United States Patent

[11] 3,537,390

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[54] **REFUSE COMPACTOR**
13 Claims, 15 Drawing Figs.

[52] **U.S. Cl.** **100/100,**
53/124; 100/52, 100/53, 100/99, 100/229, 100/256, 100/290, 100/295; 308/3.8; 312/341
[51] **Int. Cl.** **B30b 15/00**
[50] **Field of Search** 100/229, 256, 295, 290, 53, 99, 52, 100; 53/124; 308/3.8; 312/341, 350

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ABSTRACT: A domestic refuse compactor including a drawer wherein household refuse is compacted by a ram to a fraction of its normal volume. The refuse is compacted in the drawer within a suitable bag permitting the compacted refuse to be removed as a wrapped package for facilitated disposal. The compactor may be provided with a freestanding movable cabinet or may be installed as a built-in structure in a conventional kitchen base cabinet. The ram is carried on a pair of screw members to bridge the drawer and compact the refuse and return to a retracted position above the drawer permitting selective movement of the drawer to an open position for introduction of refuse into the drawer.

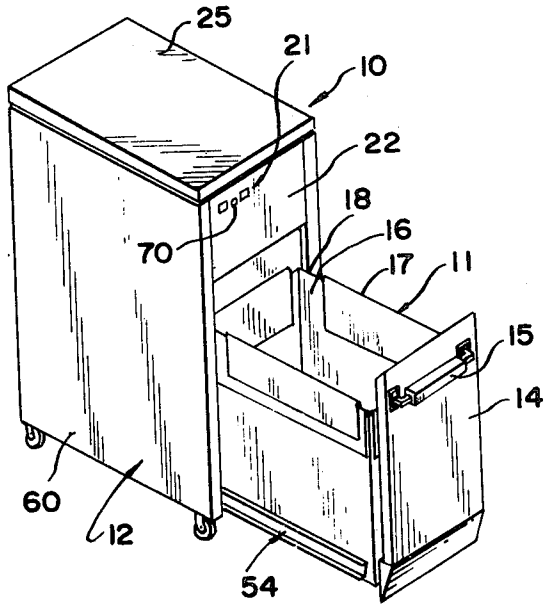


FIG.1

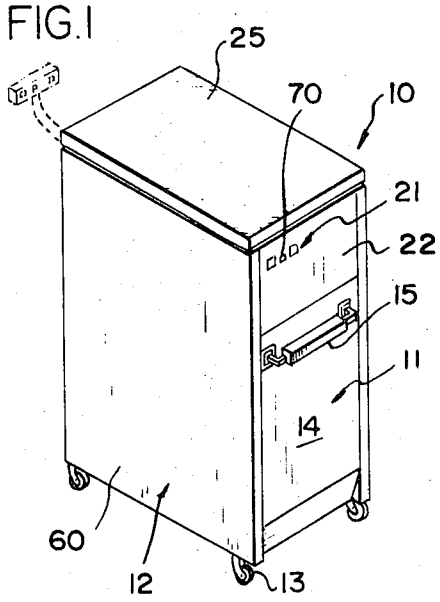
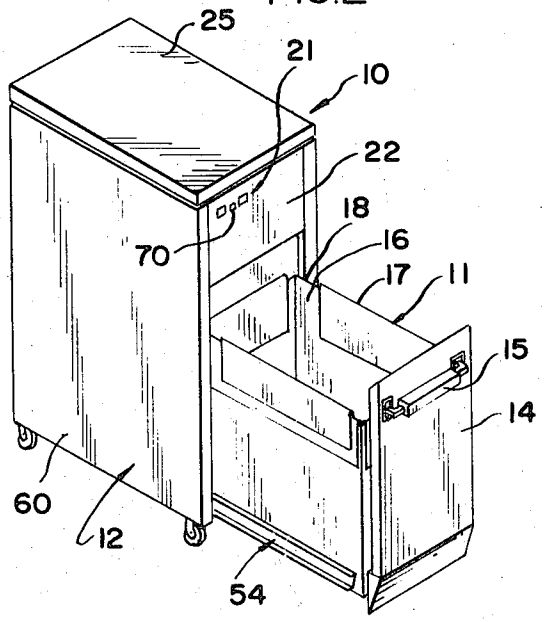


