

[54] **REFUSE COMPACTOR**  
 [76] Inventor: **Jerry W. Moon**, 2735 Alveston,  
 Bloomfield Hills, Mich. 48013  
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**Related U.S. Application Data**

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 100/289  
 [51] Int. Cl. ....**B30b 15/66**  
 [58] Field of Search .....100/229 R, 229 A,  
 100/214, 245, 255, 226, 246, 294, 287, 289;  
 312/326, 327, 328; 513/124 B

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 Attorney—Barnes, Kisselle, Raisch & Choate

[57] **ABSTRACT**

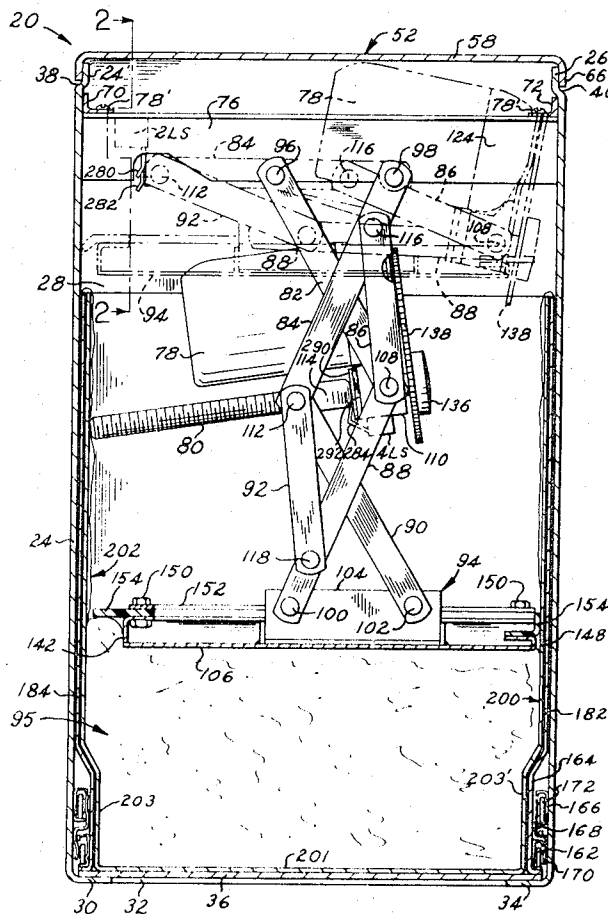
A refuse compactor including a receptacle removably contained within a cabinet wherein refuse is compacted by a ram to a fraction of its normal volume. The refuse is compacted within a specially constructed bag supported by the receptacle and cabinet, permitting the compacted refuse to be removed as a wrapped package for convenient and tidy disposal. The ram includes a refuse-compressing platen actuated through a toggle linkage to which force is applied by a single screw driven by an electric motor coupled to the screw through a reduction drive. The screw and its motor drive train are carried as a unit by the toggle linkage and move bodily therewith to provide a very compact and high ratio force multiplication system of reliable and inexpensive construction. Additional features relating to control circuitry, a safety lock, and bag, receptacle and drawer construction are also disclosed.

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**18 Claims, 17 Drawing Figures**



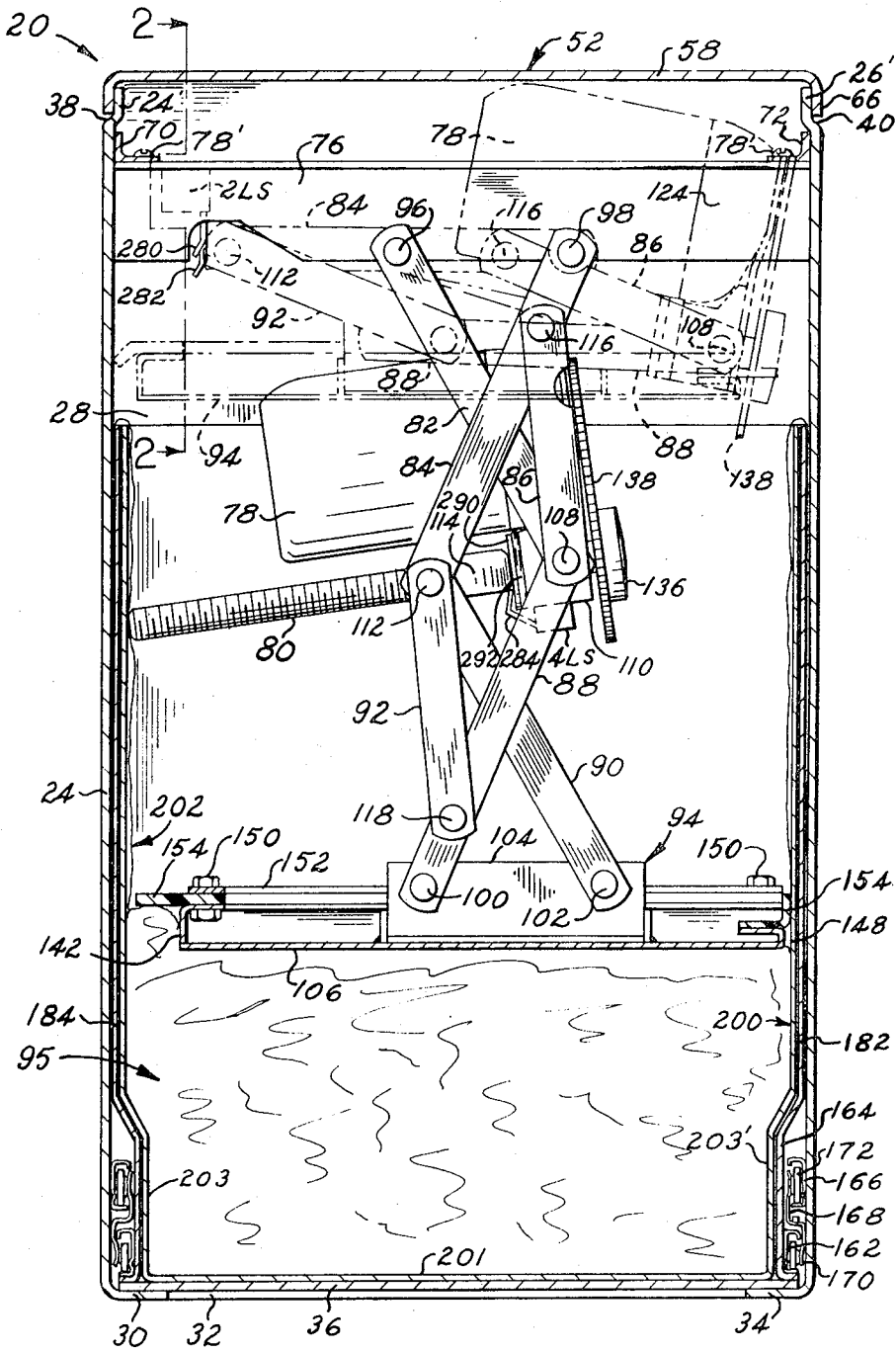
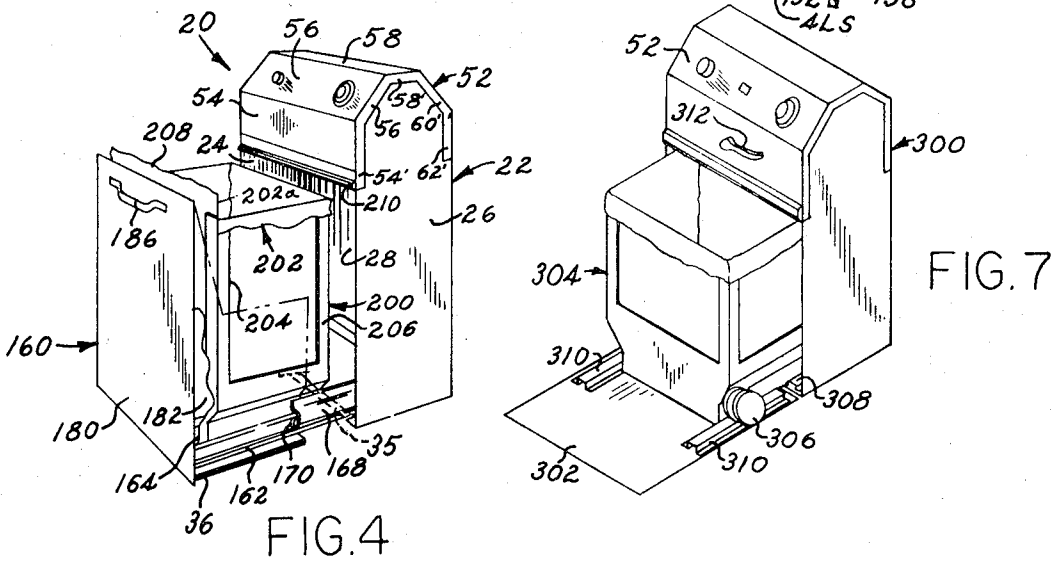
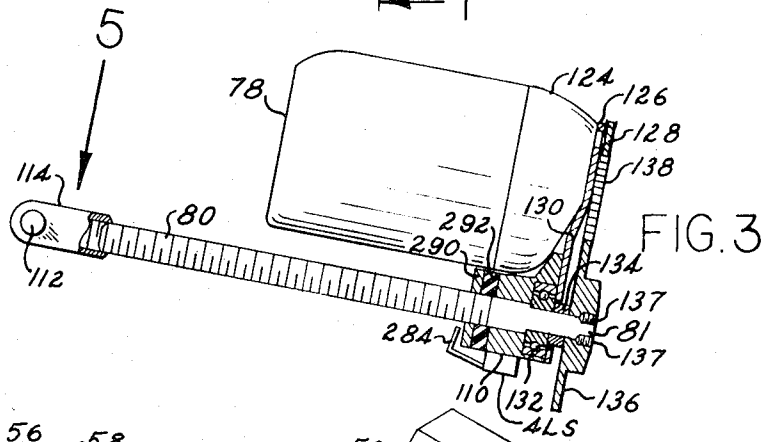
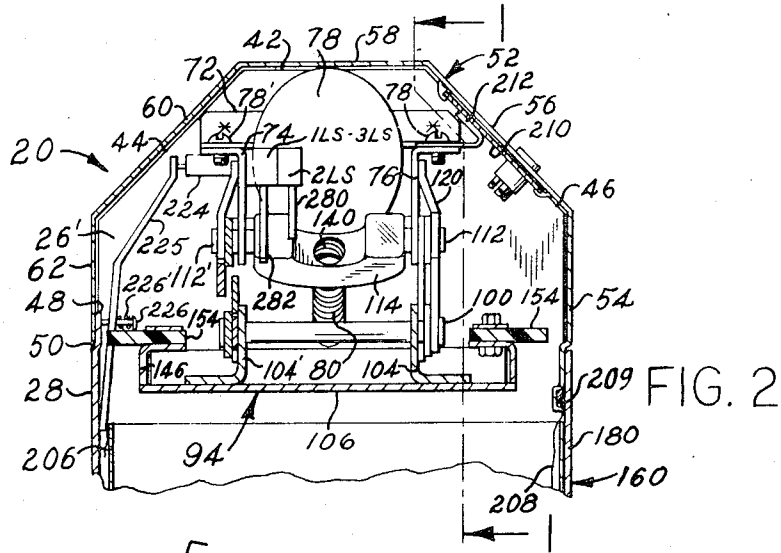


