

[54] TRASH COMPACTOR
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[51] Int. Cl. B30b 15/06
[58] Field of Search 100/52, 53, 229, 100/229 A, 289, 245, 246, 221, 224, 225, 295, 240, 244, 265, 266, 268; 53/124 B; 141/71, 73, 80; 248/54 R, 54 CS, DIG. 7; 312/270, 271, 273, 274, 319

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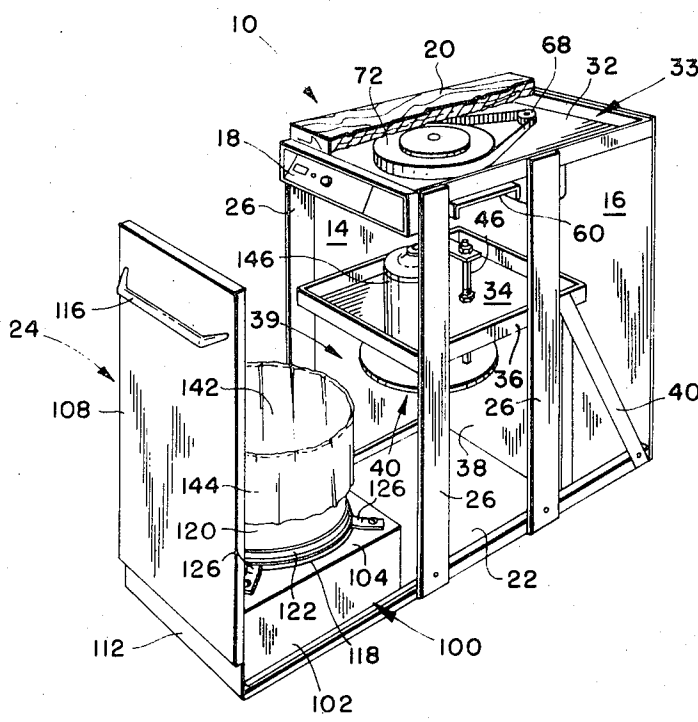
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[57] ABSTRACT
A resiliently mounted refuse receptacle adapted to be selectively moved between a closed and an open position with respect to a trash compactor unit housing, the receptacle in its closed position receiving a ram therein to compact the contained refuse to a fraction of its initial volume, such ram urging the receptacle into supportive engagement with a portion of the housing during its compaction stroke.