FIG.2



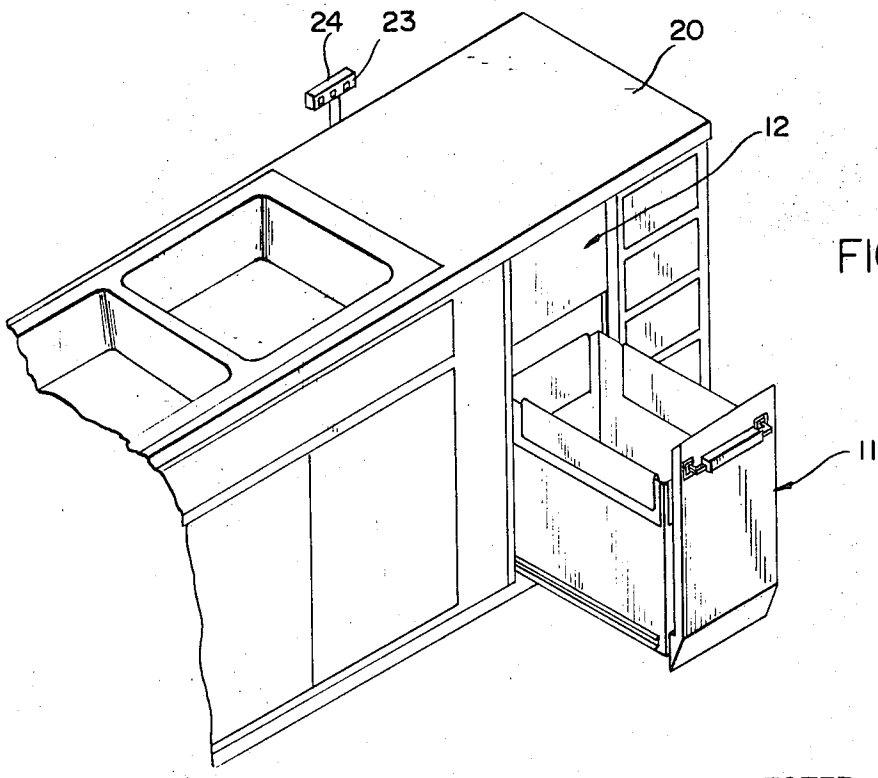


FIG.3

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ATTORNEYS.