FIG. 1



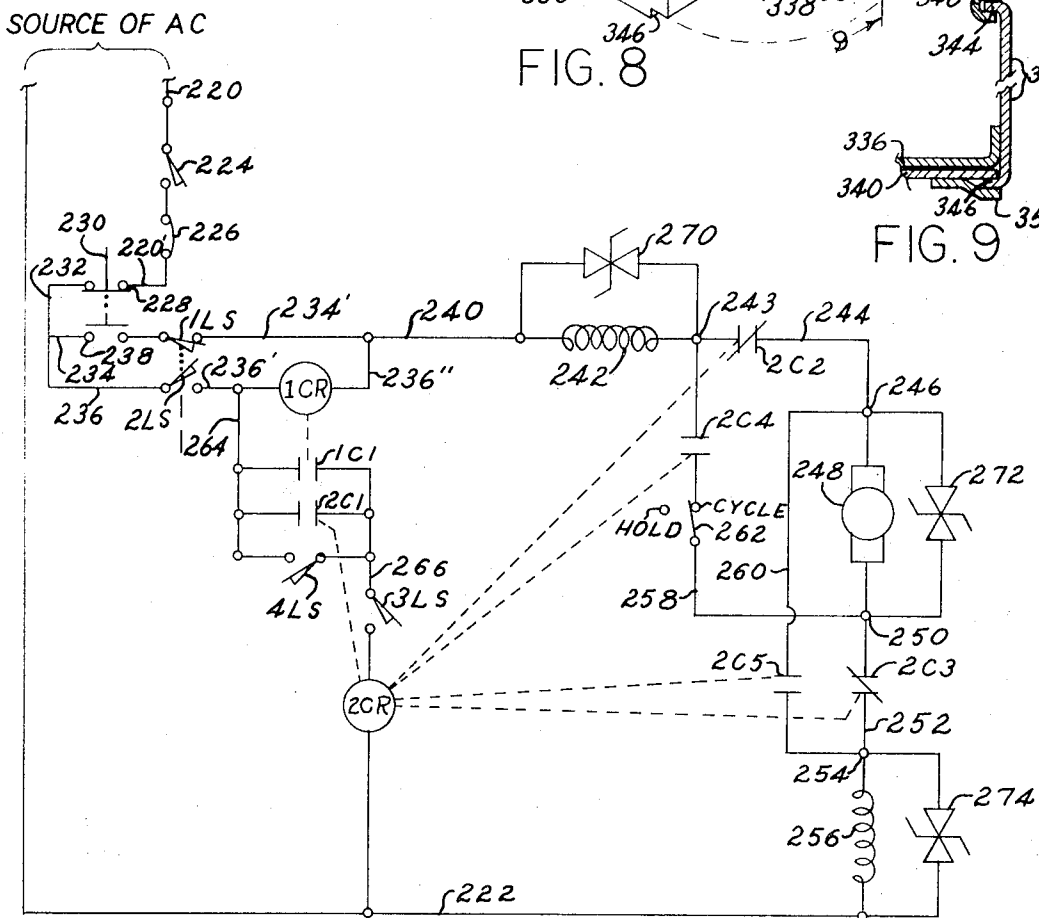
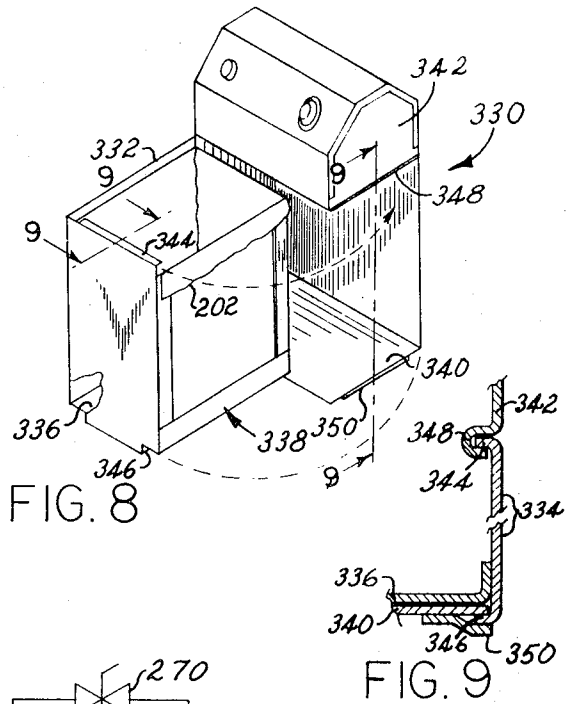
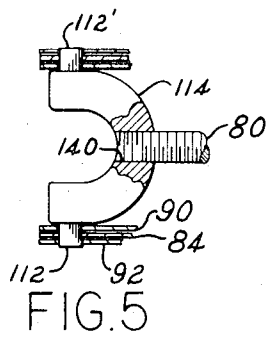


FIG. 6

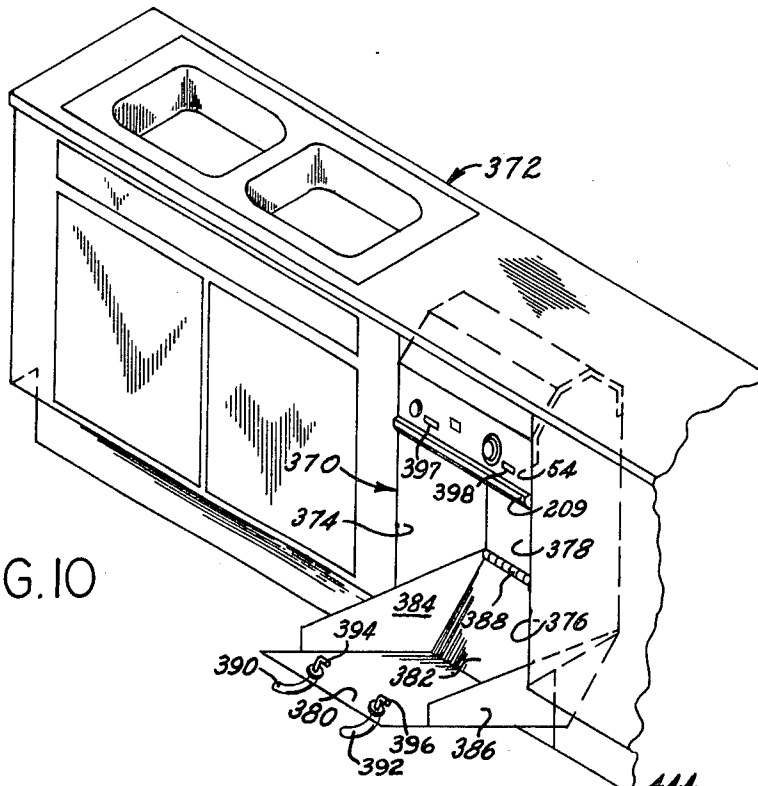


FIG. 10

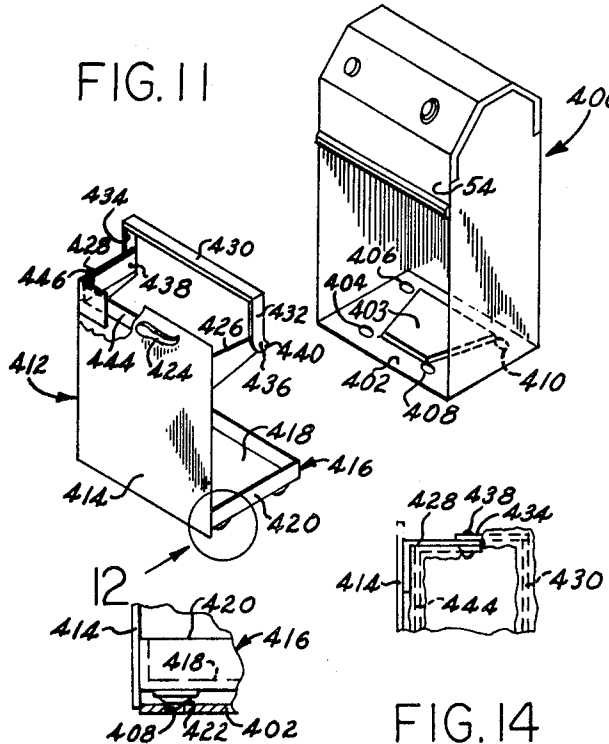


FIG. 11

FIG. 13

FIG. 12

FIG. 14

FIG. 15

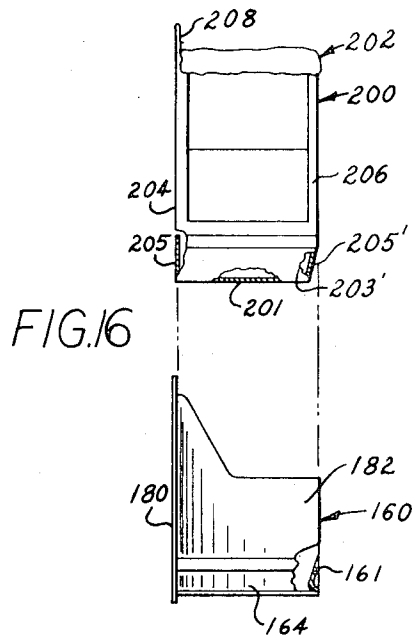
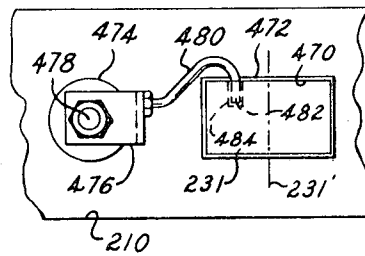


FIG. 17



**REFUSE COMPACTOR**

This is a division of application Ser. No. 148,879, filed June 1, 1971.