11 Claims, 6 Drawing Figures



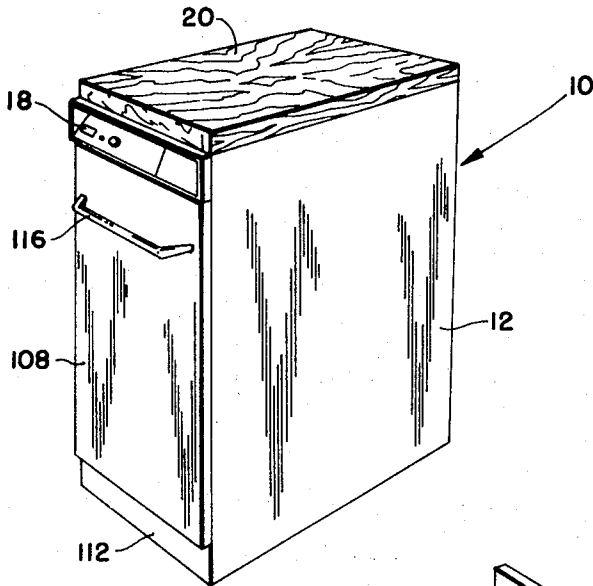


FIG. 1

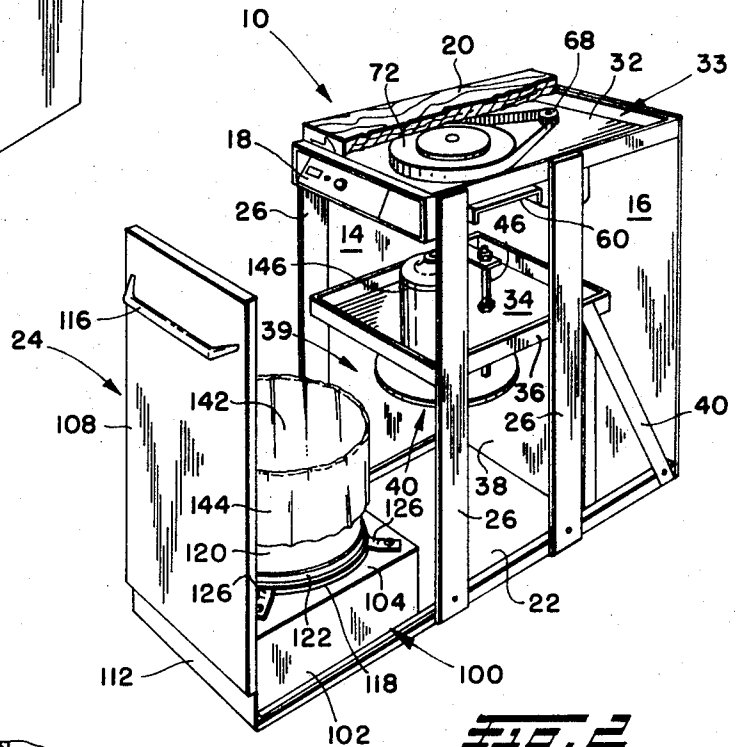


FIG. 2

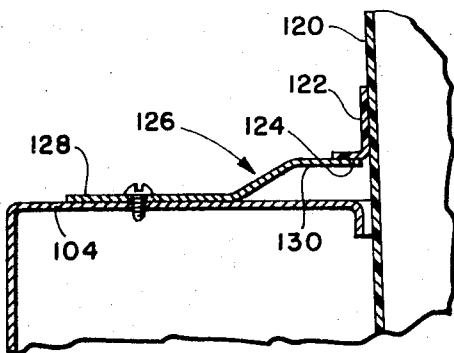
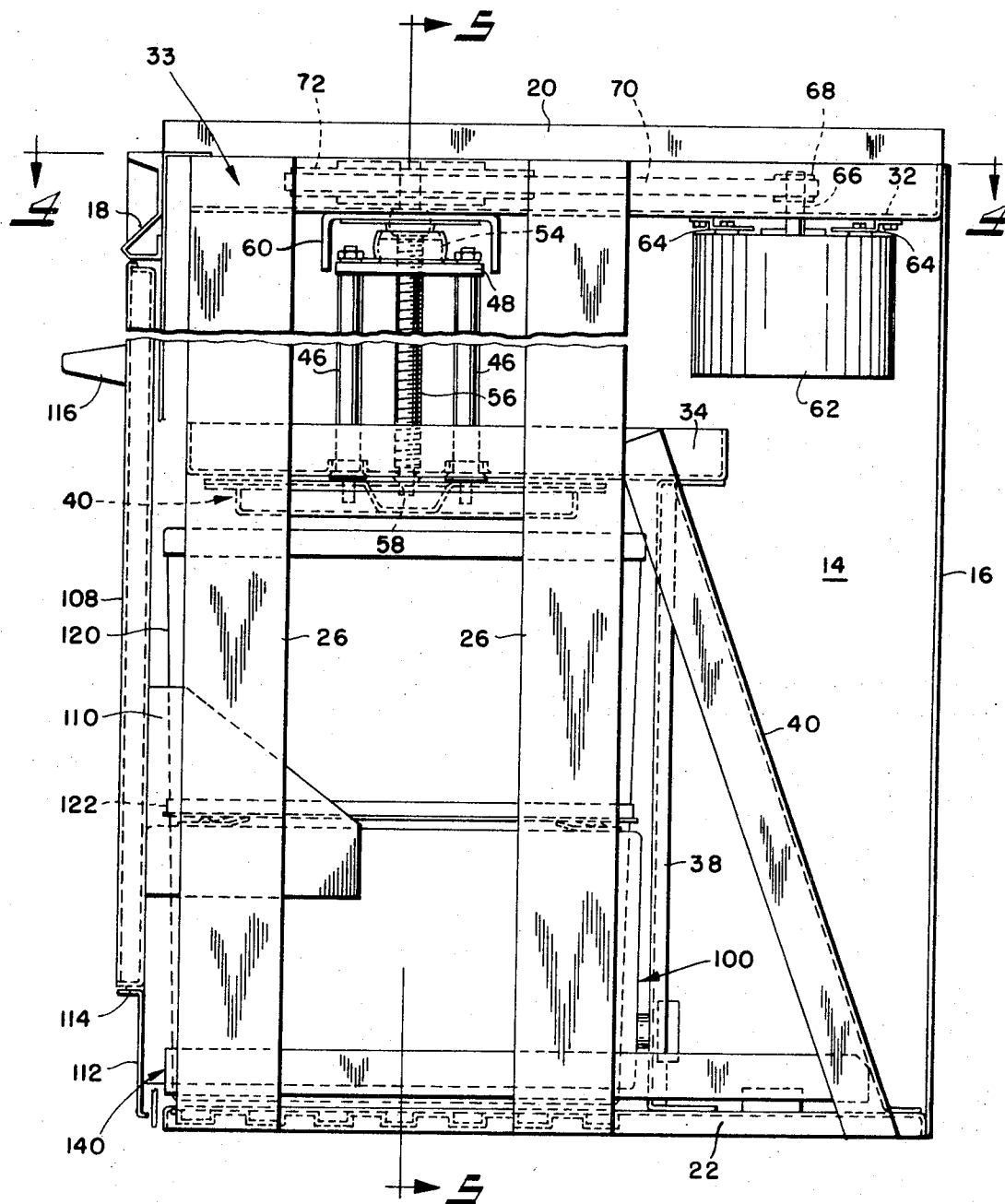