FIG.4

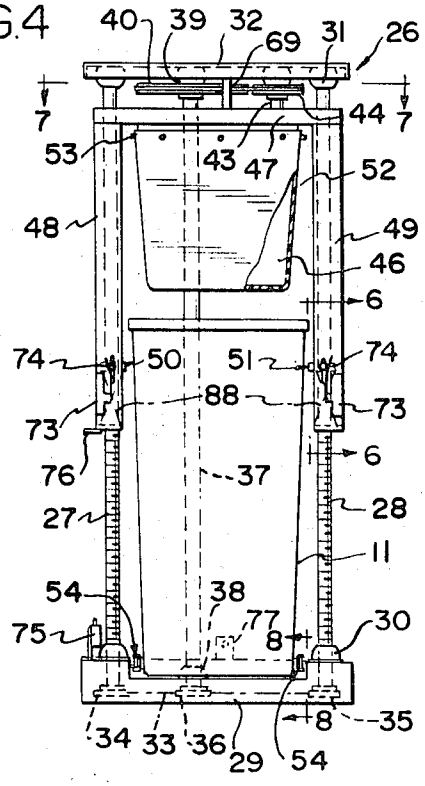


FIG.5

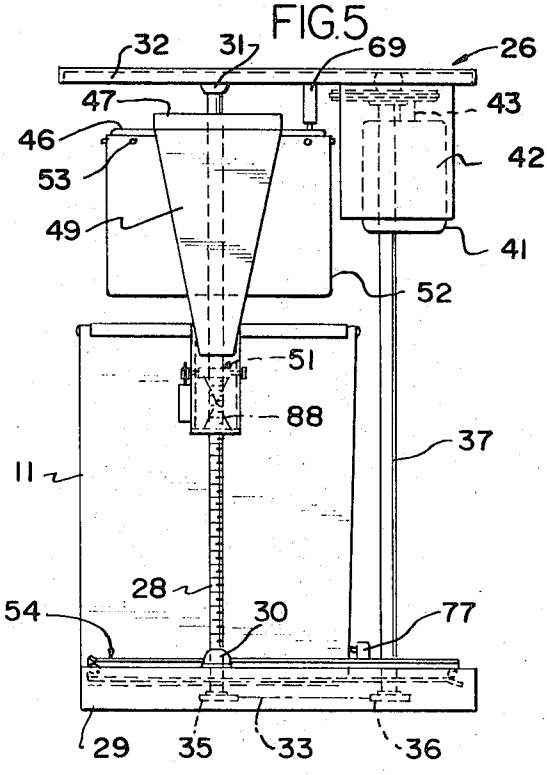


FIG.7

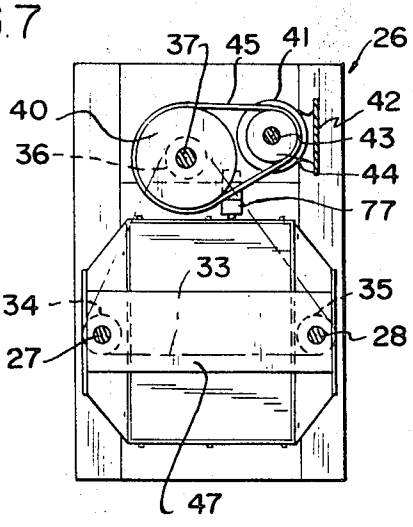


FIG.6

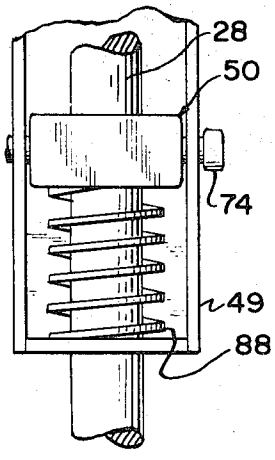


FIG.13

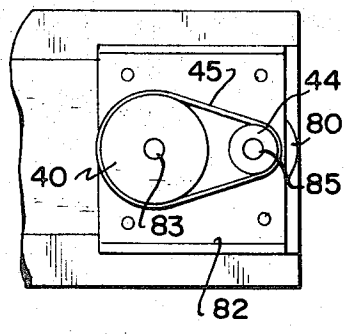


FIG.11

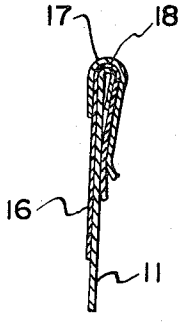


FIG.12

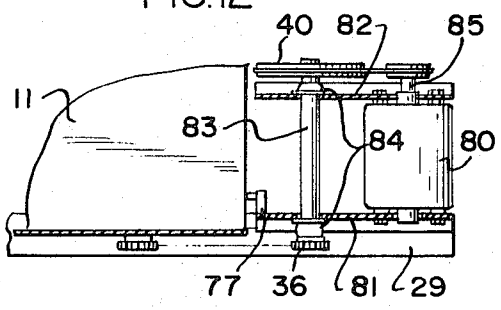


FIG.8

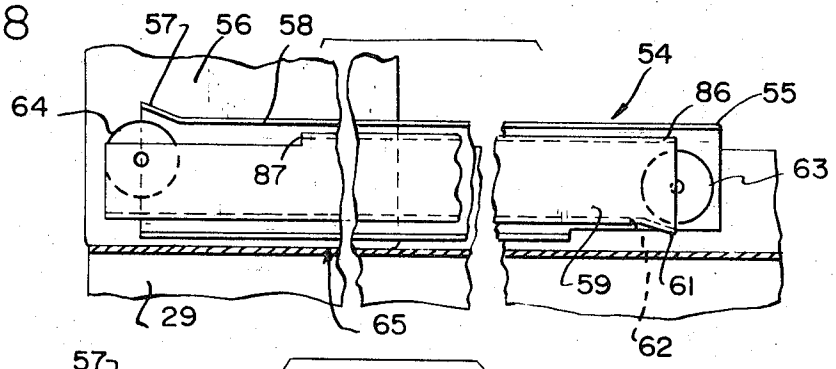


FIG.9

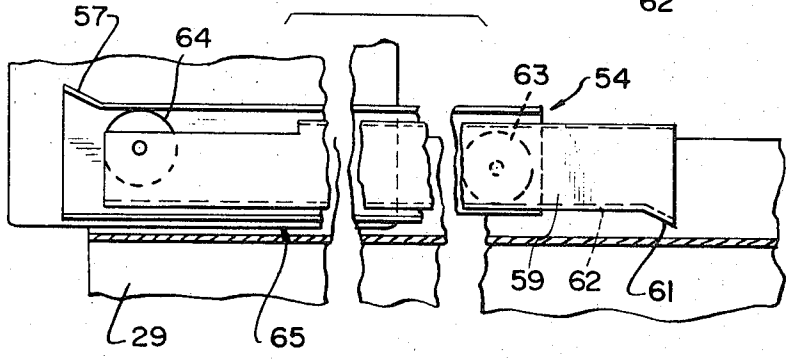


FIG.14

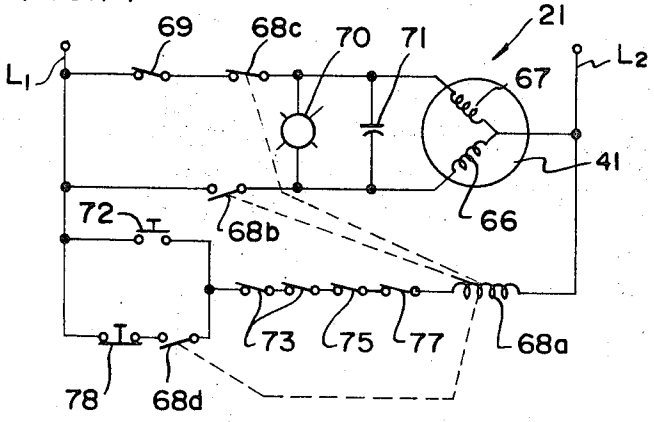


FIG.10

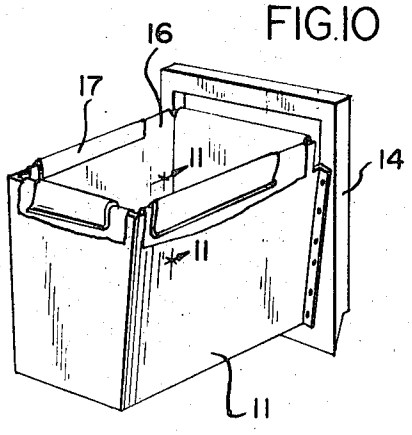
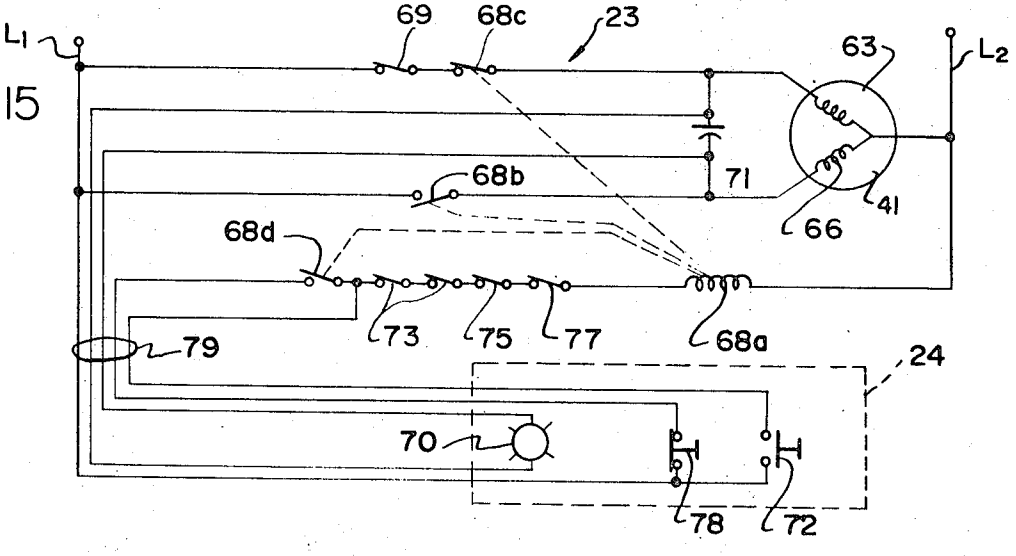


FIG.15



REFUSE COMPACTOR

SPECIFICATION

This invention relates to refuse compactors and in particular to domestic refuse compactors.

In the conventional household, refuse, such as paper, cans, bottles and garbage is normally periodically removed from the kitchen to a suitable refuse can normally disposed outdoors. Such disposal of refuse requires in many cases daily transfer to the refuse cans. One of the reasons for the need of such frequent transfer is the relatively large bulk of such refuse. The placement of such refuse in the outdoor refuse cans raises a serious problem in many areas where animals may be able to get at the refuse therein. Further, the constant requirement of frequent transfer of such refuse is generally considered a nuisance.

The present invention comprises an improved refuse compactor which permits the containment of a substantial amount of refuse, for example, an amount as would represent the quantity of such refuse normally accumulated in approximately one week by a family of three or four people.

One of the features of this invention is to provide an improved refuse compactor having a drawer in a cabinet with extensible roller support means for movably mounting the drawer in the cabinet for disposition either in an open position exteriorly of the cabinet to facilitate placing of refuse therein or a closed hidden position within the cabinet in combination with a ram above the closed drawer and means for forcing the ram into the drawer when desired to compact refuse therein.

A further feature of the invention is the provision of such a refuse compactor including a support, a drawer, means for movably mounting the drawer on the support for selective disposition in an open position wherein refuse may be placed therein and a closed position, a ram, means on the support carrying the ram for selective movement toward the drawer in the closed position to compact refuse therein and to a retracted position permitting movement of the drawer to the open position, the ram and carrying means bridging the drawer in the retracted position.