This invention relates to an apparatus for crushing, breaking, smashing and/or compacting all types of material and, more particularly, to a domestic refuse compactor which may be installed in a kitchen cabinet structure or provided as a free-standing domestic appliance.

One of the greatest problems facing the world today is solid waste pollution. Previous mechanisms proposed to deal with this problem have fallen short in the areas of cost, cleanliness, odor prevention, size, weight, compaction performance and convenience of removal of compacted material. The shortcomings of such prior art mechanisms have apparently prevented their widespread use in homes, restaurants, business, industry, recreation and other areas of modern life where such equipment is sorely needed.

Accordingly, an object of the present invention is to overcome these shortcomings by providing a solid waste compactor which is technically superior and adaptable to large size industrial and commercial use and yet sufficiently economical when constructed on a smaller scale for domestic use in the home and/or garage where the greatest need exists.

Another object of this invention is to provide a solid waste crusher and compactor having a high ratio of compaction which operates at a variable rate for maximum performance and efficiency.

A further object is to provide such a compactor which is trouble free in use yet simple and low in cost to operate and maintain, which is physically undemanding in all phases of its use and operation and adjustable in force to suit various consumer needs.

Still another object is to provide such a compactor which is fast in operation, free of odors, easy to clean, lightweight, easy to move, and sufficiently compact so that it can be placed in crowded rooms or garages but having a relatively high capacity in the amount of refuse it can receive and hold before emptying.

A further object is to provide such a compactor having a removably mounted receptacle and bag arrangement which permits easy removal and transport of compacted material without dirtying the hands or allowing spillage when removed to storage or a pick-up point.

In general, this invention, as it pertains to trash and garbage compaction, comprises an attractive cabinet which also serves as a housing for a removable receptacle and as a frame for containing the compaction force loads within the unit. The cabinet has a sliding drawer or tilting bin which is located for front access to receive the trash receptacle and provides storage for trash in compacted form which is several times the volume of such material in its uncompacted state. An electrically driven, extensible quadruple five-bar linkage compacting mechanism is housed within the cabinet directly above the drawer or bin. The compacting mechanism carries a pressure platen and operates to raise and lower the platen with increasing force toward the lower end of the down stroke where most compacting force is needed. The trash is compacted within a refuse bag retained by the receptacle, resulting in a disposable package of an easy size to handle, and this is achieved in a complete machine which is no larger than presently used large wastebaskets.

Automatic controls are provided which can be selectively set to either reverse the downtravel of the ram when it reaches a preset load regardless of the height of the trash, or to lock the drive in static position at said peak load or at any desired position so as to hold pressure on the material. The ability to hold peak pressure against the material further improves the compaction ratio and also enables the pressure platen to serve as a hermetic seal for the open upper end of the bag, thereby restricting the availability of oxygen and thus slowing odor-producing decay and preventing the air circulation which otherwise might transmit odors. This "hold" feature also denies fruit flies and other pests access to the material being processed.

The refuse bag is preferably a heavy, leakproof bag which receives the uncompacted trash and in which the trash is stored both prior and subsequent to being compacted. The upper edges of the bag are folded inwardly prior to the last "load" or "charge". This forms a tight seal on the compressed block of refuse material after the unit has compressed the bag with the edges folded in. The bag will hold several days' average accumulation of household trash and wastepaper, cartons, cans, bottles and garbage, in the instance of the home use version, before it needs to be emptied. The fold-and-seal feature makes open storage of the "blocks" feasible while awaiting pickup, thus eliminating the need for trash containers.

The removable receptacle which holds the refuse bag is a combination frame and tray which can serve as a carrying basket. The top edge of displacement, by drive means not further illustrated, in the longitudinal direction of the rear and both sides thereof holds the bag with a simple fold of the bag over the top edges of the basket which preferably are constructed as pivoted carrying handles. The drawer front and the cabinet when closed together clamp upright front edge of the bag therebetween to hold the bag open at the front. Upon opening of the drawer or bin, the top rails of the basket provide handles for easily lifting out the basket with the block of compacted material therein and for carrying it to the storage area where the bag is removed and left to await pickup.

Net compaction results are greatly improved by avoiding the disruption of packed material after compressing, a common fault of existing compactors. Because of the very high compaction force developed, objects in the bag being compacted tend to nest and interlock and hold each to the other, which reduces the tendency of the objects to "spring back" to their original volume. Spring-back is further avoided by the unique feature of maintaining peak pressure on the material until ready to place the next charge of loose material into the bag in the bin. Recycling, if desired, to renew peak holding pressure further improves overall compaction ratio. The compacted material when left under compacting pressure for a period such as over night will continue to gradually and slightly further compress and will take a semipermanent set sufficient to resist spring-back.

Another unique feature is a tray or pan which forms the bottom of the basket and serves to catch any liquid leaking from the bag, thereby keeping the cabinet clean and preventing spillage when emptying. The basket can then be rinsed in the sink or yard, if necessary, prior to installing a new bag. Bag installation into the basket is simplified because the basket is light weight and easily

handled, and thus is readily placed on a table or counter, eliminating the need for the user one down in order to reach down into a bin which can be loaded only at floor level. The basket with the empty bag installed is then slipped into the waiting drawer in the cabinet.

The cabinet is light enough for a woman to easily move and clean. There are no hidden recesses to collect foreign material and make cleaning difficult. Operation is simple, safe and foolproof.

Another feature of this invention is easy and low-cost maintenance and service. All electrical and mechanical parts of the power unit are mounted as a module on one bracket which is readily accessible and easily lifts out of the cabinet as a single lightweight unit. This exposes all wiring and operating parts for visual inspection or repair and allows the power and control assembly to be worked on at eye level on a table or bench. The power and control assembly or module is completely functional when removed from the cabinet and thus operational checkout can be performed prior to reinstallation in the cabinet. The inconvenience and very high cost of house calls by service men can be reduced or eliminated by transporting the entire compactor appliance to a service center, if service is needed. Alternatively, only the power unit may be disassembled from the cabinet merely by removing four screws with a common screw driver for service on site or at a service center, with quick replacement by another module available as another option.

Other objects, features and advantages of the present invention will become apparent from the following detailed description taken in conjunction with the accompanying drawings wherein: is simpler to construct, cheaper to operate and less expensive to maintain than

FIG. 1 is a vertical sectional view taken on the line 1—1 of FIG. 2 of a refuse compactor constructed in accordance with the present invention, the extended and retracted positions of the compacting mechanism being shown in solid and broken lines, respectively, in FIG. 1.

FIG. 2 is a fragmentary vertical sectional view taken on the line 2—2 of FIG. 1 showing the compacting mechanism in raised position.

FIG. 3 is a side elevational view of the motor and drive structure of the compacting mechanism shown by itself with portions broken away and portions shown in center section for greater clarity.

FIG. 4 is a perspective view of the refuse compactor of FIGS. 1—3 illustrating the refuse receptacle and associated slide-mounted drawer in open position.

FIG. 5 is a fragmentary plan view looking in the direction of the arrow 5 in FIG. 3 illustrating the yoke trunnion for connecting the lead screw drive to the compacting linkage mechanism.

FIG. 6 is a schematic wiring diagram of the compactor control circuit of the present invention.

FIG. 7 is a perspective view of a second embodiment of a refuse compactor also constructed in accordance with the present invention illustrating a roller-mounted receptacle cooperating with a downwardly pivoting front door of the cabinet, the unit being shown in open position with the receptacle partially inserted into the cabinet.

FIG. 8 is a perspective view of a third embodiment of the refuse compactor of the present invention wherein the receptacle is carried on an outwardly swinging por-

tion of the cabinet made up of a front panel and side panel interconnected by a bottom panel adapted to support the receptacle for swinging movement thereon.

FIG. 9 is a fragmentary sectional view taken on lines 9—9 of FIG. 8 with the swinging door in closed position and interlocked by edge flanges with the right side and bottom of the cabinet.

FIG. 10 is a fragmentary perspective view illustrating a fourth embodiment of a refuse compactor in accordance with the present invention installed in nested relation in a kitchen cabinet structure and having a bin-type swinging front and bottom panel unit for receiving and supporting the trash receptacle.

FIG. 11 is an exploded perspective view of a fifth embodiment of the refuse compactor of the present invention illustrating a modified receptacle thereof removed from the cabinet.

FIG. 12 is a fragmentary vertical elevation of the portion circled in FIG. 11.

FIG. 13 is a semischematic fragmentary vertical sectional view illustrating the receptacle of FIG. 11 with a refuse bag suspended therein with its edges folded down over the pivoted handle and clamp members of the receptacle.

FIG. 14 is a fragmentary horizontal section taken on line 14—14 of FIG. 13.

FIG. 15 is a simplified perspective view of the receptacle of FIGS. 11—14 illustrating the refuse bag inserted therein prior to folding the edges of the bag over the handle and clamp of the receptacle.

FIG. 16 is an exploded side elevational view of the receptacle and drawer of FIG. 4 with the drawer slides omitted.

FIG. 17 is a fragmentary plan view of a key lock and mechanical interlock associated with a stop-start rocker-type control switch, as viewed from the inside of the control panel of the unit shown in FIGS. 1 and 2.

Referring in more detail to FIGS. 1 and 4, a first embodiment of a refuse compactor in accordance with the present invention is designed as a free-standing unit in which a sheet metal cabinet 22 (FIGS. 1 and 4) serves as the enclosure for the trash receptacle and compacting mechanism, as the structural framework which mounts all the working parts of the compacting mechanism housed therein and as the stress-absorbing container for resisting the compacting force exerted on refuse compacted by the unit. Cabinet 22 is made up of a pair of upright parallel side walls 24 and 26 fixed along their rear edges by full length joints to a rear wall 28, the side and rear walls preferably being welded or die formed integral with one another. The lower edges of walls 24, 26 and 28 are turned inwardly to form flanges 30, 32 and 34 respectively (FIG. 1) and a cross bar 35 is welded to the front ends of flanges 30 and 34 to brace the bottom front of the cabinet (FIG. 4). A flat bottom wall 36 of a drawer, described in more detail hereinafter, is substantially coextensive with the length and width dimensions of cabinet 22 and is adapted to rest on flanges 30, 32 and 34 in the closed position of the drawer.