FIG. 3

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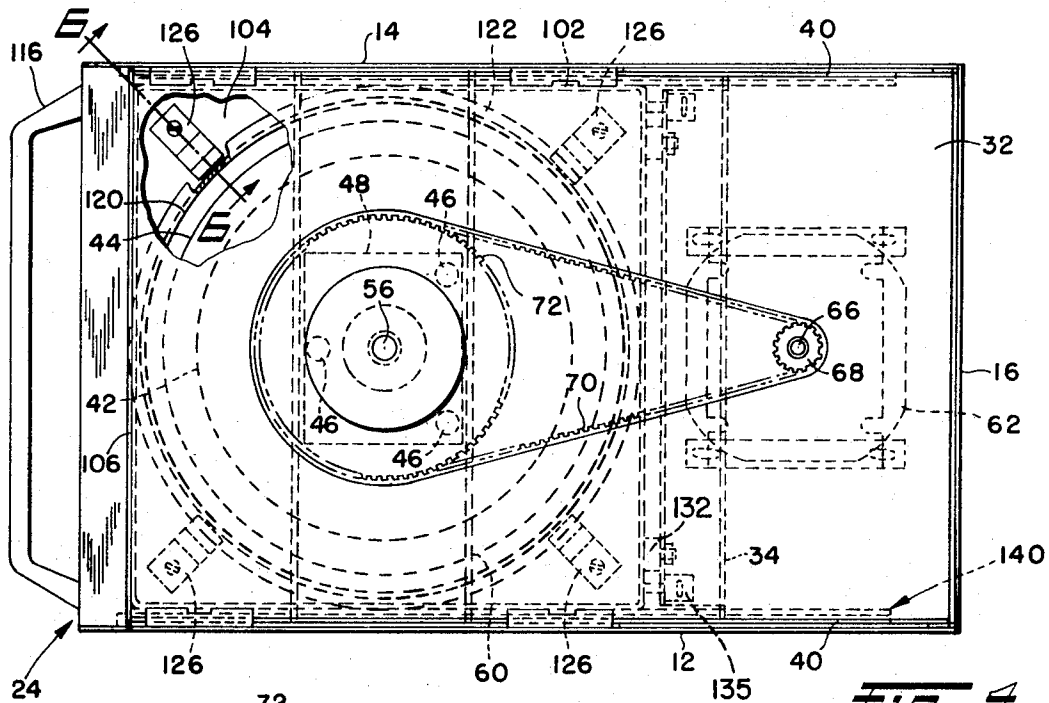