A further feature of the invention is to provide an improved refuse compactor including a movable drawer and including clamp means for retaining a disposable wrapper for the compacted refuse in the drawer.

A still further feature of the invention is the provision of such a refuse compactor wherein the drawer mounting means includes a pair of tracks, means for movably supporting the drawer for movement along the tracks, and means for precluding support of the drawer by the tracks and supporting means in the closed position.

Yet another feature of the invention is the provision of such a refuse compactor wherein the drawer is arranged to be fully removable from the support when desired.

Other features and advantages of the invention will be apparent from the following description taken in connection with the accompanying drawing wherein:

FIG. 1 is a perspective view of a domestic refuse compactor embodying the invention with a modified form of control integral with the connecting plug illustrated in dotted lines;

FIG. 2 is a perspective view of the domestic refuse compactor with the drawer in the open position;

FIG. 3 is a perspective view of a modified form of domestic refuse compactor embodying the invention installed in a conventional kitchen base cabinet;

FIG. 4 is a front elevation of the compactor apparatus as carried on the support base;

FIG. 5 is a side elevation thereof;

FIG. 6 is a fragmentary enlarged vertical section taken substantially along the line 6–6 of FIG. 4.

FIG. 7 is a horizontal section taken substantially along the line 7–7 of FIG. 4;

FIG. 8 is a fragmentary enlarged vertical section taken substantially along the line 8–8 of FIG. 4, with the drawer in a retracted position;

FIG. 9 is a fragmentary enlarged vertical section taken with the drawer of FIG. 8 in an open position;

FIG. 10 is a rear perspective view of the drawer;

FIG. 11 is a fragmentary enlarged vertical section taken substantially along the line 11–11 of FIG. 10;

FIG. 12 is a fragmentary side elevation of a domestic refuse compactor embodying the invention having a modified form of drive means wherein the motor is mounted on the base rearwardly of the drawer;

FIG. 13 is a fragmentary top plan view thereof;

FIG. 14 is a schematic wiring diagram of the control of the domestic refuse compactor shown in full lines in FIGS. 1 and 2; and

FIG. 15 is a schematic wiring diagram of the control of the domestic refuse compactor shown in dotted lines in FIG. 1.

In the exemplary embodiments of the invention as shown in the drawing, a domestic refuse compactor **10** is shown in FIGS. 1 and 2 to comprise a freestanding portable appliance wherein a drawer **11** is movable to be selectively disposed in a retracted position within a cabinet **12**, as shown in FIG. 1, and in an open position accessible from the front of the cabinet **12**, as shown in FIG. 2, for placement of refuse therein. The cabinet **12** may be provided with suitable roller carrying means, such as casters **13**, for facilitated movement of the appliance as desired. The drawer **11** includes a front panel **14** carrying a handle **15** for manual movement of the drawer to the retracted and open positions. The drawer may be internally lined with a suitable refuse wrapper or bag **16** held in place by elongated clips **17** embracing the bag and the upper edges **18** of the drawer. The drawer **11** may be provided with a suitable coating on its inner surface to facilitate easy release of the bag **16**. This coating or finish is preferably of a type with low abrasion resistance providing a "slippery" type of surface. Such materials include DuPont "Slip Spray", silicone, Teflon, and a material with a polyethylene ingredient. As shown in FIG. 3, the drawer **11** may be installed in a conventional kitchen base cabinet **20** by omitting the casters **13** used with the cabinet **12**. Operation of the compactor may be manually controlled by suitable control means **21** carried on a front panel portion **22** of the cabinet **12**, or, alternatively, may be controlled by a control **23** provided in a plug **24** adapted to be connected to a conventional household power supply receptacle (not shown).

The top wall **25** of cabinet **12**, as shown in FIGS. 1 and 2, may comprise a wood cutting block. The height of the cabinet **12** may be preselected to permit fitted installation in the conventional counter **20** as desired.

Referring now to FIGS. 4 through 6, the compactor apparatus, generally designated **26**, is mounted within the cabinet **12**, or base cabinet **20**, and comprises a pair of heavy screws **27** and **28** upstanding, from a base **29**, at opposite sides of the drawer **11**. The lower ends of the screws are rotatably carried in suitable journals **30** on the base **29** and the upper ends of the screws are rotatably carried in suitable journals **31** on an upper plate **32**. The screws **27** and **28** are concurrently rotated by a chain **33** engaging a sprocket **34** on the lower end of screw **27** and a sprocket **35** on the lower end of screw **28**. The chain **33** is driven by a sprocket **36** carried on the lower end of a drive shaft **37** rotatably carried on the base by journal means **38** and on the plate **32** by journal means **39**. The shaft **37** is, in turn, driven by a pulley **40**. A drive motor **41** is mounted on a suitable bracket **42** depending from the plate **32** and the shaft **43** thereof is provided with a pulley **44** to drive a belt **45**, which in turn drives the pulley **40**.