Side walls 24 and 26, as well as drawer bottom wall 36, provide the primary frame members of the cabinet for taking the reaction stresses developed during trash compaction effected by power extension of the compacting mechanism, and hence these members are preferably constructed of relatively heavy gauge sheet metal, such as 12-gauge steel. Side walls 24 and 26 are



bent inwardly as indicated at 38 and 40 (FIG. 1) to form a cover-receiving appliance offset along their upper three edges 42, 44, 46. As best seen in FIGS. 2 and 4, the upper ends of walls 24 and 26, in addition to being offset, are each beveled at the corners to form a horizontal uppermost central edge 42 (FIG. 2) extending for about a third of the width of the side wall, and two 45° downwardly sloping rear and front edges 44 and 46. Rear wall 28 terminates at an upper edge 48 (FIG. 2) which extends horizontally from side to side about one inch above the elevation of bends 38 and 40, rear wall 28 likewise being bent inwardly at 50 at the elevation of bends 38 and 40.

A removable cover 52 (FIGS. 1, 2 and 4) forms the top wall of cabinet 22 and consists of a vertical front panel 54, a rearwardly sloping and suitably apertured control panel 56, a horizontal top panel 58, a forwardly sloping rear panel 60 and a vertical rear panel 62, each of these panels having right angle flanges 54', 56', 58', 60', 62', respectively, at their side edges (FIG. 4) which are dimensioned to slip closely over inwardly offset portions 24' and 26' of the upper edges of the side walls of the cabinet. Cover 52 may be detachably fastened to the side walls by simple sheet metal screws (not shown).

The compacting mechanism of compactor 20 is best seen in FIGS. 1-3 and 5 and is detachably mounted to the upper ends of side walls 24 and 26 so as to nest in its retracted position within the upper confines of cabinet 22. Referring to FIGS. 1 and 2, a pair of right angle brackets 70, 72 are welded to the inner surface of walls 24 and 26, respectively, near the upper edges thereof to form a strong support for a pair of parallel, horizontally extending right angle beams 74, 76. The horizontal upper flanges of beams 74 and 76 abut the undersides of brackets 70, 72 and are secured by four screws 78 which extend vertically and have their slotted heads exposed above the mounting brackets. Beams 74 and 76 are spaced horizontally apart as shown in FIG. 2 to permit nesting of an electric motor 78 and associated drive train components of the compacting mechanism when the same is in its retracted position shown in broken lines in FIG. 1 and in solid lines in FIG. 2.

The compacting mechanism comprises an extensible linkage herein illustrated by way of a preferred example as a system of two identical extensible linkages laterally spaced from one another fore and aft of the cabinet. Front beam 76 serves as the fixed anchor for one linkage set and rear beam 74 serves as the fixed anchor for the other linkage set. Each of the front and rear sets of linkages consists of two identical five-bar linkages wherein the fifth bar of each linkage consists of a variable length element which is common to both of the five-bar linkages; i.e., a threaded screw 80 shown by way of a preferred example herein, for bidirectionally applying force to the linkage to extend and retract the same. The upper five-bar linkage of the front set thus consists of beam 76, two substantially equal length cross links 82 and 84, a stabilizer link 86 and screw 80. The lower five-bar linkage of the front set likewise consists of screw 80, two substantially equal length cross links 88 and 90, a stabilizer link 92 and a platen assembly 94 which serves as the movable ram for applying compaction force to refuse 95 contained within the receptacle of compactor 20. Links 82 and 84 are pivotally mounted at 96 and 98 to beam 76 to provide a first

age. Links 88 and 90 are pivoted at their lower ends at 100 and 102 respectively to a right angle bracket 104 which in turn is welded to flat bottom plate 106 of the platen assembly 94. Pivots 100 and 102 thus also have a fixed spacial relation relative to one another, but move up and down with platen assembly 94 in response to contraction and extension of the linkage assembly. The adjacent ends of links 82 and 88 and the lower end of stabilizer link 86 are interconnected in common pivotal relation by an axle stud 108 threadably secured to a right-hand trunnion (as viewed in FIG. 1) in the form of a bearing block 110 in which screw 80 is journaled. The adjacent ends of links 84 and 90, as well as the upper end of link 92, likewise are journaled by a common pivot stud 112 secured to a left-hand trunnion 114. The upper end of stabilizer 86 is pivoted by a stud 116 to link 84 slightly below pivot 98, and similarly the lower end of stabilizer link 94 is pivoted by a stud 118 to link 88 slightly above pivot 100.

The crossed links 82 and 84 and 88 and 90 thus form a toggle linkage operating from a fixed, first pivot means at 96 and 98 to raise and lower a second pivot means (platen assembly 94) as a result of force applied through the variable length, third pivot means comprising pivots 108 and 112 carried on the screw trunnions. Links 92 and 86 together with links 84 and 88 form a parallelogram linkage for stabilizing the direction of travel of platen assembly 94 so that it moves through a vertical path of travel while being maintained generally in parallel relation with beams 76 throughout its travel from the fully extended position thereof shown in solid lines in FIG. 1 to the retracted position thereof shown in broken lines in FIG. 1 (and in solid lines in FIG. 2). The rear linkage set is identical to the front linkage set and therefore those elements of the rear set which appear in the drawings are indicated by the same reference numerals raised by a prime and the description thereof not repeated, it being understood that upper pivot 98' of the rear set is secured to rear beam 74 in fore and aft alignment with pivot 98. Pivot 96 is a shaft which extends through both beams 76 and 74 to serve both sets of linkages. Likewise, the lower pivots 100 and 102 are shafts which extend through and are secured by brackets 104 and 104' to plate 106 as best seen in FIG. 2.

The fixed pivots 98 and 98' are preferably short stud shafts in order to provide clearance therebetween to allow the motor assembly to retract into the space between beams 74 and 76. Stud 98 and 98' are additionally supported by outboard bearing brackets 120 and 120' (shown only in FIG. 2) which are welded at their upper ends to the associated beams 76 and 74 and bent downwardly and outwardly to provide balanced support for pivot studs 98 and 98'.

As best seen in FIG. 3, the drive for the compacting mechanism consists of electric motor 78 which is preferably a conventional reversible universal AC-DC fractional horsepower motor, such as that used for portable drills, having a conventional gear reduction unit encased in a die-cast housing 124 attached to the front end of the main motor housing with an output shaft 126 protruding therefrom to which is affixed a drive sprocket 128. Motor 78 and associated gear reduction unit 124 are cantilever mounted on a rigid bracket 130 which in turn is secured at its lower end to bearing block 110. Block 110 has a bearing cavity in its right-hand face containing a ball bearing assembly 132

through which a reduced diameter extension 81 of shaft 80 is journaled. Bracket 130 thus serves as a retainer for bearing 132. A thrust collar 134 is mounted between the inner face of bearing 132 and the inner face of a large diameter chain sprocket 136 which in turn is suitably fixed, as by set screws 137, to a reduced diameter extension 81 of shaft screw 80 to rotatably drive screw 80. This shaft journal arrangement thus provides a bearing adapted to take radial thrust as well as axial thrust forces in both directions of the axis of screw 80. Motor 78 is drivingly connected to sprocket 136 by suitable link chain 138 trained over sprockets 128 and 136.

The left-hand trunnion of the drive mechanism is best seen in FIGS. 2 and 5 and consists of the semicircular yoke 114 having an internally threaded bore 140 threadably receiving lead screw 80 therethrough. Pivot studs 112 and 112' are affixed to the opposite ends of yoke 114, and thus are spaced to the left of bore 140 as viewed in FIGS. 2 and 5. This arrangement allows screw 80 to be shortened, thereby keeping the path of travel of the left-hand end of the screw generally within the confines of the path of travel of platen assembly 94 and clear of cabinet side 24.

Platen assembly 94 has a left side wall 142 (as viewed in FIG. 1), front and rear walls 144 and 146 (FIG. 2), and a right side wall 148 (as viewed in FIG. 1). Right wall 148 is recessed centrally thereof to provide clearance for block 110 in the retracted position of the compacting mechanism. Each of the walls 142, 144, 146 and 148 has an inturned horizontal flange on which is mounted by means of fasteners 150 and retaining strips 152 a rectangular wiper 154. Wiper 154 has a large central aperture so as to be clear of the toggle mechanism in its retracted position and protrudes horizontally outwardly around the upper edge of platen assembly 94 so as to have a light wiping contact with the inner surface of refuse bag 202 suspended in the receptacle or basket 200. Preferably wiper 154 is constructed of rubber or other suitable flexible and resilient material so that such wiping contact is maintained should the platen assembly 94 move horizontally in the plane of the drawing as viewed in FIG. 1 a short distance, for example, one inch during its 12 inches of vertical travel, between its retracted and extended positions. Wiper 154 also will accommodate whatever slight horizontal movement fore and aft of the unit may occur due to tolerance stack-up in the linkage as well as whatever installation misalignment may result from manufacturing tolerance variations. Wiper 154 thus serves to keep loose, small pieces of trash or refuse from moving up around the side edges of platen 106 as it descends during a compacting stroke.

Compactor 20 has a front-opening drawer assembly 160, best seen in FIG. 4, wherein the drawer is shown in open position out in front of cabinet 22. Drawer 160 may be mounted for approximately horizontal sliding movement between its open position, as shown in FIG. 4, and its closed position, as shown in FIG. 2, by a pair of conventional drawer slides, such as disclosed in U.S. Pat. No. 3,537,390. Each of the slides thus may comprise a track 162 affixed to an indented portion 164 of the right side wall of drawer 160 (FIG. 1), a track 166 fixed to the inner surface of wall 26, and a roller carrier 168 having journaled thereon rollers 170 and 172 which roll in tracks 162 and 166 respectively.

Drawer 160 is made up of a front panel 180 joined at its lower edge to horizontal bottom wall 36, the joint between front wall 180 and bottom wall 36 being reinforced by side walls 182 and 184 (FIGS. 1, 4 and 16).

Right-hand side wall 182 is shown in solid lines in FIGS. 4 and 16 fragmentarily and the complete outline of side wall 182 is indicated by broken lines in FIG. 4. Left-hand side wall 184 is the same as right-hand wall 182. Drawer 160 is provided with a handle 186 for pulling the drawer open and a pushing it shut, and a suitable latch may be provided if desired to lock the drawer in closed position. Preferably the tracks of the drawer slides are mounted at a slight incline (rearwardly downwardly) of approximately 2 degrees to insure that the drawer is gradually lowered as it is pushed in and when it is closed, bottom wall 36 rests on flanges 30 and 34 of the side walls so that the drawer slides do not carry the compression force exerted by the compacting mechanism.