FIG. 4

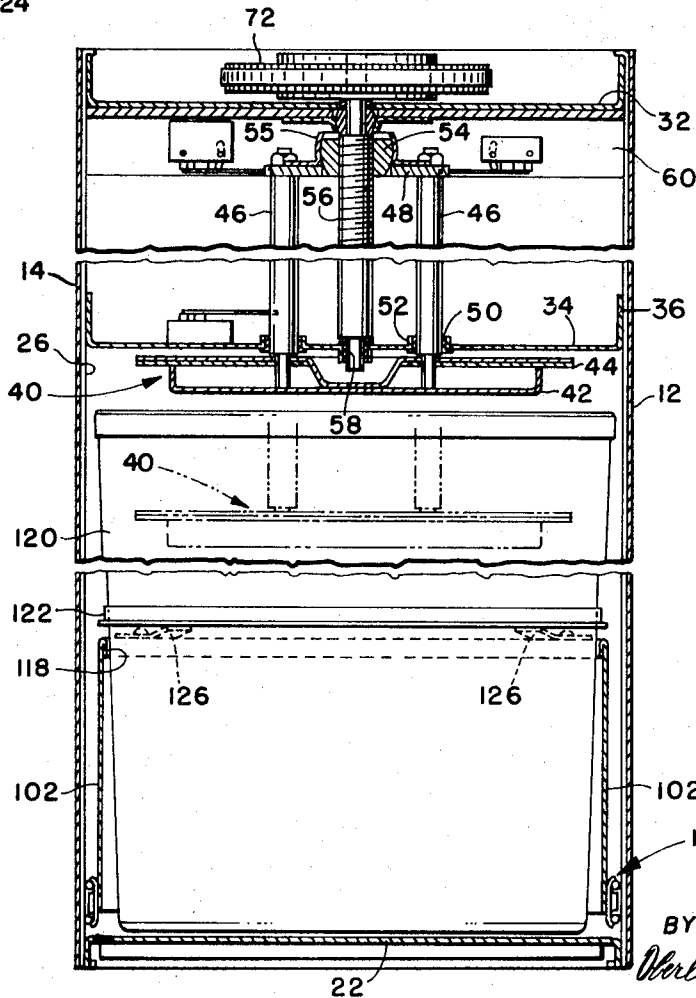


FIG. 5

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TRASH COMPACTOR

This invention relates as indicated to refuse compactors and more particularly to the mounting of the refuse receptacle within a drawer assembly.

For the convenience of the homeowner and increased efficiency in the use of available facilities for trash removal and destruction or recycling, trash compacting units have been developed for domestic use which compact the refuse deposited therein to a fraction of its initial volume. Fundamentally, all of the known units have a container or chamber positioned in a housing into which the trash is introduced, with a ram being driven into the chamber to compact such trash. Reference may be had to U.S. Pat. Nos. 3,353,478 and 3,537,390 for examples of trash compacting units known to the art. A prerequisite in unit design is the development of a compactor which may be easily and continually used by the homeowner, without malfunction of parts necessitating repair, to provide not only positive and efficient compaction of the refuse placed therein but also easy handling thereof.

It is accordingly the primary object of the present invention to provide a receptacle for containing the refuse in such a compactor which may easily be withdrawn from the unit housing for insertion of trash but which is positively supported in the housing during the ram compaction stroke.

It is another important object of the present invention to resiliently mount such receptacle on a drawer selectively to be moved between open and closed positions with respect to the unit housing. As will be seen, this resilient mounting is preferably provided by springs disposed upon a drawer frame to bias the receptacle normally to a position in which the drawer has adequate clearance for ready sliding movement. However, during the compaction stroke of the ram, the receptacle can engage a portion of the rigid unit housing against the bias of the springs, thereby to provide positive support for such receptacle with increased cycle efficiency.

It is still another object of the invention to provide a guided, single screw drive for the compaction ram which develops a preselected compressive force on the refuse while moving such ram substantially rectilinearly, thereby to minimize asymmetrical loading upon the resilient mounting means and receptacle.

Other objects and advantages of the present invention will become apparent as the following description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail a certain illustrative embodiment of the invention, this being indicative, however, of but one of the various ways in which the principle of the invention may be employed.

In the annexed drawings:

FIG. 1 is a perspective of a freestanding refuse compactor according to the present invention;

FIG. 2 is a perspective similar to FIG. 1 with the drawer of the unit, carrying a receptacle, in withdrawn position, a side panel being removed and the top broken away to enhance the illustration;

FIG. 3 is a side elevation of FIG. 2 with the drawer in its closed position;

FIG. 4 is a partially broken away, horizontal section taken along line 4—4 of FIG. 3;

FIG. 5 is a vertical section taken along line 5—5 of FIG. 3; and

FIG. 6 is an enlarged and fragmentary elevation of the receptacle mounting means taken along line 6—6 of FIG. 4.