Refuse in drawer **11** is compacted therein by a ram **46** carried by a cross member **47** which is supported at its opposite ends by a first upright member **48** and a second upright member **49** at opposite sides of the ram. The members **48** and **49** are connected, respectively, through springs **88** to the screws **27** and **28** by nut means **50** and **51** (see FIG. 6) whereby concurrent rotation of the screws **27** and **28** selectively clockwise and counterclockwise effects concurrent upward and downward movement of the nut means **50** and **51**

and corresponding upward or downward movement of the ram **46**. As best seen in FIG. **4**, the vertical height of the ram **46** is less than that of the drawer **11**. The ram may be tapered in transverse cross section generally similarly to the tapered transverse cross section of drawer **11**. To prevent sticking of adherent refuse and the like to the ram, the ram may be provided with a suitable cover **52** which may be removably secured thereto by suitable conventional connectors **53**. Illustratively, the cover **52** may be formed of Teflon (tetrafluoroethylene) or other similar low friction material.

As shown in FIG. **2**, the drawer **11** is movably carried in the cabinet **12**, or base cabinet **20**, by a pair of suitable track means **54**. Referring now to FIGS. **8** and **9**, each track means **54** herein is seen to comprise a first track **55** carried on the side wall **56** of the drawer **11** and having a forwardly, upwardly angled end **57** of a top flange **58** thereof. A reversely similar track **59** is mounted on side wall **60** of the cabinet on base **29** with rearwardly, downwardly angled rear end **61** of the lower flange **62** thereof. A first roller **63** is rotatably mounted on the track **55** in the rear end thereof for rolling movement forwardly along the flange **62** of the track **59** when the drawer is moved from the retracted position of FIG. **7** to the open position of FIG. **8**. A second roller **64** is rotatably mounted on the second track **59** in the forward end thereof to be engaged by the flange **58** of the first track to rollingly carry the flange as the drawer is moved to the open position of FIG. **8**.

Thus, as best seen in FIG. **8**, when the drawer is in the closed position of FIG. **1**, the roller **63** and the track **55** are dropped by the weight of the drawer and refuse therein so that the bottom wall **65** of the drawer rests on the base **29**. Thus, the force of the ram acting downwardly on the refuse is directed against the bottom wall of the drawer on base **29** rather than against the rollers for improved positive compaction of the refuse without distortion or damage to the roller and track means.

The ram effectively compresses refuse and the like deposited in the drawer **11** to approximately 15 percent to 25 percent of its original volume. When the bag **16** is effectively filled with compacted refuse, the top of the bag may be folded over the compacted refuse to provide an enclosed package for facilitated removal. The bag may be self-sealing. Thus, the bagged refuse may be placed outdoors without the need for placement in a refuse can or the like. It has been found that a filled bag of refuse may weigh approximately 25 to 35 pounds, thus permitting facilitated removal from the drawer while yet effectively maximizing the amount of refuse which may be so removed. The ram provides sufficient pressure to crush paper, trash and the like, and, depending upon the distribution, even tin cans and bottles for compaction thereof. It may be preferable that garbage, including wet garbage, be disposed of by a conventional garbage disposal unit, thereby eliminating the need for making the bag **16** waterproof. However, the invention comprehends such waterproof construction of the bag where desired.

The refuse compactor **10** may be automatically controlled by the control **21**, as shown in FIG. **14**, or control **23**, as shown in FIG. **15**. As shown in FIG. **14**, control **21** includes a plurality of electrical components connected across power supply leads L_1 and L_2. The motor **41** includes a first winding **66** and a second winding **67**, each having one end connected to power supply lead L_2. Energization of the motor **41** is controlled by a normally open switch **68***b* controlled by a suitable relay coil **68***a*, a normally closed switch **68***c* controlled by the relay coil **68***a*, and a normally closed limit switch **69** which opens when the ram is at the upper limit of its travel. A signal light **70** is connected across the motor windings **66** and **67** to be illuminated whenever the motor is energized in either direction of rotation to indicate the operation of the compactor to the user. A suitable capacitor **71** may be placed in parallel with the signal light **70** which in the illustrated embodiment comprises a 230 volt neon pilot lamp.