Receptacle 200 is preferably constructed in the form of an open rectangular framework to serve as a lightweight basket for receiving the paper refuse bag 202 therein. Basket 200 has an imperforate bottom panel 201 (FIG. 16) enclosed on all four sides by relatively short, upright left and right side walls 203, 203' and front and rear walls 205, 205', respectively, to form a liquid-tight drip pan at the bottom of the basket. Basket 200 has four upright corner posts, two posts 204 at the front and two posts 206 at the rear. The upper ends of the front and rear posts are connected by side cross pieces and the two rear posts are connected at their upper ends across the back of the basket by another cross piece (not shown). However, there is no cross piece at the front between the upper ends of the front posts 204 in order to facilitate removal of bag 202 after the same has been filled with compacted trash and hence has a tendency to bulge slightly outwardly. The basket is illustrated herein is thus made of an open framework, preferably of metal, but also may be made of suitable plastic materials in order to make the basket lightweight and easy to handle.

Basket 200 is dimensioned to seat flat on bottom wall 36 of drawer 160 and is just slightly smaller than the interior space defined laterally between the side walls of cabinet 22, and fore and aft by rear wall 28 of the cabinet and front wall 180 of drawer 160 when the drawer is in closed position. Thus, in accordance with one feature of the present invention, it is these side walls of the drawer and cabinet which are relied upon to restrain expansion of paper bag 202 when trash is being compacted therein, rather than the structure of the basket itself. Basket 200 is not fastened to drawer 160, but rather merely rests loosely on bottom wall 36 thereof with the front uprights 204 of the basket adjacent the inner surface of panel 180. To assist in a snug seating of basket 200 in drawer 160, the rear wall 205' of the integral drip pan of the basket is inclined rearwardly and upwardly (FIG. 16) at a locking angle of about 5°. Drawer 160 is provided with a matching short rear wall 161 likewise inclined to form a light friction locking relationship when basket 200 is fully inserted downwardly into drawer 160, the basket being readily released as soon as the basket is lifted slightly upwardly in drawer 160.

Preferably bag 202 is a suitable refuse bag made of heavy paper lined with plastic or other liquidtight material having upper side and rear edges which protrude

above the upper side and rear edges of basket 200 and which can be folded downwardly thereover as shown in FIGS. 4 and 16 to thereby removably suspend the bag in the basket. As shown in FIG. 4, bag 202 is provided with preslits or cuts 202a formed at the front corners of the bag so that front edge 208 of the bag may be left standing upright when the side and rear edges of the bag are folded down. Thus when drawer 160 is pushed closed, edge 208 of the bag will be clamped upright between the upper edge of panel 180 of the drawer and a sponge rubber clamping strip 209 (FIGS. 2 and 4) affixed to cabinet 22 at an elevation just high enough to clear the upper end of the basket. This insures that bag 202 is not dragged down by the friction of wiper 154 as trash is being compacted in the bag.

Compactor 20 is provided with a control circuit shown schematically in FIG. 6 for operation by control switches mounted on a control panel 210 (FIG. 2). Panel 210 is affixed by a bracket 212 to front beam 76 so that all the switches and electrical circuitry are removable as a unit or module with the compacting mechanism. Front panel 56 of cover 52 is apertured as required to accommodate the controls provided on panel 210 so that the exterior actuators or knobs of the controls protrude through panel 56 for access by the operator.

The control circuitry includes a pair of main motor energizing leads 220 and 222 connected across a suitable source of current, such as 110 volt or 220 volt AC. A safety interlock switch 224 (mounted on rear beam 74 as seen in FIG. 2) is connected in series in lead 220, as is a conventional circuit breaker 226 which may be of the automatically resetting or manual resetting type. Interlock switch 224 is operated by a lever 225 (FIG. 2) pivoted clockwise on a pin 226 against the bias of a spring 226' when its lower arm 225' is pressed against wall 28 by the rear upper edge of basket 200 as drawer 160 is pushed into its fully closed position. One set 228 (the "stop" set) of contacts of a commercially available rocker-type, three-position "start-stop" switch 230 is connected by the "stop" jumper of switch 230 when in neutral and "start" positions to lead 220' and a lead 232 which in turn is connected to the parallel leads 234-234' and 236-236'-236''. The other ("start") set of contacts 238 of switch 230 and a limit switch 1LS are connected in series in lead 234, and a second limit switch 2LS and the coil of a relay 1CR are connected in series in lead 236. A lead 240 is connected at one end to the junction of leads 234 and 236'' and at the other end to one terminal of a field winding 242 of motor 78. A set of normally closed contacts 2C2 and a lead 244 connect the other terminal of winding 242 to one terminal 246 of the armature winding 248 of motor 78. The other terminal 250 of winding 248 is connected by a set of normally closed contacts 2C3 and lead 252 to one terminal 254 of another field winding 256 of motor 78. The other terminal of winding 256 is connected to lead 222.

A reversing lead 258 is connected between terminal 243 of winding 242 and terminal 250 of winding 248 and an associated reversing lead 260 is connected between terminal 254 of winding 256 and terminal 246 of winding 248. Lead 258 has a normally open set of contacts 2C4 and a "hold-cycle" switch 262 in series therein, and lead 260 has a set of normally open contacts 2C5 connected in series therein.

A relay energization circuit is connected across leads 236'' and 222 and comprises a lead 264 connected to lead 236' between limit switch 2LS and relay coil 1CR and in series with three sets of contacts connected in parallel with one another between lead 264 and a lead 266. These three sets of contacts consist of a normally open set of relay contacts 1C1 closed by energization of coil 1CR in response to a given value of excess current flowing through lead 236, a normally open set of contacts 2C1 closed by energization of a relay coil 2CR connected in series in lead 266, and a limit switch 4LS. Another limit switch 3LS is connected in series with coil 2CR and lead 266. Thus coil 2CR when energized closes contacts 2C1, 2C4 and 2C5 while simultaneously opening contacts 2C2 and 2C3. Commercially available arc suppressors 270, 272 and 274, such as those sold under the trademark THYRECTOR by General Electric, are connected respectively in parallel across motor windings 242, 248 and 256.

The operation of the compactor 20 will be understood from the following description of the control circuit for the compactor. First the basket 200 with the empty refuse bag 202 installed therein is placed in position in drawer 160 and then drawer 160 closed. The last increment of movement of the drawer into closed position closes interlock switch 224. Operation of the machine is then controlled by manipulating start-stop switch 230 and cycle switch 262. Start-stop switch 230 is a rocker-type switch with a maintained "stop" position, a neutral position and a momentary "start" position. As is well understood in the art, switch 230 has a wide-angle, V-shaped operating knob or rocker 231 (FIG. 17) pivotable about an axis 231' extending parallel to panel 210. The rocker is stable in a middle, neutral position wherein contacts 228 are held closed and contacts 238 are open. When the "stop" side of rocker 231 is depressed, rocker 231 is pivoted clockwise, thereby opening contacts 228. The rocker will remain latched in the depressed stop position. If the "start" side of rocker 231 is depressed, while it is either in the "stop" or "neutral" position, rocker 231 will be pivoted counterclockwise, thereby first unlatching the rocker and allowing contacts 228 to be closed and then closing contacts 238 as the rocker reaches the other limit of its travel. However, rocker 231 must be held by finger pressure to keep it in "start" position, and it will return to the middle neutral position if such pressure is removed.

To start a compacting cycle of machine 20, the operator presses switch 262 to either the "cycle" or "hold" position. If switch 262 is pressed to the "cycle" position (closed) and then the operator depresses the "start" side of switch 230 and holds it down for about 2 seconds, contacts 238 are thereby closed so that power can flow to the motor windings via lead 220, switch 224, breaker 226, contacts 228, lead 232, contacts 238, switch 1LS, leads 234 and 240, winding 242, contacts 2C2, lead 244, winding 248, contacts 2C3, winding 256 and lead 222. This energizes motor 78 to rotate clockwise, causing lead screw 80 to rotate and begin drawing pivots 108 and 112 toward one another to thus begin extending the compacting mechanism on its downstroke from the completely retracted position shown in phantom in FIG. 1. As the left-hand trunnion 114 begins to move downwardly away from the actuating arm 280 (FIG. 2) of limit switches 2LS and from the adjacent actuating arm 282 of a combined double

throw unit containing limit switches 1LS and 3LS, the sequential positions and differing lengths of these arms first causes switch 2LS to close, establishing an enabling shunt around contacts 238 and switch 1LS relative to the motor windings. The next slight downward movement of trunnion 114 causes limit switch 3LS to close, and the further slight downward movement then causes limit switch 1LS to open. Motor energizing current now flows through lead 236, switch 2LS and coil 1CR so that the operator can now release pressure from the "start" side of switch 230, allowing its spring to open contacts 238 without thereby de-energizing the motor.

Continued downward movement of the compacting mechanism causes platen 106 to engage and compress the trash or refuse downwardly in bag 202. When the mechanism in its downstroke encounters a given upper limit of resistance from the compressed trash, correlated to a given maximum value of current draw by motor 78, this amount of current causes coil 1CR to close its contacts 1C1, thereby energizing relay coil 2CR via lead 264, contacts 1C1, lead 266 and switch 3LS. Energization of relay coil 2CR closes contacts 2C1 which provides a hold-in shunt around contacts 1C1 for coil 2CR. Energization of coil 2CR also simultaneously closes contacts 2C4 and 2C5 while opening contacts 2C2 and 2C3, thereby reversing the power connections to armature winding 248 and thus reversing the direction of rotation of motor 78. The compacting mechanism will now be driven on its upstroke to return to the retracted position thereof.

As trunnion 114 approaches the end of its upstroke, it will sequentially engage the aforementioned switch arm 282 of limit switch 1LS-3LS and arm 280 of switch 2LS to sequentially close switch 1LS, then open switch 3LS and then open switch 2LS. The closure of switch 1LS conditions the circuit for the next cycle. The opening of switch 3LS de-energizes relay coil 2CR to thus close contacts 2C2 and 2C3 and open contacts 2C4 and 2C5 to return the motor connections to the clockwise or the down direction. However, by the time it takes the relay coil 2CR to effect this action, switch 2LS will have been opened, de-energizing motor 78 so that it stops in the full-up position of the compacting mechanism (bearing in mind that contacts 238 are still open).

Thus, upon completion of one cycle as described above, the initially loose fill of trash will have been compacted in bag 202 and platen 106 returned to its fully retracted position so that it is clear of the top of basket 200. Drawer 160 can now be opened for receiving another load of uncompactied trash. The compacting cycle then can be repeated by the operator again pushing start switch 230 as described above.

