42,** beneath a vented pump housing **54.** The input to the pump **13** is connected by a quantity of tubing **55** to the interior of the collapsable chamber as, for example, by means of a coupling **56** mounted adjacent the rear edge of the cover **35.** The discharge of pump **13** is through the vented pump housing **54** and through vent openings **57** formed in the front door **42.**

In order to automatically terminate a compaction stroke of the pressure plate assembly, a limit switch **58** may also be mounted in the pump housing **54** in electrically operative association with the electric motor for the pump **13.** This switch is provided with a switch arm **59** that is biased to constantly follow and contact the pressure plate assembly throughout its arc of reciprocation. The arrangement is such that upon the pressure plate assembly having been moved through a maximum compacting stroke, and the switch arm **59** having moved through a corresponding arc, the switch **58** is opened.

In order to vent the enclosed volume of the container to atmosphere, upon opening of the switch **58,** the solenoid valve **19** may be coupled to the junction of the conduit **55** and the intake to the pump **13,** as is schematically indicated in FIG. **6.** With this arrangement, there is no need to form a separate vent opening in the pressure plate assembly or in walls of the can or container.

As will be apparent, in the use of the embodiment shown in FIGS. **5–11,** refuse may be introduced thereinto merely by lifting the cover **35** to the dotted outline position depicted in FIG. **6.** Refuse then can be dropped behind the retracted pressure plate assembly after which a compaction cycle may be started, for example, by use of a key switch **22** such as is shown in FIG. **4.** After successive loads of trash have been compacted and it is desired to remove the compacted contents of the container, the cover **35** is lifted to permit outward movement of the front door **42** to dotted outline position of FIG. **6.** This permits the lower angular portion of the pressure plate assembly to be supported by an inclined top wall of the pump housing **54,** whereby the contents of the compactor may be readily removed through the relatively wide opening defined between the upper edge of the pressure plate assembly and the forward edge of the cover **35.**

FIGS. **12** and **13** illustrate an auxiliary or alternative means of breaking the vacuum within a refuse compactor of the invention. In this case, a wall **61** of a refuse can or container is provided on its inner surface with a fixed, rigid, inwardly-protruding projection **62.** The refuse container may be conceived of as being either

circular or non-circular in cross-sectional configuration. As before, a pressure plate assembly **63** comprises a rigid plate **64** with a cover plate **65** secured thereto, with the marginal edge portions thereof adapted to rigidly clamp a beaded portion **66** of an endless flexible lip seal **67.**

The plate **64** and cover **65** are similar in planform to the cross-sectional configuration of the refuse container but slightly smaller in area to define a clearance between the periphery of the pressure plate **64** and the inner surface of the wall **61.** The seal **67** has a lip **68** which protrudes beyond the periphery of the pressure plate **64** and, in response to a differential of air pressures, is flexibly deformed into sealing engagement with the inner surface of the wall **61** whereby the pressure plate assembly **63** is forced downwardly, as viewed in FIG. **12,** in response to atmospheric pressure.

In this case the vacuum breaker means comprises one or more of the protrusions **62** located a predetermined distance beyond the retracted position of the pressure plate assembly **63.** Preferably, such protrusions would be located in position to define a maximum length of compaction stroke of the pressure plate assembly **63** so that upon the lip **68** coming into contact with a protrusion **62** the lip is deflected, in the manner illustrated in FIGS. **12** and **13,** out of sealing contact with the inner surface of the wall **61,** effecting a break in the vacuum on the low pressure side of the pressure plate assembly **63.** This is best illustrated by the arrows **69** in FIG. **13.**

Preferably, the construction of FIGS. **12** and **13** is utilized in a compactor having a control system such as is shown in FIG. **4,** or utilizing the timer switch **22** and solenoid valve **19** of FIG. **4.** With such an arrangement, in the event that a refuse container is so thoroughly or fully packed that the pressure plate assembly **63** does not reach the point of maximum compaction in which it is coincident with a protrusion **62,** a time switch, such as the switch **22,** will effect opening of the solenoid valve **19** to interrupt the cycle and to equalize the external and internal pressures.