Referring now more particularly to the drawings and initially to FIGS. 1 and 2 wherein like reference numerals indicate like parts, a freestanding portable refuse compactor indicated generally at 10 is illustrated which includes a housing comprised of side panels 12 and 14, back panel 16, front control panel 18, top wall 20 and bottom panel 22. Drawer 24 is horizontally slidably mounted to said housing for selective movement between the open accessible position of FIG. 2 and the closed compaction position of FIG. 1.

The top wall 20 is illustrated as a wood cutting board although other materials could be substituted therefor. It will also be understood that the refuse compactor of the present invention may be installed in a conventional kitchen base cabinet (not shown) by preselecting housing dimensions to given space requirements.

The frame to which the exterior housing panels are attached includes two pairs of opposed vertical side members commonly designated at 26 which are connected adjacent their lower edges to a downwardly directed peripheral flange on bottom wall 22. Adjacent their upper edge, members 26 are connected to an upwardly turned flange on horizontal wall 32 which extends between the opposed pairs of side members and is subjacent top wall 20. Wall 32, top 20, and the upper portion of front control panel 18 define therebetween a drive chamber indicated generally at 33.

Between wall 32 and bottom panel 22, preferably most closely adjacent to the former, a guide partition 34 with an upstanding peripheral shoulder 36 is mounted upon side members 26. Guide partition 34 is additionally supported by upstanding panel 38 and inclined frame members 40 which extend between bottom panel 22 and plate 34. Panel 38, side walls 12 and 14, guide plate 34 and floor panel 22 define therebetween a compaction chamber indicated generally at 39 in which drawer 24 is received in the closed position shown in FIG. 1.

Referring now to the compactor mechanism, a generally cylindrical ram indicated at 40 is adapted to be moved from a retracted or elevated position shown in full lines in FIG. 5 to an extended or operative position shown in phantom lines in the same figure. In the retracted position of the ram, the drawer 24 may be freely selectively slid between its open and closed positions. In its extended position, the ram is received within drawer 24 to compact refuse placed therein.

As best shown in FIG. 5, ram 40 comprises a cup-shape lower pressure plate 42 and a composite back-up plate 44. The diameter or shape of the ram 40 is preselected so that it will be of complementary geometry to the receptacle with which it is to be associated. Three vertical guide bars 46 triangularly arranged around the drive screw are connected at their lower end to back-up plate 44 and at their upper end to cross member 48. Intermediate their ends, guide bars 46 are received for reciprocal sliding movement in sleeves 50 disposed within bosses 52 in guide partition 34, thereby to confine the bars 46 to rectilinear vertical motion.

Cross member 48 is provided with a centrally located, self-aligning nut 54 mounted in sleeve 55 so that it can swivel to prevent binding. Threaded drive screw 56 extends through nut 54 and is rotatably connected at its lower end in journal 58 to transverse wall member 34. At its upper end, screw or drive rod 56 is rotatably received in and extends through transversely extending U-shape member 60 and wall 32 into drive chamber 33. The threaded engagement between nut 54 and screw 56 causes the cross member 48 and accordingly ram 40 to move in a vertical reciprocal pattern, with the direction of such movement being dependent upon direction of screw rotation.

It will be noted that the single drive screw, co-operating cross member and guide rods are designed to effect equal and simultaneous vertical movement in the respective guide rods, thereby to impart motion to the ram 40 without any cantation or inclination being developed in such ram. Thus, the loading upon the receptacle and the included refuse is substantially uniform. In addition, the single drive screw positioned above the drawer 24 allows the entire width of the compaction chamber 39 to be used for the refuse receptacle, thereby relatively increasing the storage capacity of the unit.