At any time desired, typically after each loading, unless an immediate reloading is desired, or at the end of a day's use, after say two or three loads of trash have been successively compacted in bag 202, compactor 20 can be conditioned for tighter "setting" of the trash. To do this, the operator merely pushes the rocker of hold-cycle switch 262 to the "hold" position in which it maintains the switch contacts open. The operator then pushes start button 230 to begin the downstroke portion of the compacting cycle. The first half of the sequence described above is repeated; i.e., motor 78 is energized in the clockwise direction to drive pressure platen 106 downwardly until the resistance of the trash

being compacted reaches the aforementioned upper limit, thereupon causing relay contacts 1C1 to be closed by the current sensing coil 1CR. This again energizes relay coil 2CR to thus open the contacts 2C2 and 2C3 and close contacts 2C4 and 2C5, thereby disabling the "downstroke" connections to winding 248 and making the "upstroke" connections thereto. However, since switch 262 is in its "hold" or open position, the reversing circuit is still disabled and hence the motor is stopped rather than being energized in the reverse direction. The compacting mechanism will thus be stopped at the maximum pressure point in its downstroke and will remain at this position because of the very high force multiplication ratio between the motor armature and compacting linkage; that is, the force exerted upwardly by the compacted trash on platen 106 is not sufficient to overcome the resistance of the lead screw 80 and associated drive train components. The mechanism thus is effectively locked down at the normal reversing point in its cycle, thereby maintaining full pressure on the compacted load until such time as the operator, say after breakfast the next morning, actuates switch 262 to the "cycle" position. The motor then will be energized in the reverse direction to retract and shut off the compacting mechanism, thereby completing the full cycle of downstroke and upstroke.

In the event that the amount of trash in bag 202 is insufficient to create a resistance force equal to said given current draw value prior to completion of a full downstroke of platen 106, and thus insufficient to cause a pressure trip reversal of the compacting mechanism, the compacting mechanism will continue to drive platen 106 downwardly until it is fully extended. This will cause left-hand trunnion 114 to travel all the way in on screw 80 until it strikes the actuating arm 284 of limit switch 4LS mounted on bearing block 110 (FIG. 1) to thereby close the switch. This will energize relay coil 2CR even though contacts 1C1 are still open due to motor current not having risen to the setting of coil 1CR. Closure of switch 4LS thus will effect reversal of the motor to reverse rotation of drive screw 80. As trunnion 114 starts to move away from block 110, switch 4LS will reopen, but the now closed contacts 2C1 will hold relay 2CR "in" to enable the upstroke to be completed as described above.

It is to be understood that limit switches 1LS, 2LS and 3LS may be either a compound switch with internal phasing driven from a single actuator, or two or more independent switches and external actuators phased to provide proper sequencing. Also, the circuit arrangement described by way of example in FIG. 6, while presently preferred, may be varied as to components and arrangement to accomplish the function intended.

In the event that switch 4LS should malfunction, trunnion 114 will continue to be drawn toward block 110 until it engages a metal plate 290 (FIG. 3) which is adhesively secured to a rubber bumper 292, which in turn is adhesively secured to block 110. As bumper 292 is compressed, it will increase the load on motor 78 until motor current reaches the aforementioned predetermined reversing value, thereby causing relay 1CR to close contacts 1C1 to thereby energize the reversing relay to reverse the direction of rotation of the motor. Although switch 4LS could be eliminated, and bumper 292 relied upon to effect full stroke reversal of the compacting mechanism, it is preferred to use limit

switch 4LS for this purpose to reduce the wear on the bumper and to rely on the bumper only as a malfunction safety device.

FIG. 7 illustrates a second embodiment 300 of a refuse compactor also constructed in accordance with the present invention in which the construction differs from compactor 20 only with regard to the drawer and basket arrangement. Compactor 300 has a fixed bottom wall (not shown) corresponding to the drawer bottom 36 of compactor 20, which is secured in stationary relation to flanges 30 and 34 of the cabinet side walls. Front panel 302, instead of being part of a drawer, is hinged along its lower edge to the front edge of the bottom wall of the cabinet so as to pivot about a horizontal axis between a horizontal down position (as shown in FIG. 7) to an upright position in which panel 302 closes the front of the cabinet. With this arrangement, a modified basket 304 may be constructed similar to basket 200 described previously except that four rollers 306 are added, two of the rollers being rotatably mounted on each side of the drip pan portion of the basket which are adapted to roll on two parallel guide tracks 308 mounted on the side edges of the cabinet bottom wall and two parallel tracks 310 mounted on the inside surface of panel 302. Tracks 310 thus serve as extensions of tracks 308 when panel 302 is in its open horizontal position. Such roller basket and track arrangements are well known in the art, particularly in connection with household automatic dishwashing machines and hence need not be described in further detail herein. It is also to be understood that suitable depressions may be provided in tracks 308 which register with rollers 306 when basket 304 is fully inserted into the cabinet so that the bottom of the basket seats firmly on the floor of the cabinet in the closed position of the cabinet, whereupon the bottom wall of the cabinet supports the bottom wall of the basket against the forces exerted during compaction of trash in the basket. A suitable latch 312 is provided on cover 52 to lock panel 302 in its upright closed position after a basket 304 with a bag 202 therein has been loaded into the cabinet of compactor 300.

FIG. 8 illustrates a third embodiment of a compactor 330 also constructed in accordance with the present invention in which the sliding drawer 160 of compactor 20 is replaced by a swinging door arrangement. Compactor 330 thus has a front panel 332 rigidly connected to a right side panel 334 and a horizontal bottom panel 336 connected along its right and front edges in rigid relationship to panels 334 and 332, respectively. A modified basket 338 is provided which is constructed similarly to basket 200 except that it is contoured to seat on the bottom wall or panel 336, and no side indentations need be provided to accommodate the drawer slides embodied in compactor 20. Basket 338 receives bag 202 in the same fashion as basket 200. Panel 332 is suitably hinged along its left vertical edge to the front vertical edge of the left wall 24 of the cabinet of compactor 330 so that the door can be swung about a vertical axis from the open position shown in FIG. 8 to a closed position (as indicated by the broken lines in FIG. 8). In its closed position, panel 334 forms a portion of the right side wall of the cabinet and panel 332 serves as the front door of the cabinet.

In order to interconnect panel 334 with bottom wall 340 and with the fixed upper portion 342 of the right side wall of the cabinet, panel 334 is provided with in-

wardly bent flanges 344 and 346 (FIGS. 8 and 9) along the top and bottom edges respectively of the panel. The lower edge of side panel 342 is bent inwardly and then outwardly to form a channel portion 348 (FIG. 9) which receives flange 344 in the closed position of the swinging door. Likewise, bottom wall 340 has a downwardly offset retainer strip 350 affixed to the underside thereof adjacent its right edge to define therewith a lower slot or groove for receiving flange 346 of panel 334 in the closed position of the door. Thus approximately half of the reaction forces opposing the compaction force developed by the compacting mechanism of unit 330 are taken in tension through panels 334 and 342 as a result of the tongue-in-groove connection of the right door panel 334 with the cabinet panels. As in the previous embodiments, basket 338 is adapted to removably seat on the door bottom so that it can be readily lifted and removed when the door is in its open position.

FIG. 10 shows a fourth embodiment of a refuse compactor 370 which in most respects is similar to compactor 20 except that it is particularly adapted for built-in applications wherein the cabinet of the unit would be suspended from adjacent structure of a conventional cabinet 372 as illustrated in FIG. 10 for use in home kitchens, restaurants, lunch counters and the like. Compactor 370 has one-piece side walls 374 and 376 and a rear wall 378 similar to walls 24, 26 and 28 of compactor 20 but without the bottom flanges 30 and 34 thereof. In lieu of drawer 160, cabinet 370 has a downwardly opening, flour bin type front panel 380 fixed at its lower edge to a bottom panel 382, with reinforcing side gusset panels 384 and 386 suitably secured to the front and bottom panels 380 and 382. The rear edge of bottom panel 382 is hinged by a piano-type hinge 388 to the lower edge of bottom wall 378 so that the door pivots about a horizontal axis from its down, open position shown in FIG. 10 upwardly to a closed position wherein the upper edge of panel 380 overlies and engages the clamping strip 210 of compactor 370. Suitable latches and interlocks are provided to connect panel 380 to the front panel 54 of the cover so that the cabinet in closed position is adapted to take the compacting forces as well as lateral stresses imposed by bulging of the refuse bag during compaction. For example, a pair of locking handles 390 and 392, which may be of the type shown at 20 or 21 in U.S. Pat. No. 3,353,478, are suitably mounted on panel 380 and have tangs 394 and 396 respectively extending perpendicularly to the rotational axis of the handles. Tangs 394 and 396 are adapted to pass through elongated slots 397 and 398 respectively in front panel 54 when the handles are oriented as shown in FIG. 10. When panel 380 is pivoted upright to closed position, handles 390 and 392 are rotated 90° to latch panel 380 in closed position to panel 54. A removable bag and basket such as bag 202 and basket 338 is used with compactor 370.

FIGS. 11-15 inclusive illustrate a fifth embodiment of a compactor 400 also constructed in accordance with the present invention. Compactor 400 has a cabinet and compacting mechanism constructed identically to compactor 20 except for the bottom wall of the cabinet, the other principal modification being in the bag, basket and drawer structure. Referring to FIG. 11, the bottom wall 402 of compactor 400 is provided with four pockets 404, 406, 408, 410 arranged with the rear pockets 406 and 410 spaced farther apart laterally of

the cabinet than the front pockets 404 and 408. As shown in FIG. 12, wherein front pocket 408 is illustrated, the pockets may be in the form of drilled holes in wall 402 or they may be hemispherical indentations (not shown) or other readily formed shapes.

In accordance with a further feature of the invention, compactor 400 has a combination drawer, basket, drip pan and handle assembly 412. Assembly 412 comprises an upright front panel 414 having a drip pan 416 made up of an imperforate bottom wall 418 and four short upright side walls 420, the pan being fixed along its front edges to panel 414, as best seen in FIG. 12. A set of four suitable ball casters 422 are mounted on the underside of wall 418 so as to register with pockets 404-410 when drawer basket 412 is fully inserted into the cabinet of compactor 400. In this position, the roller ball of each caster drops into its associated pocket and thus serves as a detent to hold the drawer securely positioned against lateral movement within the cabinet. A suitable latch operated by a handle 424 is mounted on panel 414 near the upper edge thereof to cooperate with latching structure (not shown) mounted on the front panel 54 of the cover of compactor 400, as in the previous embodiments. Pan 416 is liquid tight around its joint between the bottom and sides thereof to serve as a drip pan to catch liquids which might leak from the refuse bag. Preferably bottom wall 402 of the cabinet is raised to provide a platform in the central portion 403 thereof to bear against the underside of the pan bottom wall 418 in the closed condition of the cabinet to provide support for the bottom wall against the compacting stresses.