Another embodiment of the invention is illustrated in FIGS. **14–16.** In this case, there is an upright can **70** that is preferably substantially rectangular in horizontal cross-section throughout its height. Thus, the can is preferably formed with a vertically extending rear wall **71,** a pair of flat opposite side walls **72,** and a front wall comprising a lower section **73** that is flat and divergently wedgingly related to the rear wall **71** and, also, having an upper wall portion **74** that is arcuate in vertical section. A pressure plate assembly **76** that is similar in planform to the cross-section of the can **70** is hingedly connected, as indicated at **77,** to the upper edge of the rear wall **71.** In this connection, it should be observed that the side walls **72** project upwardly and rearwardly beyond the upper edge of the rear wall **71.**

The pressure plate assembly **76** comprises a pressure plate **78** with a cover **79** secured thereto whose marginal edge portions clamp the beaded portion of an endless seal **80** therebetween to support a flexible lip **81** in an outwardly projecting position.

As is indicated in FIG. **15,** a plenum **82** is defined between confronting surfaces of the pressure plate and cover in open communication with an array of holes **83** extending through the pressure plate. In order to evacuate the interior of the container **70,** an opening **84** in the cover is provided with a coupling to receive one end of a hose **86** whose other end is hooked to the intake of pump **13.** Another opening **87** in the cover normally has communication with the atmosphere through solenoid valve **19** and is closed during operation of the pump **13** by being connected within power line **20** to motor **12** for the pump. As in the case of the first described embodiment of the invention, it will be understood that the relief opening **87** is closed by the solenoid valve **19** while the pump **13** is actuated whereby atmospheric pressure on the pressure plate assembly **76** forces it downwardly in the can **70** to compact the refuse therein.

In this case, the endless seal **80** is substantially similar to the seal **48** in that embodiment of the invention illustrated in FIG. **5.** Thus, the seal **80** along the front edge of the pressure plate assembly **76** and for the major portion of its length along the opposite sides of the pressure plate is of a uniform cross-section such as is indicated in FIG. **15.** However, near the rear ends of the side portions of the seal **80** its cross-section gradually develops into a friction configuration of the seal, as is indicated at **80a** in FIG. **16,** to provide a friction seal in the areas around the hinge axis of the pressure plate assembly. Along the rear edge of the pressure plate assembly, the seal **80** develops into a strip which may be bonded to the outside of the upper edge portion of the rear wall **71** and along the rear edge portion of the cover of the pressure plate assembly. With this arrangement it will be understood that a pressure differential seal extends almost uninterruptedly around the complete periphery of the pressure plate assembly being gradually supplanted by a friction seal in the wall areas at the opposite ends of the hinge.

The inner surface of the front wall portion **74** is formed along an arc having its center at the axis of the hinge **77.** Thus, when the pump **13** is actuated by means of the timer switch **22,** FIG. **4,** the solenoid valve **19** is closed. As air is evacuated from the interior of the can **70** the lip **81** of the seal is deformed to tight sealing engagement with the confronting inner wall surfaces of the can **70.** The differential of pressures then effects downward movement of the pressure plate assembly **76** to effect compaction of the refuse within the can. Then, upon the junction **88** of the front wall portions **73** and **74** being passed by the lip **81** of the seal, the vacuum beneath plate assembly **76** is broken in order to permit the pressure plate assembly to be raised to a retracted position, as by means of a handle **89.**

Various modes of carrying out the invention are contemplated as being within the scope of the following claims.