As best shown in FIGS. 3 and 4, the drive means for rotating threaded screw 56 includes a motor 62 mounted on brackets 64 depending from plate 32. The shaft 66 of such motor is provided with a relatively small diameter pulley 68 to drive belt 70, which in turn drives a relatively large pulley 72 suitably keyed to the top of drive screw 56. Drive motor 62 is provided with an electrical control circuit (not shown) operative upon actuation by a start button on control panel 18 sequentially to energize motor 62 to drive the ram downwardly until a preselected compressive force upon the refuse is obtained, to reverse the motor until the ram is withdrawn to its retracted position, and to automatically shut off motor 62, thereby to complete the compaction cycle.

Referring now to the refuse reception mechanism, the drawer 24 includes an open bottom, rectangular frame 100 having rigidly interconnected walls comprising side panels commonly designated at 102, top panel 104 and front panel 106. A vertical and transversely oriented door 108 is connected by suitable fastening means to the front panel 106 of frame 100. The door 108 is additionally supported in its vertical position by a bracket 110 extending between such door and one side 102 of frame 100. Below the door 108, kickplate 112 is attached to the front panel 106 of frame member 40, such kickplate 112 being provided with a forwardly extending horizontal shoulder 114 which provides additional support for door 108. Adjacent the top of the door, a horizontal, transversely extending handle 116 is provided to facilitate movement of the drawer between its respective positions.

The top wall 104 of frame 100 is provided with an aperture 118 of circular configuration. A cylindrical receptacle 120 tapered slightly from top to bottom is partially received in such aperture, the receptacle preferably being cylindrical in shape since such configuration is inherently able to withstand greater internal forces, although, of course, other receptacle shapes are within the scope of the present invention. The exterior side-wall of receptacle 120 is provided with an annular collar 122 which forms a horizontal and outwardly extend-

ing lower lip 124 as best shown in FIG. 6. The receptacle 120 is mounted on frame 100 by four annularly spaced leaf springs 126 suitably connected at their outer end 128 to top wall 104 and bearing at their inner end 130 against the lip 124, thereby resiliently to maintain the receptacle in the vertical position shown.

Although four leaf springs are illustrated, it will be appreciated that a greater or smaller number of such springs could also be used. In addition, other spring forms could be employed with equal facility, such as a helical compression spring, and the springs alternatively could be mounted to the side of the receptacle so that they would bear upon top wall 104 of frame 100.

The springs 126 are selected so that the receptacle is biased upwardly to the FIG. 6 position regardless of the weight of the refuse contained therein. In such position, the bottom of the receptacle is slightly elevated above the bottom panel 22 of the housing, thereby allowing the drawer 24 to be selectively opened or closed when the ram is retracted. However, when the drawer is closed and the ram is in its compaction stroke, the receptacle 120 will be urged downwardly against the bias of the springs into contact or engagement with bottom panel 22. Thus, the entire load is transferred to the panel 22 rather than against the drawer mounting and guide means shown for purposes of illustration in FIG. 5 as an extensible track and roller assembly 140, thereby allowing more positive refuse compaction without distortion or damage to such mounting means. The bottom panel 22 may be reinforced below the compaction chamber in any suitable manner such as by the adjacent channel members 23 shown in FIG. 3. When the ram is withdrawn from the receptacle, springs 126 will urge the receptacle upwardly and out of engagement with the bottom panel 22 so that the drawer 24 may be selectively withdrawn from the housing.

Since it is necessary that the receptacle 120 be in vertical registry or alignment with ram 40 for compaction to occur, a pair of inwardly extending, transversely spaced stops 132 are provided adjacent to bottom wall 22 on upstanding panel 38, as best shown in FIGS. 3 and 4. The stops limit the forward travel of drawer 24 at a position in which the ram is vertically aligned with the receptacle 120. It is to be noted that normally open, interlock switches 135 in the electrical control circuit may be positioned adjacent stops 132, such switches being closed by frame 100 when drawer 24 is in its closed and aligned position, thereby to allow actuation of the compacting unit only when such drawer is contained within the housing.

The receptacle 120 is provided with a disposable plastic liner or bag 142 substantially similar in configuration to the internal walls of such receptacle, such liner preferably being waterproof and self-sealing. The liner is held in place by a cuff 144 disposed over the lip of the receptacle or by suitable clamps (not shown). When the liner 142 is substantially filled with compacted refuse, the liner may be sealed and removed from the compactor to a trash disposal area. It is to be noted that in the absence of a liner or bag 142, the entire receptacle 120 could readily be removed from the drawer frame 100 and carried to a disposal area for emptying.