Assembly 412 also serves as a basket for the refuse bag and for this purpose has a pair of brackets 426 and 428 affixed at their inner ends to the inner surface of panel 414 near the upper corners thereof so as to extend rearwardly slightly more than half the front-to-rear dimension of assembly 412. A handle 430 of U-shaped configuration has the free ends of its arms 432 and 434 pivotally connected at 436 and 438 to the free ends of arms 426 and 428, respectively. Handle arms 432 and 434 are curved beyond the pivot connection to form stops 440 which engage the lower edge of the associated arms 426, 428 when handle 430 is pivoted clockwise 90° from the upright carrying position thereof shown in FIG. 11 to the horizontal position thereof shown in FIG. 15.

Another U-shaped member 444 having arms 446 and 448 also has the free ends of its arms pivotally connected at 436 and 438 to the inner ends of arms 426 and 428 and serves as a clamping fixture for the refuse bag. It is to be understood that handle 430 has its arms disposed outwardly of the bracket arms, whereas clamp 444 has its arms disposed inwardly of the bracket arms. Suitable shims may be provided at the pivot connections to provide clearance between the clamp arms and bracket arms to allow the upper edges of the bag to fit closely therebetween. Clamp 444 thus can be pivoted from a clamping position shown in solid lines in FIG. 13 upwardly to a release position shown in broken lines in FIG. 13. Suitable stops (not shown) are also provided on clamp 444 to limit pivotal movement thereof counterclockwise beyond the clamping position shown in solid lines in FIG. 13.

In accordance with another feature of the present invention, a specially constructed refuse bag 450 is provided as shown in FIGS. 13-15 for use with drawer bas-

ket 412. Bag 450 may be constructed of heavy paper with a plastic lining and is a five-sided (i.e., four upright sides and a bottom side) bag open at the top. Bag 450 has a pair of notches 452 and 454 formed in the middle of the upper edges of its side walls 456 and 458 adapted to register with and provide clearance for the pivoted ends of handle 430 and clamp 434 when the bag is seated upright with its bottom resting snugly in the drip pan 416, as best seen in FIG. 15.

To install bag 450 in drawer-basket 412, handle 430 is first rotated clockwise to its down, horizontal position, in which position it acts as a rear support for the upper edge of the bag. Clamp 444 is also rotated (counterclockwise) to its down clamping position. Then bag 450 may be inserted vertically downwardly bottom end first through the opening defined by handle 430 and clamp 444 until the bottom of the bag is seated in the drip pan 416. Next clamp 444 is pivoted clockwise upwardly to a vertical position, whereupon the upper front edge portions 460 and 462 of the bag sides are folded slightly forwardly. Then clamp 444 is again pivoted counterclockwise downwardly to clamping position wherein it is disposed inwardly of the adjacent portions of the bag. Now the rear edge 466 of the bag and rear portions 468 and 470 of the sides of the bag are folded outwardly over and then down about the handle 430 to thereby suspend the rear half of the bag on handle 430. Finally, the front half of the bag is suspended on clamp 444 by folding bag edges 460, 464, 462 inwardly over clamp 444 as best seen in FIGS. 13 and 14. Preferably the front portion of clamp 444 has a tight fit against the inner surface of wall 14 in the horizontal position of clamp 444 so that the front wall of the bag is securely pressed in clamped relation against the front panel 414. The drawer basket 412 is now ready to be loaded with trash and then rolled into the cabinet of compactor 400.

After several loads have been compacted in bag 450, and the bag is full except for the last load, the last load is placed in the bag, compacted, the drawer pulled out and then clamp 444 and handle 430 both pivoted upwardly. Preferably, prior to compacting the last load, the bag is loosened to uncurl and release the edges of the bag and then the upper edges are folded inwardly to seal the upper end of the bag. After compacting the bag in sealed condition, and pivoting the handle and clamp upright, handle 430 alone or in conjunction with clamp 444 is grasped with one hand and used to carry drawer basket 412 to the area where the compacted trash bags are stored for pick-up. Thus, there is a minimum handling of the refuse bag, the drip pan insures that there will be no spillage in transit and one hand is free to open doors, etc.

Referring to FIG. 17, rocker 231 of the "stop-start" switch 230 is shown as it appears from the interior of control panel 210 and for clarity without any of the other associated structures of switch 230. As described previously, rocker 231 is pivotable about axis 231' and is mounted in an opening 470 in panel 210 as to project on both sides thereof in all three positions of the rocker described previously. Hence, side surface 472 of rocker 231 will be exposed interiorly of panel 210, both in the stop and start positions of the rocker. In accordance with another feature of the present invention, rocker 231 is combined with a safety key lock arrangement so as to mechanically prevent operation of compactor 20 except when a key (not shown) is inserted into the tum-

bler of a conventional drawer lock 474 mounted in panel 210 adjacent rocker 231. The axis of rotation of the tumbler of lock 474 is arranged transversely to axis 231' and lock 474 is angularly oriented so that when its tumbler is in locked position a block 476 secured to shaft 478 of the lock is oriented as shown in FIG. 17. In this position a hook-shaped arm 480 secured to block 476 has its free end 482 inserted into a hole 484 drilled in side wall 472 of rocker 231 to thereby lock the rocker against pivotal movement. Only in this locked position of the tumbler can the key be withdrawn from the lock, the absence of the key in the lock thus indicating to the operator that the stop-start switch has been rendered safe so that the compactor cannot be operated by unauthorized personnel or children.

To unlock switch 230, the operator inserts the key into lock 474 and rotates its tumbler 90 degrees counterclockwise as viewed in FIG. 17, thereby pivoting the free end 482 of arm 480 out of hole 484 so that rocker 231 can now be pivotally manipulated as described previously. Lock 474 is of the type wherein in any but the locked position of its tumbler the key cannot be removed. Hence, the key serves as a "warning flag", i.e., the operator can tell at a glance whether or not it is safe to leave the compactor unattended merely by observing the presence or absence of the key protruding from the control panel.

From the foregoing description, it now will be apparent that the present invention provides an improved refuse compacting mechanism, cabinet arrangement, control circuitry, safety interlock features, and drawer, basket and bag features which amply fulfill the objects of the present invention. In addition to the objects and features described previously herein, it now will be better understood that the compactor of the present invention is of economical construction due to the walls of the cabinet and drawer serving as the main structural framework, as well as providing lateral constraint against bulging forces generated in the refuse being compacted. Cover 52 also serves as a part of the compactor framework in that it is a rigid one-piece member and serves as a brace for the side and rear walls so as to resist twisting force exerted on the cabinet due to the slight lateral motion of platen 106 during its downstroke travel.

The construction of the drawer and basket wherein the drawer is generally open at the rear and the basket is generally open at the front greatly facilitates removal of a refuse bag after the same has been filled with compacted trash. The provision of the close-fitting drip pan at the bottom of basket 200 adapted to nest snugly in the bottom of drawer 160 with the mating rear walls inclined to provide the locking angle relationship insures that the basket is located in proper position in the drawer for movement therewith, as well as being properly angularly oriented in the drawer, and offers support to resist tipping or tilting of the basket during compaction and movement of the drawer. The provision of side and/or rear panels on the basket restrains the bag from bulging when the drawer with the basket therein is pulled out to open position. However, as soon as the basket is lifted a fraction of an inch to disengage it from the friction locking relationship with the bottom of the drawer, the basket may be tilted rearwardly slightly, increasing the fore and aft clearance so that the basket with the full bag therein may be readily lifted out of the drawer. Likewise, the generally open front of the bas-

ket will then permit ready removal of the refuse bag despite its tendency to bulge laterally when full of compacted material. The rear panel on the basket, by preventing rearward bulging of the trash bag when the basket is fully seated in the drawer, makes the drawer easy to shut after each successive reloading of the bag.

The suspension of the compacting mechanism from the two main beams 74 and 76, which in turn are suspended by screws 78, greatly facilitates servicing. Merely by loosening these four screws 78, the heads of which are conveniently accessible from above, the entire compacting unit including the motor, drive, toggle mechanism, platen, control panel and all wiring can be removed as a single unit for servicing on the site or at a remote service center. It will be noted that fasteners 78 extend in the direction of thrust and hence are not loaded by the compacting forces but rather merely carry the weight of the compacting mechanism. Thus only hanger brackets 70 and 72 which are welded to the side walls take the compacting force as a shear stress and thus have high strength for this type of loading.

Motor 78 is mounted on the fore and aft center line of the compacting mechanism as well as on the fore and aft center line of the cabinet and compacting space. Hence the forces exerted by the compacting mechanism develop a minimum of twisting couples or moments, enabling only the walls of the cabinet themselves to serve as a framework for the unit.

It is also to be understood that the basket and refuse bag can be integrated into one unit by using a plastic container. Such a single basket-bag unit need not be any stronger than the refuse bag described herein, but in such event the back wall on the drawer would be extended slightly higher in order to provide reinforcement against rearward bulging of the unit when the drawer is opened which otherwise could make the drawer hard to close.

I claim:

1. In a refuse compactor comprising an upright cabinet, a refuse receptacle received in said cabinet adjacent the lower end thereof and having an open upper end facing the upper end of said cabinet, a compacting mechanism mounted in said cabinet adjacent said upper end thereof including a presser platen movable into and out of the open upper end of said receptacle between a downwardly extended position within said receptacle and a retracted position disposed above and clear of said open upper end of said receptacle, said cabinet having upright exterior walls defining a space interiorly of said cabinet for receiving said receptacle, a movable access panel having a normally upright door portion and a bottom wall portion disposed perpendicular to said door portion, said door and bottom wall portions forming a tiltable unit operably connected to said side walls for pivotal movement about a horizontal axis whereby said door portion may be swung from an upright position closing said cabinet downwardly and outwardly to an open position causing said bottom wall portion to tilt from a horizontal to an upwardly and rearwardly inclined position, said receptacle comprising a basket supported on said bottom wall portion for tilting movement therewith, and means for detachably interconnecting said door portion and said cabinet in the closed position thereof.