I claim:

1. A self contained portable refuse compactor comprising an open top refuse container, a cover adapted to rest on the top rim of said container, a pressure plate suspended from said cover and adapted to be moved downwardly to apply pressure to the refuse in the container, power means including an electric motor vacuum pump unit carried by said cover and connected to evacuate air from said container beneath said pressure plate and effect downward movement of said pressure plate therein, spring tensioned means providing for the extension of the suspension of said pressure plate and for retraction of said pressure plate to its upper position beneath the cover upon termination of operation of said power means, and a holding switch in the power

circuit of said motor to initiate actuation of said motor and operate the same for a given cycle to effect compaction of the refuse in the container.

2. The construction of claim **1** and a normally closed safety cutout micro-switch to open the power circuit of said motor upon a predetermined extension of the suspension of said pressure plate.

3. The construction of claim **1** and a normally open safety micro-switch in the power circuit for said motor, and means to close said switch upon predetermined mating of said cover upon the rim of the refuse container.

4. A refuse compactor comprising an open top refuse container, a cover for the open top of said container, a pressure plate suspended from said cover and adapted to move downwardly to apply compacting pressure to the refuse in said container, said pressure plate comprising a disc constructed to be slidably sealed against the inner wall of said refuse container to seal the container space beneath the disc from the atmosphere, a vacuum pump having its inlet connected through an opening in said disc to the container space therebeneath for evacuating air from said space whereby said pressure plate is moved downwardly in said container by atmospheric pressure applied to said plate to compact the refuse within the container, vacuum relief means responsive to a predetermined degree of movement of said pressure plate to open said container space to the atmosphere when said evacuating pump is inoperative, and means to retract said pressure plate toward said cover.

5. The construction of claim **4** and a face plate spaced from and secured to said disc to protect said opening from becoming clogged by refuse and to maintain freedom of access of air in the container to said opening.

6. The construction of claim **5** in which said face plate is peripherally sealed to said disc and is corrugated centrally in spaced relation to said disc, said face plate having holes therein distributed throughout the upper and lower convolutions of the corrugations therein.

7. The construction of claim **4** in which said relief means comprises a relief port through said disc for connecting the space therebelow to the atmosphere, and valve means closing said relief port upon actuation of said vacuum pump.

8. A refuse compactor comprising:

a rigid container;

a rigid pressure plate that is freely reciprocable within said container;

an endless hermetic seal means mounted on the periphery of said plate, a portion, at least, of said seal means comprising an impervious flexible sheet material that engages inner surfaces of said container outside of the volume of said container that is covered by said plate;

said flexible sheet material, when subjected to a reduction of the internal pressure of the volume of said container that is covered by said plate, being flexibly deformed into air sealing engagement with inner surfaces of said container and, when subjected to substantially equal internal and external pressures, assuming an essentially relaxed state to minimize frictional resistance to movement of said sheet material over said inner surfaces of said container;

and a means to evacuate air from the volume of said container that is covered by said plate to bias said sheet material into air sealing engagement with said inner surfaces of said container to effect refuse compacting movement of said plate, in opposition to a wall of said container, by atmospheric pressure,

said sheet material, when said means to evacuate air is inoperative and upon substantial equalization of the internal and external pressures, assuming an essentially relaxed state to minimize frictional resistance to movement of said pressure plate in a direction away from said wall of said container.

9. A refuse compactor as in claim **8** in which said container is of circular cross-section and said plate is circular in planform.

10. A refuse compactor as in claim **9** in which said hermetic seal means comprises an endless piece of said impervious sheet material having a substantially uniform radial cross-section including a lip that extends radially beyond the periphery of said plate to span an annular clearance space between the periphery of said plate and the inner surface of said container.

11. A refuse compactor as in claim **10** in which said seal means is of a piston-cup configuration having an endless free edge portion that is flexibly deformable into substantially cylindrical configuration to conform to the circular cross-section of said container.

12. A refuse compactor as in claim **8** in which said container is non-circular in cross-section in the region of said pressure plate and said plate has a planform that is geometrically similar to said non-circular cross-section.