Energization of the relay coil **68***a* is controlled by a normally open "Start" push button **72** connected in series with the relay coil **68***a* through a pair of normally closed load limit switches **73** carried by the upright members **48** and **49** to be engaged by actuators **74** on the nut means **50** and **51** when the back force on the ram reaches a preselected maximum value such as 1,500 pounds. A normally closed safety limit switch **75** is mounted on base **29** to be engaged by an actuator **76** on the upright member **48**. A normally open drawer interlock switch **77** is provided on base **29** to open when the drawer is moved away from the closed position. A normally closed "Up" push button **78** is connected in parallel with "Start" push button **72** in series with a normally open switch **68***d* controlled by relay coil **68***a*.

Thus, when the user depresses "Start" push button **72** with the drawer in the closed position of FIG. **1**, the ram being then at the upper retracted position of FIG. **4**, relay coil **68***a* is energized to close switch **68***b* and thereby energize motor **41**. As discussed above, the motor **41** includes a first winding **66** and a second winding **67**. Either of the windings **66** and **67** may be connected, via control **21**, in series relation with a capacitor **71** (shown in FIG. **14**), and in parallel with the other winding. At any given time, one of the motor windings **66** or **67**, depending upon the state of energization of coil **68***a*, will be connected in series with the capacitor **71**, with the other motor winding being connected in parallel across the line. Rotation of the motor **41** in the reverse direction is then accomplished by operating control **21** to connect the capacitor **71** in series with the other winding, with both windings being connected in parallel across L_1 and L_2. As illustrated, in order to move the ram downward toward the receptacle, the coil **68***a* is energized causing normally closed switch **68***c* to open and normally open switch **68***b* to close. The motor is then energized across L_1 and L_2 through connections in which capacitor **71** is connected in series with motor winding **67** and in parallel with motor winding **66**. In order to return the ram to the retracted position, the coil **68** is deenergized establishing connections in which switch **68***b* is open and switch **68***c* is closed, connecting motor **41** across L_1 and L_2 with capacitor **71** in series with winding **66** and in parallel with winding **66**.

Normally closed limit switch **69** opens interrupting energization when the ram is at the upper limit of its travel, as shown in FIG. **4**.

The signal lamp **70** is connected across the capacitor **71** and, thus, is illuminated whenever the motor **41** is energized to operate in either direction to indicate energization of the motor. The lamp **71** may comprise a conventional 230 volt neon pilot lamp.

As soon as the ram moves away from the upper position after the "Start" push button is depressed, limit switch **69** closes, but switch **68***c* is opened by the energization of coil **68***a* to prevent energization of the motor at this time. The user may release push button **72** as the normally open switch **68***d* is now closed by the energization of relay coil **68***a* to maintain the circuit to the coil through the normally closed push button **78** and switches **73**, **75** and **77**. When the compaction of the refuse in drawer **11** produces a sufficient back force on the ram, one or both of the load switches **73** open breaking the circuit to the relay coil **68***a* and thereby opening switch **68***b*. However, switch **68***c* now recloses and, as switch **69** is now closed, the motor **41** is energized to move the ram back to the upper position of FIG. **4**. The upward movement of the ram is stopped and the lamp **70** extinguished by the opening of the switch **69**.

As indicated above, the control of the compactor may be effected through a modified circuit, as shown in FIG. **15**, wherein the manual control is in the plug **24**. Thus, as shown in FIG. **15**, the control **23** is identical to the control **21**, except that the push buttons **72** and **78** and the signal light **70** are disposed in the plug **24** and connected to the compactor through a suitable multiconductor cable **79**. Thus, control **23** functions identically to control **21** as described above.

Referring now to FIGS. 12 and 13, a modified form of drive means for driving ram 46 is shown to comprise an electric motor 80 mounted on a bottom plate 81 secured to base 29 and carrying a top plate 82. A shaft 83 is journaled on plates 81 and 82 by suitable bearings 84. The lower end of the shaft extends through the plate 81 and carries the sprocket 36. The upper end of the shaft extends upwardly through the top plate 82 and carries the pulley 40. The pulley 44 is carried on the upper end of the motor shaft 85 which extends upwardly through the plate 82 for driving the pulley 40 through the belt 45. Thus, as shown in FIG. 12, the drive may be disposed entirely rearwardly of the drawer 11 on base 29. Such a drive installation may, for example, be utilized in connection with a conventional kitchen cabinet such as one having a 15 inch or an 18 inch width. The upper arrangement of the motor and drive, as shown in FIG. 5, may also be utilized where advantageous, for example, in a conventional kitchen counter cabinet.