2. In a refuse compactor comprising a cabinet having exterior wall means enclosing said cabinet with the in-

terior surface thereof defining a compacting space within said cabinet, said wall means including door means providing access to said compacting space from the exterior of said cabinet, a refuse receptacle received on support means in said space, said receptacle being closed at one end with said closed end engaging said support means and having an open end facing one end of said cabinet, said receptacle being adapted for successive compaction of plural loads of refuse sequentially inserted therein, a self-contained compacting mechanism module removably mounted on said wall means entirely within said cabinet adjacent said one end thereof within the confines of said wall means offset from said space and including a presser platen movable into and out of the open end of said receptacle between an extended position within said receptacle and a retracted position disposed clear of said open end of said receptacle, an electric motor, extensible linkage means and drive means operably interconnecting said motor and said extensible linkage means of said compacting mechanism for causing movement of said platen between said extended and retracted positions thereof, said compacting mechanism being disposed in offset relation from said compacting space so that said mechanism is substantially inaccessible via said door means in the retracted position of said platen, at least a portion of said cabinet wall means extending between said compacting mechanism and said support means providing substantially the sole means resisting separation of said compacting mechanism from said receptacle in the direction of compacting force.

3. The compactor defined in claim 2 wherein said door means includes a movable front panel defining at least in part a front wall of said cabinet in the closed condition of said cabinet, said cabinet wall means including a pair of spaced upright side walls and wherein said support means comprises a bottom wall supported by said side walls, and wherein said receptacle is generally open at the front thereof, and means for removably mounting said receptacle on said bottom wall to anchor said receptacle when in compacting position against lateral movement in the closed condition of said cabinet.

4. The compactor defined in claim 3 wherein said front panel and bottom wall are fixedly interconnected to form a movable unit adapted to removably receive said receptacle, said unit being generally open at the rear thereof, said means for mounting said receptacle on said bottom wall comprising complementary inter-nestable drip pan portions on said unit and said receptacle.

5. The compactor defined in claim 4 wherein said receptacle comprises a basket and said drip pan portion thereof comprises an imperforate rectangular bottom wall with upright side portions extending around the side edges thereof to form a liquid tight pan area at the bottom of said basket, said basket having a framework at its upper end adapted to removably receive a refuse bag therethrough with the upper edges of the bag suspended on said basket framework and the bottom of the bag seated on said basket bottom wall.

6. The compactor defined in claim 5 wherein said drip pan portions of said unit and said basket each have a rear wall inclined upwardly and rearwardly from the respective rear bottom edges thereof at a slight friction locking angle.

7. The compactor defined in claim 6 wherein said basket has a rear panel above said inclined rear wall thereof to resist rearward bulging of the bag in the open position of said unit.

8. The compactor defined in claim 2 wherein said cabinet has a front wall with a movable front panel hinged at its lower edge to the bottom front edge of said cabinet to pivot from an upright position closing the front of said cabinet to a horizontal open position out in front of said cabinet, a first pair of tracks mounted along the side edges of said cabinet front panel, a second pair of tracks mounted within said cabinet in end-to-end alignment with said first pair of tracks in the open position of said cabinet front panel, and wherein said receptacle has roller means mounted thereon to ride on said tracks.

9. The compactor defined in claim 2 wherein said cabinet wall means comprises front, rear and side walls and has a movable panel portion of one of said side walls and a movable panel portion of said front wall fixedly joined perpendicularly to one another along juxtaposed edges thereof and a bottom wall perpendicular to said front and one side wall fixedly joined thereto along juxtaposed edges thereof, said other side wall of said cabinet being immovably fixed to said rear wall and spaced laterally opposite and parallel to said one side wall in the closed condition of said cabinet, said front panel being hinged to said other side wall for pivotal movement about a vertical axis, said bottom wall being adapted to removably support said receptacle thereon for swinging movement therewith, and means for detachably interconnecting said movable panel portion of said first side wall adjacent the top and bottom edges thereof with immovable portions of said cabinet walls in the closed condition of said cabinet.

10. The compactor defined in claim 2 wherein said cabinet has a bottom wall fixed to side and rear walls of said wall means, and wherein said receptacle comprises a pan adapted to seat on said bottom wall, an upright front panel fixed adjacent its lower edge to said front edge of said pan adapted to serve as a part of said cabinet front wall, a pair of arms fixed to said front wall near its upper edge, one adjacent each side edge thereof and projecting rearwardly from said front wall over said pan, and first and second U-shaped members pivoted at their opposite ends to the ends of said arms to swing about a horizontal axis from upright positions to horizontally opposed positions wherein said members define a rectangular framework for attachment of the upper edge of a refuse bag thereto, at least one of said members serving as a carrying handle for said receptacle in the upright position thereof.

11. The compactor as defined in claim 2 wherein said wall means includes first and second horizontally spaced upright walls, and wherein said compacting mechanism includes beam means directly supporting said mechanism within said cabinet, said beams extending transversely of the direction of compacting force and having oppositely disposed ends secured one to each of said spaced walls offset from said compacting space, said wall means having an end wall extending over said mechanism.

12. The refuse compactor as set forth in claim 2 wherein said extensible linkage means includes stabilizing means movable with said linkage means and imparting self-guiding travel thereto during extension and re-



traction of said linkage means in moving said platen between its extended and retracted positions.

13. The refuse compactor as set forth in claim 2 wherein said linkage means is operable to move said platen in a curvilinear path between said extended and retracted positions thereof.

14. The refuse compactor as set forth in claim 13 wherein said linkage means is operable to cause tilting movement of said platen out of a perpendicular attitude relative to its path of travel between said extended and retracted positions thereof.

15. In a refuse compactor comprising an upright cabinet having exterior wall means enclosing said cabinet with the interior surface thereof defining a compacting space within said cabinet, said wall means including door means providing access to said compacting space from the exterior of said cabinet, a self-supporting refuse receptacle removably received via said door means on support means in said cabinet, said receptacle being closed at one end with said closed end resting on said support means and having an open upper end facing the upper end of said cabinet, a compacting mechanism mounted in said cabinet adjacent said upper end thereof within the confines of said wall means including a presser platen movable into and out of the open upper end of said receptacle between a downwardly extended position well within said receptacle and a retracted position disposed above and clear of said open upper end of said receptacle and a motor and drive means operably interconnecting said motor and said compacting mechanism for causing movement of said platen between said extended and retracted positions thereof, said cabinet wall means defining a space for closely receiving said receptacle with the walls thereof in the empty condition thereof disposed closely adjacent associated interior surfaces of said wall means, at least a portion of said cabinet wall means extending between said compacting mechanism and said support means providing substantially the sole means resisting separation of said compacting mechanism from said receptacle in the direction of compacting force,

said cabinet wall means including a front and spaced side walls fixedly connected to a rear wall, said front wall having a movable panel portion fixed at its lower edge to a bottom wall disposed perpendicular to said front wall, said bottom wall being hinged at its rear edge to said rear wall for pivotal movement about a horizontal axis whereby said front wall panel may be swung from an upright position closing said cabinet downwardly and outwardly to an open position, said receptacle comprising a basket removably supported on said bottom wall for tilting movement with said front wall, and means for detachably interconnecting said front wall panel and said cabinet in the closed position thereof.

16. In a refuse compactor comprising an upright cabinet having exterior wall means enclosing said cabinet with the interior surface thereof defining a compacting space within said cabinet, said wall means including door means providing access to said compacting space from the exterior of said cabinet, a self-supporting refuse receptacle received on support means in said cabinet, said receptacle being closed at one end with said closed end resting on said support means and having an open upper end facing the upper end of said cabinet,

a compacting mechanism mounted in said cabinet adjacent said upper end thereof within the confines of said wall means including a presser platen movable into and out of the open upper end of said receptacle between a downwardly extended position well within said receptacle and a retracted position disposed above and clear of said open upper end of said receptacle and a motor and drive means operably interconnecting said motor and said compacting mechanism for causing movement of said platen between said extended and retracted positions thereof, at least a portion of said cabinet wall means extending between said compacting mechanism and said support means providing substantially the sole means resisting separation of said compacting mechanism from said receptacle in the direction of compacting force, said wall means including first and second horizontally spaced upright walls, and wherein said compacting mechanism includes beam means directly supporting said mechanism within said cabinet, said beams extending transversely of the direction of compacting force and having oppositely disposed ends secured one to each of said spaced walls above said compacting space, said wall means having a top wall extending over said mechanism, said door means comprising a front wall and a bottom wall constituting said receptacle support means secured to said front wall, said front wall being generally vertical and said bottom wall being generally horizontal in the closed condition of said door means, means mounting said door means on said wall means for pivotal movement about a horizontal axis whereby said front panel may be swung downwardly and outwardly of said cabinet to an open position while said bottom wall is tilted so as to be inclined rearwardly upward, and means for detachably interconnecting said door means with a contiguous portion of said wall means in the closed position of said door means such that said door means is loaded in tension by said wall means in response to compaction of refuse in said receptacle by operation of said compacting mechanism.

17. In a refuse compactor comprising a cabinet having exterior wall means enclosing said cabinet with the interior surface thereof defining a compacting space within said cabinet, said wall means including movable door means providing access to said compacting space from the exterior of said cabinet, said door means including a laterally expandable refuse receptacle associated therewith and received on support means in said cabinet, said receptacle being closed at one end with said closed end engaging said support means and having an open end facing one end of said cabinet, a compacting mechanism mounted in said cabinet adjacent said one end thereof within the confines of said wall means including a presser platen movable into and out of the open end of said receptacle between an extended position within said receptacle and a retracted position disposed clear of said open end of said receptacle and a motor and drive means operably interconnecting said motor and said compacting mechanism for causing movement of said platen between said extended and retracted positions thereof, said cabinet wall means defining a space for closely receiving said receptacle with the walls thereof in the empty condition thereof disposed closely adjacent associated interior surfaces of said wall means, at least a portion of said cabinet wall means extending between said compacting mechanism and said support means providing substantially the sole

means resisting separation of said compacting mechanism from said receptacle in the direction of compacting force, said portion of said wall means also providing substantially the sole means which resist lateral bulging of said receptacle due to compaction of refuse therein by operation of said compacting mechanism, said portion of said wall means including a surface of said door means contacted by said receptacle to also resist lateral bulging of said receptacle in the direction of opening movement of said door means and adapted when said door means is opened to allow said receptacle to expand in the direction of opening movement of said door means to thereby relieve the bulging stress imposed by the compacted refuse on said portion of said cabinet wall means in a direction transverse to said direction of opening movement of said door means to thereby facilitate removal of the receptacle when filled with refuse

compacted by said mechanism, said receptacle having at least one opening extending between said ends thereof and transverse to said direction of opening movement of said door means to facilitate said receptacle expansion.

18. The refuse compactor as set forth in claim 17 wherein said exterior wall means form a rectangular enclosure for said compacting space and wherein said portion of said cabinet wall means defines spaced opposed side walls of said cabinet, said wall means also having a rear wall connected to said side walls and a front wall with said door means forming at least a portion of said front wall, the lateral dimensions of said front and rear walls substantially exceeding the lateral dimension of said side walls.

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