13. A refuse compactor comprising;

a rigid container;

a rigid pressure plate that is pivotally secured to said container for reciprocation of a free end of said plate through an arc within said container during refuse compaction and plate retraction strokes of said plate, said plate being mounted in opposition to an inner surface of said container to compact refuse therebetween during a compaction stroke of said plate;

means including said pressure plate to seal the inside of said container from the atmosphere;

and a vacuum means to evacuate air from the inside of said container to effect a compaction stroke of said plate by atmospheric pressure.

14. A refuse compactor as in claim **13** in which:

said plate is non-circular in planform and is reciprocable within a section, at least, of said container that is geometrically similar in cross-section to the planform of said plate, said plate having an area to substantially fully close said section of said container.

15. A refuse compactor as in claim **14** in which said seal means comprises an endless member mounted at the periphery of said plate for sealing engagement with walls of said container.

16. A refuse compactor as in claim **15** in which said endless member includes a lip of a flexible sheet material that is deformable by a differential of internal and atmospheric pressures into air sealing engagement with wall surfaces of said container.

17. A refuse compactor comprising:

a rigid container;

a rigid pressure plate in said container having a planform that is geometrically similar to the cross-section of said container and of an area to substantially fully close said section of said container;

means for hermetically sealing the volume enclosed by said container and said plate;

means to reduce the internal pressure of the enclosed volume to effect movement of said plate by atmospheric pressure to compact refuse in said container;

and a vacuum relief means that vents the enclosed volume to atmosphere in response to a predetermined degree of movement of said plate in a refuse compacting direction.

18. A refuse compactor as in claim **17** having a means to retract said pressure plate when said container is vented to atmosphere.

19. A refuse compactor as in claim **17** in which said means for hermetically sealing comprises an endless member mounted at the periphery of said plate for sealing engagement with walls of said container.

20. A refuse compactor as in claim **19** in which said member includes a lip of a flexible sheet material that is deformable by a differential of internal and atmospheric pressures into air sealing engagement with wall surfaces of said container.

21. A refuse compactor as in claim **20** in which said vacuum release means comprises at least one inwardly directed protrusion on an inner surface of said container having shape characteristics to deflect a portion of said flexible lip out of air sealing engagement with said inner surface upon movement of said lip thereover.

22. A refuse compactor as in claim **20** in which said vacuum relief means comprises a portion of the inner surface of the enclosed volume of said container that is disposed beyond the reach of said lip to provide open fluid communication between the enclosed volume and the atmosphere upon movement of said lip therepast during compacting movement of said plate.

23. A refuse compactor as in claim **17** in which said vacuum release means comprises an opening into the volume enclosed by said container and said plate and a valve to close said opening during actuation of said means to reduce the internal pressure of the enclosed volume.

24. A refuse compactor as in claim **23** in which said means to reduce internal pressure comprises a vacuum pump and a control circuit that includes said valve, said circuit also including a means to close said valve during operation of said pump.

25. A refuse compactor comprising:

a rigid container;

a rigid pressure plate within said container having a planform shape and area to substantially fully occupy a cross-section of said container throughout a given length of said container in which said plate can reciprocate in a direction normal to said cross-section, said plate being of an area that is freely movable through said given length of said container with sufficient peripheral clearance to permit tilting of said plate out of a plane that is normal to said direction upon said plate encountering a non-uniform mass of refuse;

flexible means to close said clearance between said plate and container wall in all positions of said plate;

and means to evacuate said container to move said plate in a direction to compact refuse within said container.

26. A refuse compactor as in claim **25** in which said flexible means comprises an endless piece of flexible sheet material secured to the periphery of said plate to project outwardly therefrom into substantially continous slidable engagement with the inner surface of said container.

27. A refuse compactor as in claim **26** in which said endless flexible sheet of impervious material has a width sufficient to be flexibly deformed into a piston-cup cross-sectional configuration sealingly engaged with the inner surface of said container throughout an angular range of tilting of said plate out of a plane normal to said direction.

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