At times, complete removal of the drawer 11 from the appliance may be desired. To permit such removal, the upper flange 86 of the track 59 may be cut away as at 87 at the forward end thereof permitting the rollers 63 to be moved upwardly therethrough when the drawer is in the fully forward position thereof.

As discussed above, the compactor 10 provides a number of highly desirable advantages for domestic use. Thus, the nuisance of daily removal of the trash and refuse to an outside refuse can is avoided. During peak periods of trash collection, such as during spring cleaning, a substantial amount of trash may be compacted without overtaxing the normal removal facilities. As discussed above, under normal conditions, the conventional refuse can may be eliminated and the trash merely placed in the outside removal location in the closed bag 16. Further, by providing compaction, savings may be effected in areas where extra charges are made by the municipality for trash collection over a preselected standard amount. Further, the bagging of the refuse provides automatic compliance with the bagged refuse disposal requirements of many communities. The use of the portable compactor 10 shown in FIGS. 1 and 2 permits a collection of refuse at a desired location other than necessarily in the kitchen or, more specifically, adjacent the sink. The simplicity of the compactor construction permits the compactor to be relatively inexpensive, while yet providing the highly desirable features discussed above.

While we have shown and described certain embodiments of our invention, it is to be understood that it is capable of many modifications. Changes, therefore, in the construction and arrangement may be made without departing from the spirit and scope of the invention as defined in the appended claims.

The embodiment of the invention in which an exclusive property or privilege is claimed is defined as follows:

We claim:

1. A domestic refuse compactor comprising: a cabinet; a drawer; extensible guide means for movably mounting the drawer in said cabinet for substantially rectilinear movement of the drawer for selective disposition in an open position at least partially exteriorly of said cabinet wherein refuse may be placed therein and a closed position within said cabinet; a ram; and means in said cabinet carrying said ram for selective movement toward the bottom of said drawer in said closed position to compact refuse therein and to a retracted position permitting movement of said drawer to said open position, said ram and carrying means bridging said drawer in said retracted position.

2. The domestic refuse compactor of claim 1 wherein said cabinet comprises a freestanding cabinet.

3. The domestic refuse compactor of claim 1 including roller means for movably carrying said cabinet.

4. The domestic refuse compactor of claim 1 wherein said ram carrying means comprises a pair of parallel screws, means threadedly engaging said screws and supporting said ram therebetween, and means for concurrently rotating said screws.

5. The domestic refuse compactor of claim 1 wherein said ram carrying means includes a drive motor disposed in a space within said cabinet above the level of the top of the drawer in the closed position of said drawer.

6. The domestic refuse compactor of claim 1 wherein said cabinet includes a base subjacent said drawer, and said carrying means includes a drive motor mounted on said base rearwardly of said drawer when said drawer is in the closed position.

7. The domestic refuse compactor of claim 1 including means for releasably retaining a wrapper in said drawer for receiving said refuse.

8. The domestic refuse compactor of claim 7 wherein said clamp means comprises resilient means engaging said wrapper and drawer.

9. The domestic refuse compactor of claim 8 wherein said drawer has an open top bounded by edges, said wrapper comprises an open top bag, and said clamp means comprises a plurality of spring clips releasably retaining said bag open top on said drawer edges.

10. The domestic refuse compactor of claim 1 wherein said drawer mounting means includes means for causing said drawer to be effectively removed from said guide means and positively supported in said cabinet in said closed position.

11. The domestic refuse compactor of claim 10 including means for selectively separating said drawer fully from said guide means.

12. A domestic refuse compactor comprising:

a cabinet;

a drawer;

means for movably mounting the drawer in said cabinet for selective disposition in an open position wherein refuse may be placed therein and a closed position, said drawer mounting means including a pair of tracks, means for movably supporting said drawer for movement along said tracks, and means for precluding support of said drawer by said tracks and supporting means in said closed position;

a ram; and

means in said cabinet carrying said ram for selective movement toward said drawer in said closed position to compact refuse therein and to a retracted position permitting movement of said drawer to said open position.

13. The domestic refuse compactor of claim 12 wherein said tracks include a first track on said drawer and a second, parallel track on said cabinet base, and said means for movably supporting said drawer includes a first roller on said cabinet base for engaging said first track, and a second roller on said drawer for engaging said second track, said tracks being constructed to preclude said engagement of the rollers therewith in said closed position of the drawer.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,537,390 Dated November 3, 1970

Inventor(s) Lester H. Hinkel, Gordon H. Brown and Robert M. Chandl

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Claim 7, line 22, insert the word --clamp-- following "including".

Signed and sealed this 6th day of July 1971.

(SEAL)
Attest:

EDWARD M.FLETCHER,JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents