United States Patent

Longo

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[54] TRASH COMPACTION UNIT

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[52] **U.S. Cl.**.....**100/229,** 53/124, 92/40, 92/132, 100/53, 100/266, 100/269, 100/295, 141/73

[51] **Int. Cl.**.....**B30b 15/06**

[58] **Field of Search**.....100/53, 224, 266, 269, 295; 141/73; 92/40, 132; 53/124

[56] **References Cited**

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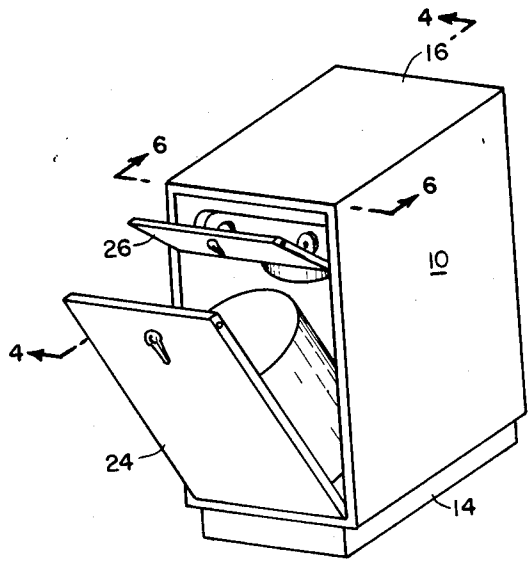
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[57] **ABSTRACT**

A household compaction unit having a receptacle for collection of trash and a hydraulic ram operated by household water supply to compact said garbage.