The operation of the compactor which should be clear from the above description will be hereinafter briefly described. The drawer is pulled outwardly to its

withdrawn or open position shown in FIG. 2, and trash is inserted into the lined receptacle 120. The drawer is then returned to its retracted or closed position with the receptacle in vertical alignment with ram 40, and the drive means is actuated by depressing the start button on control panel 18. The ram 40 then automatically completes its compaction cycle reducing the volume of the trash in drawer 24 to approximately one-fourth of its initial volume. The drawer may then be withdrawn from the housing to its open position for insertion of additional trash to be compacted in the same manner, or if the lining bag is substantially full of compacted trash, such bag may be removed from the receptacle, sealed and placed at a trash disposal area.

I, therefore, particularly point out and distinctly claim as my invention:

1. A refuse compactor comprising a housing, a drawer slidably mounted in said housing for selective movement between a closed position within said housing and an open position at least partially withdrawn therefrom, a refuse receptacle carried by said drawer, the latter having an open bottom, means for resiliently supporting the receptacle on the drawer and normally holding the same above the bottom of the drawer for such slidable movement thereof, and a reciprocal ram in said housing adapted to move into said receptacle to compact refuse therein when the drawer is in its closed position, the ram in its compaction movement forcing the refuse-containing receptacle against the means resiliently supporting the same through the bottom of the drawer for supporting engagement thereof by the bottom portion of the housing to transfer the force of compaction to the latter, retraction of the ram and the resulting removal of the compaction force causing the receptacle to be returned to its normal relatively lifted position by said means resiliently supporting the same to permit the outward sliding movement of the drawer from the housing.

2. A compactor as set forth in claim 1, wherein said receptacle has a peripheral projection, and at least one spring is interposed between said projection and the drawer, thereby resiliently to support said receptacle.

3. A compactor as set forth in claim 2, wherein said receptacle is substantially cylindrical and is supported by plural leaf springs.

4. A compactor as set forth in claim 3, wherein said ram during its compaction movement depresses said springs so that the bottom of said receptacle engages said housing.

5. A refuse compactor comprising: a housing including walls therewithin defining an upper drive chamber and a lower drawer space; a ram normally positioned at the top of said space; drive means in said chamber

including screw means for vertically extending the ram into the drawer space and retracting the same to its normal elevated position; electric motor means in the housing having a driving connection with the drive means in said upper drive chamber for such actuation of the ram; drawer means including a front closure panel, inwardly extending body means, a refuse receptacle removably carried by said body means, and guide means for slidable mounting of said drawer means in said drawer space for selective movement of the former between a closed position in which said receptacle is positioned in the space beneath the ram and a withdrawn open position permitting access to and removal and replacement of the receptacle; and resilient support means for normally holding at least a portion of said drawer means resiliently vertically above the bottom of the housing; the ram when extended by the drive means entering the receptacle to compact refuse therein, with the force of compaction of the refuse by the ram acting against such resilient support means to force said drawer portion supported thereby downwardly against the bottom of the housing, thereby to transfer to the latter the force exerted by the ram in compaction of the refuse, retraction of the ram to its normal position causing return of the drawer means to its normal condition for the in and out sliding movement of the same relative to the housing.

6. A compactor as set forth in claim 5, wherein said resilient means comprises a plurality of springs.

7. A compactor as set forth in claim 5, wherein that portion of the drawer means which is resiliently mounted for relative vertical movement by the compaction force exerted by the ram is the removable refuse receptacle.

8. A compactor as set forth in claim 5, wherein the drive means includes a single screw having a large diameter driven member attached at its upper end, and the electric motor means is mounted vertically in the rear top of the housing with its output shaft having a smaller diameter drive member thereon interconnected with said driven member for direct drive of the screw means and hence the ram.

9. A compactor as set forth in claim 5, wherein the screw means is fully contained within the drive chamber throughout actuation of the ram and cooperates with extensible ram connecting means actuated thereby to produce extension and retraction of the ram.

10. A compactor as set forth in claim 9, wherein the resiliently mounted portion of the drawer means is the removable refuse receptacle.

11. A compactor as set forth in claim 10, wherein said resilient means comprises a plurality of springs.

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