8 Claims, 9 Drawing Figures



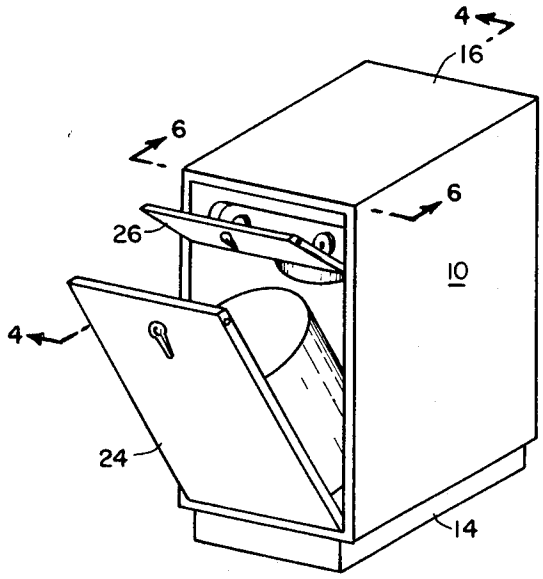


FIG. 1

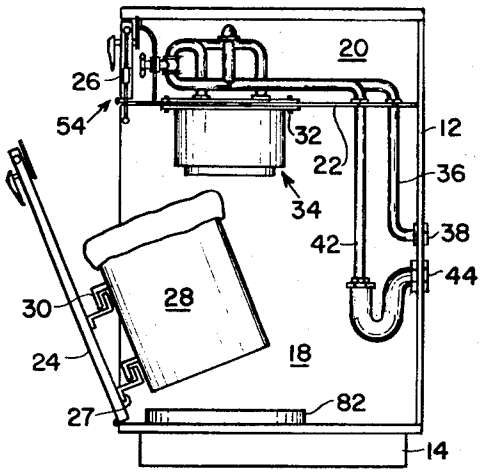


FIG. 2

FIG. 3

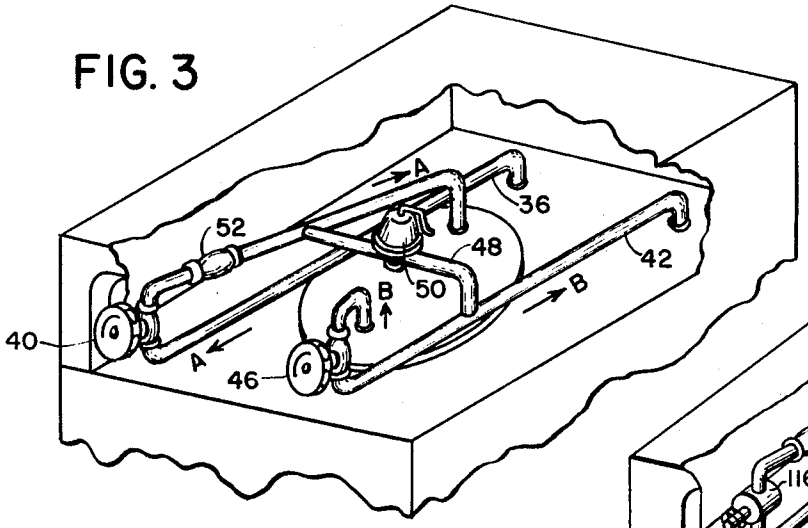
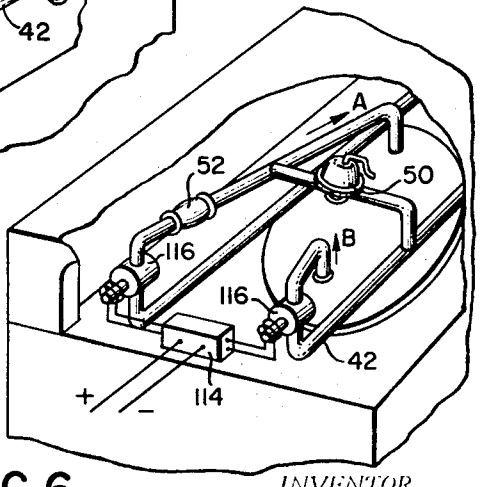


FIG. 3a



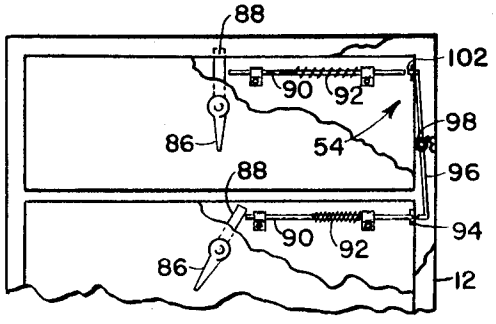


FIG. 6

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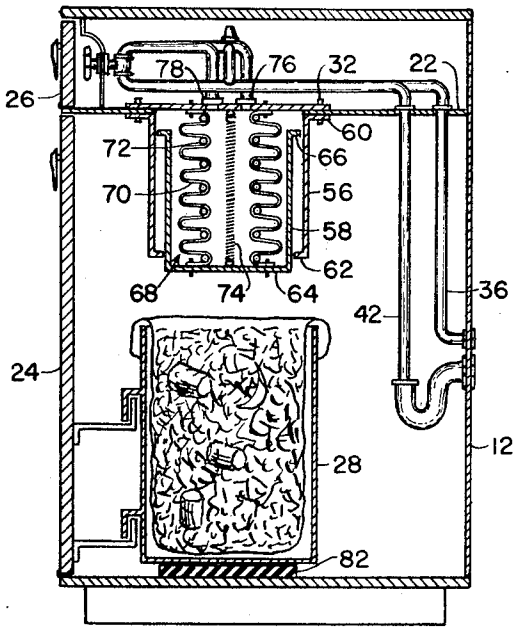


FIG. 4

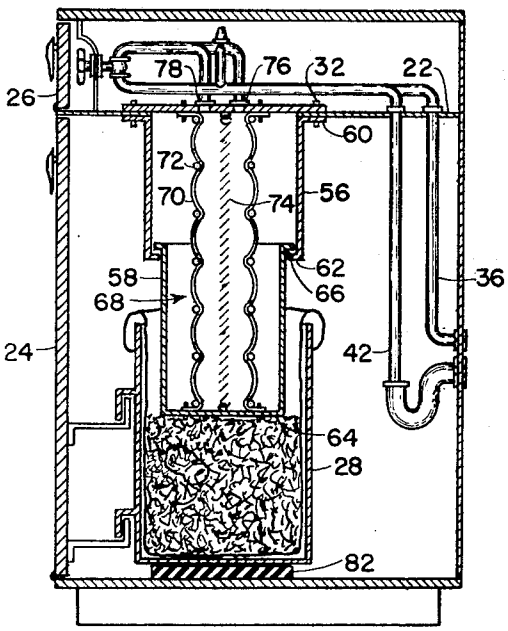


FIG. 5

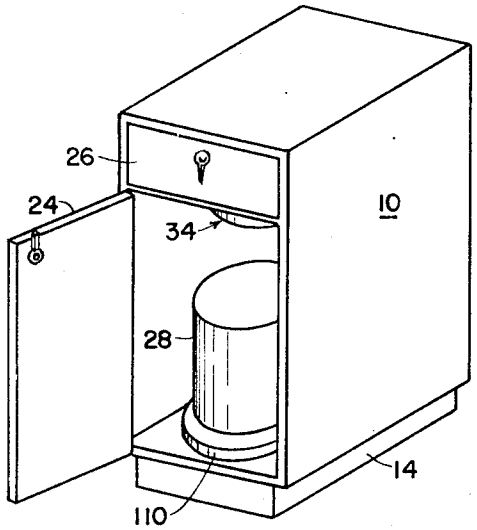


FIG. 7

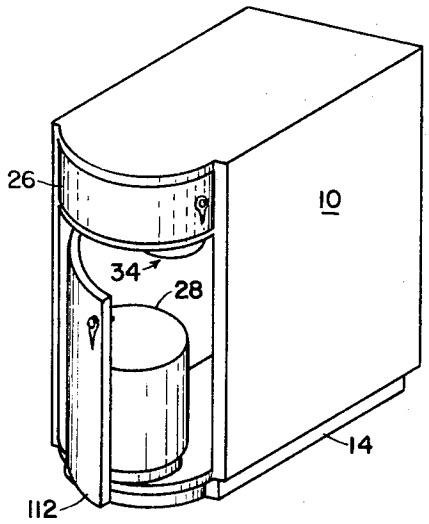


FIG. 8

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TRASH COMPACTION UNIT

BACKGROUND OF INVENTION

The present invention relates to garbage and trash disposal and in particular to apparatus for the compaction of household refuse and garbage.

The disposal of household garbage and refuse has been a problem for many years. The total amount of household waste has increased to such large proportions that the normal facilities for collection and disposal of the same have been severely taxed. Automatic garbage grinding and disposal units attached to the kitchen drain have also been found to be inadequate for modern uses and in addition overburden the community sewer and normal liquid waste disposal systems.

There is therefore a pressing need for simple economical garbage disposal means which reduces the total amount of refuse. It is the object of this invention to help satisfy this need.

In the past few years the compaction of trash and garbage has acquired a considerable following in large institutional uses. It is the prime object of the present invention to provide a compaction unit for the compaction of household trash, garbage and refuse.

It is a further object of the present invention to provide a small, inexpensive unit for placement in the kitchen without intensive modification of existing architectural designs.

It is a specific object of the present invention to provide a household compaction unit which is free of use of electricity and is safe and easy to operate.

It is a further object of the present invention to provide a trash compaction unit in which household rubbish and trash may be compacted into bags for easy disposal.

SUMMARY OF THE PRESENT INVENTION

According to the present invention there is provided a household compaction unit having a receptacle for the collection of garbage, and hydraulic ram operated by the household water supply to compact said garbage.

In the preferred form of the present invention, compaction takes place without the use of electricity. It is also preferred that compaction is accomplished within plastic bags which may be then tied and removed conveniently.

Full details of the present invention together with an understanding of the foregoing objects and additional advantages will be seen from the description set forth hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

In the description reference is made to the accompanying drawings in which:

FIG. 1 is a perspective view of a device embodying the present invention;

FIG. 2 is a side elevational view of the device shown in FIG. 1 with the side panel removed;

FIG. 3 is a perspective view of the top of the device shown in FIG. 1 with a portion of the cover removed so as to show the interior plumbing;

FIG. 3*a* is a view similar to that of FIG. 3 showing the use of automatic valves and electrical controls.

FIG. 4 is a sectional view taken along line 4—4 of FIG. 1;

FIG. 5 is a view similar to FIG. 4 showing the extension of the hydraulic ram,

FIG. 6 is an enlarged detailed view, partially broken away, taken along lines 6—6 of FIG. 1, and

FIG. 7 are perspective views of two additional and

FIG. 8 embodiments of the present invention.

DESCRIPTION OF THE INVENTION

Referring specifically to the figures, there is provided a rectangular cabinet comprising a pair of parallel side panels **10**, a back panel **12** mounted upon a base **14**, and covered with a top surface **16**. The cabinet is of a size and dimension similar to that of other household kitchen appliances and is finished in suitable manner in either porcelain, wood or conventional enamel sheet metal to closely resemble the same.

The cabinet is divided into a lower section **18** and an upper section **20** by a horizontal bulkhead or wall **22**. Doors **24** and **26** are each hinged at their bottom to the base **14** and bulkhead **22** respectively and are adapted to swing outwardly, exposing the interior of each section **18** and **20**. The lower door **24** is provided with a pair of brackets **27** on which is removably supported a receptacle such as a pail **28** which is likewise provided with a pair of mating brackets **30**.

Mounted medially of the transverse dimension of the horizontal wall **22** by suitable fastening means **32** is a hydraulic ram assembly generally indicated by the numeral **34**. The hydraulic ram assembly **34** is operated by application of household water and is thus provided with a water inlet pipe **36** provided at its exterior end with a suitable fitting **38** for connection to a household water supply (not shown). The inlet pipe **36** is also provided with a conventional faucet **40** (FIG. 2) by which the flow of fluid is controlled into the ram assembly **34**. The hydraulic ram assembly **34** is also provided with an outlet pipe **42** connected to a drain **44** for discharging water to the local sewage system (not shown). A faucet **46** is also provided within the run of the outlet pipe **42** to control the fluid discharged from ram assembly **34**. Cross connecting the inlet pipe **36** and the outlet pipe **42** is a relief pipe **48** provided with a pressure valve **50**. The inlet pipe is also provided with a one way valve or stop valve **52** to insure unidirectional flow of fluid in the direction shown by the arrows A (inlet) and B (discharge) in FIG. 3. The valves **40** and **42** as well as the relief valve **50** and stop valve **52** are easily accessible through door **26**.

As will be further described in detail later herein the lower door **24** and upper door **26** are provided with a mating latch mechanism generally depicted **54** which insures that only one door at a time may be opened.

Turning now to FIGS. **4** and **5** the ram assembly **34** is a telescoping construction comprising an outer support member **56** and an inner movable piston member **60**. The outer member **56** is tubular in form and is provided at its upper end with an outwardly extending flange **60** which is secured by the fastening means **32** to the horizontally extending bulkhead **22**. The lower end **60** of the supporting tubular section **56** is provided with an inwardly extending flange which is adapted to slidably engage the inner piston member **58**. The piston member **58** is also tubular in shape, open at its upper end but closed at its lower or head end **64**. The piston member **58** is provided at its upper end **66** with an outwardly turned flange which is adapted to engage the inwardly turned flange **60** of the outer supporting member **56** when the piston is extended downwardly (FIG. 5) to abut against the horizontal bulkhead **22** when retracted (FIG. 4).

Secured within the piston member **58** between the bulkhead **22** and the inner surface of the head end **64** is an expandable bellows **68** comprising a single cylindrical resilient tube **70**. The resilient tube **70** is preferably made of high grade rubber material, although other elastic material such as rubber substitutes or plastic material may be used. The elastic tube **70** is molded integrally with a plurality of metallic or other inelastic rings **72** spaced axially along its length. The tube and rings are preferably molded as an integral unit with the elastic tube extended but not stretched. The upper and lower ends of the tube **70** are secured by suitable epoxy resins or other adhesives to the bulkhead **22** and the inner surface of the head end **64** so as to insure a fluid type seal therebetween.

Within the tube **70** itself there is secured a high tension helical spring **74**, the upper end of which is fastened to the inner surface of the head end **64** by suitable fastening means. The spring **74** acts to normally bias the piston member **58** upwardly against the horizontal bulkhead **22** and consequently contracts the inner tubular bellows **70** in an accordion like fashion as seen in FIG. 4.

The inlet and outlet pipes **36** and **42** are fitted with suitable nozzle like fittings **76** and **78**, respectively, which are located within the diameter of the tubular bellows **70** to thereby allow water to enter and discharge directly therefrom.

The operation of the device will now be apparent. With the discharge faucet **46** closed, the inlet faucet **40** is opened, allowing water to enter the bellows **70** extending the piston member **58** against the bias of the spring **74** until the two flanges **66** and **62** engage. The pressure of the piston **58** as applied to the head end **64** compacts any garbage located in the pail **28**. Normal household water pressure ranges between 20–30 lbs. per square inch. Therefore, even at 20 lbs. per square inch, if the ram face were only 6 inches in diameter, then the pressure on the interface between the head end **64** of the piston **58** and the garbage within the pail would be at least 500 lbs. (using the formula $Tp=psi(r^2)$). At such pressure any household garbage will be compacted to at least a third to a fifth of its normal size.

The stop valve **52** prevents the increasing pressure created within the tube **70** from backing the water into the inlet pipe, while the relief valve **50** being preset insures that any excess pressure over a predetermined amount releases the water flow immediately into the drain.

After compaction, the inlet faucet **40** is closed and the outlet faucet **46** is opened. The release of pressure thus effected reduces the force in the bellows so that the spring **74** then causes the inner piston member **58** to move upwardly contracting the bellows **70**. As the bellows **70** contracts most of the water is forced out of the bellows **68** through the drainage outlet **44** into the community sewage system. After successive compaction cycles, the receptacle **28** becomes full and can then be emptied by removing it as a whole and disposing of the compacted load.

It is preferred to employ a plastic bag **80** within the receptable **28** and within which the garbage is first placed. After compaction the bag **80** may be tied and used to carry the load in a sanitary, odor free manner. To further insure proper compaction and avoid damage to the receptacle, etc., a resilient block of rubber **82** or other soft plastic material is provided beneath the pail **28**. The pail **28** thus can rest on the block **82** which will then act to absorb the pressure of the piston on the garbage within the can.

To prevent operation of the ram when the can is removed, or removal of the can while the ram is being operated, the simple latch mechanism **54** connecting the two doors **24** and **26** is provided. Each door is operated by a handle **86** having a lever **88** extending therefrom within the cabinet **10**. Mounted on the inner face of each door and extending laterally from the handle **86** and the lever **88** is a transversely extending rod **90** biased by a spring **92**. The rod **90** extends from proximity to the handle **86** to the side of its respective door where it engages within a hold **94** formed in the side thereof. The rod **90** is biased by the spring **92** to be normally engaging the handle and free of the hole **94**. Mounted to the cabinet panel is a vertically positioned lever **96** pivoted at its center **98**. The lever is provided at each of its ends with a pin **102** extending transversely into the hole **94**. Should either of the doors be opened, the handle **86** associated with that door causes the lever **88** to push the associated rod **90** against the bias of the spring **92** into the hole **94** where it then pushes out the associated pin **102** pivoting the lever **98** so that the opposite pin **102** engages within the opposite hole **94** of the other door. Consequently when the door is opened, the other automatically becomes latched in a closed or shut position. As a result, the user of the machine cannot inadvertently open both doors simultaneously and thus damage to the can or hydraulic ram is avoided.

It will be obvious that various modifications and changes can be easily made by those skilled in the present art. For example, the type of faucet shown may be replaced by similar devices. The can hangers and can mountings may likewise be modified by the use of conventional equivalent hanger structures. The door latch mechanism may be replaced also by other latching devices.

The present apparatus may be made automatic, that is, can be made to have certain electrical control systems **114**, such as a switch and cycle or timer relays and solenoid actuated valves **116** which create automatic and simplified operation. It is preferred, however, to maintain the present device free of electrical installation so that its installation in the home may be easily and conveniently made.

Two modifications are shown in FIGS. **7** and **8**. In FIG. **7** the door to the lower part of the cabinet is swung along a vertically extending hinge, such as a piano hinge. The receptacle may be supported, not on the door but on a resilient block **110** which is cut out to secure the receptacle from movement. In FIG. **8** the cabinet is provided with a rounded front and a door **112** which is rolled in an arcuate manner back within the cabinet rather than being swung outwardly. In either case the two units are essentially the same as that described earlier.

It will be observed that a compact, simple household compaction unit is provided by the present invention. Since the present disclosure indicates numerous modifications and changes which can be made, the foregoing description is to be taken only as illustrative of the principle stated.

What is claimed is:

1. A garbage compaction unit comprising a cabinet, a receptacle for receiving garbage therein, a hydraulic ram assembly mounted within said cabinet having piston means movable into and out of said receptacle, conduit means connecting said ram to a source of water and to a drain for said water, and valve means for selectively flowing water into and out of said ram assembly to extend or retract said piston with regard to said receptacle, said hydraulic ram assembly comprises a tubular member having a longitudinal axis and secured at one end to a horizontal wall in said cabinet, a piston member having a head end fully mounted to slide within said tubular member, a bellows expandable along a longitudinal axis, said bellows being mounted coaxially within said piston with one end secured to the inner surface of said head end and the other end secured to said horizontal wall, the water and drain conduits communicating with the interior of said bellows, spring means for normally biasing said piston in closed position, the introduction of water into said bellows expanding said bellows, whereby the movement of said bellows causes extension and retraction of said piston.

2. The unit according to claim **1** wherein said bellows comprises a resilient tubular member having a plurality of inextensible bands axially spaced therealong whereby said tube is constrained from radial expansion.

3. The unit according to claim **2** including fluid tight sealing means connecting the bellows to the piston and to the cabinet.

4. The unit according to claim **1** including means for mounting the receptacle beneath and axially in line with the piston.

5. The unit according to claim **4** including a door for said cabinet, said receptacle being mounted on said door.

6. The unit according to claim **5** wherein said door is hinged to said cabinet to swing outwardly removing said can from said cabinet.

7. The unit according to claim **5** wherein said door slides within said cabinet to expose said receptacle.

8. The unit according to claim **5** including pressure relief means to control the force of said water within said bellows.

* * * * *