United States Patent

Harza

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[54] **METHOD FOR GARBAGE DISPOSAL**

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Related U.S. Application Data

[60] Continuation of Ser. No. 824,874, May 15, 1969, which is a division of Ser. No. 677,206, Oct. 23, 1967, Pat. No. 3,514,969.

[52] **U.S. Cl.** **62/62,** 62/341, 100/93

[51] **Int. Cl.**.....**F25d 25/00**

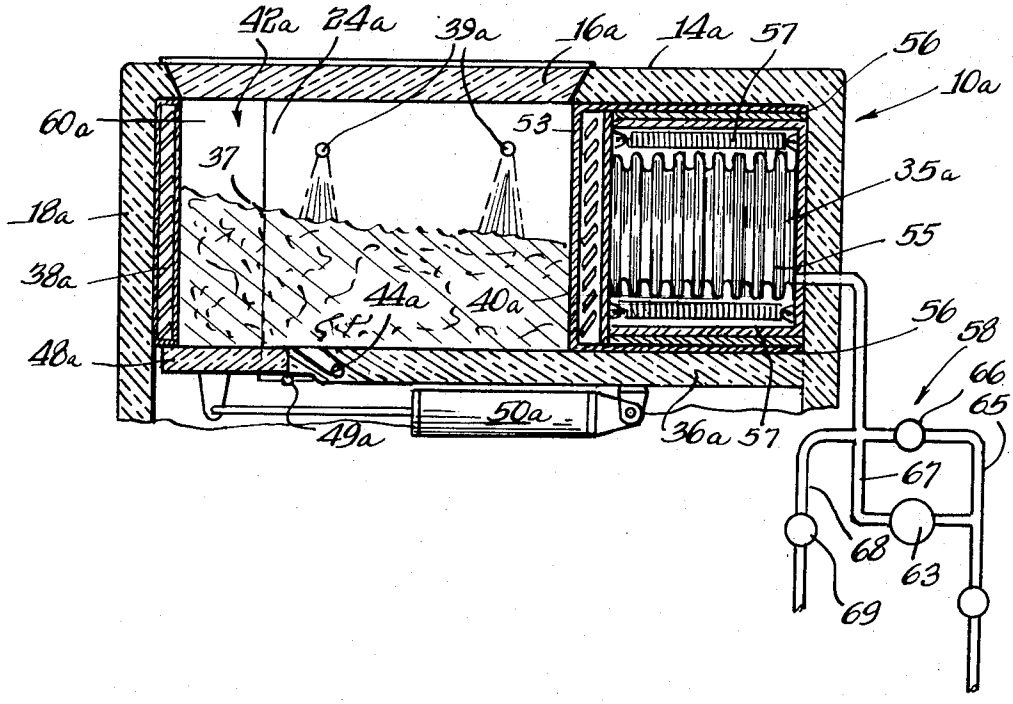
[58] **Field of Search** 62/62, 64, 341; 99/149, 192, 99/195; 100/93

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[57] **ABSTRACT**

A method of disposing of refuse which comprises wetting nominally heterogeneous and at least partly dry refuse with water, compressing the moistened refuse, and freezing the moistened, compacted refuse into solid pellets.

4 Claims, 5 Drawing Figures



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SHEET 1 OF 2

Fig. 1.

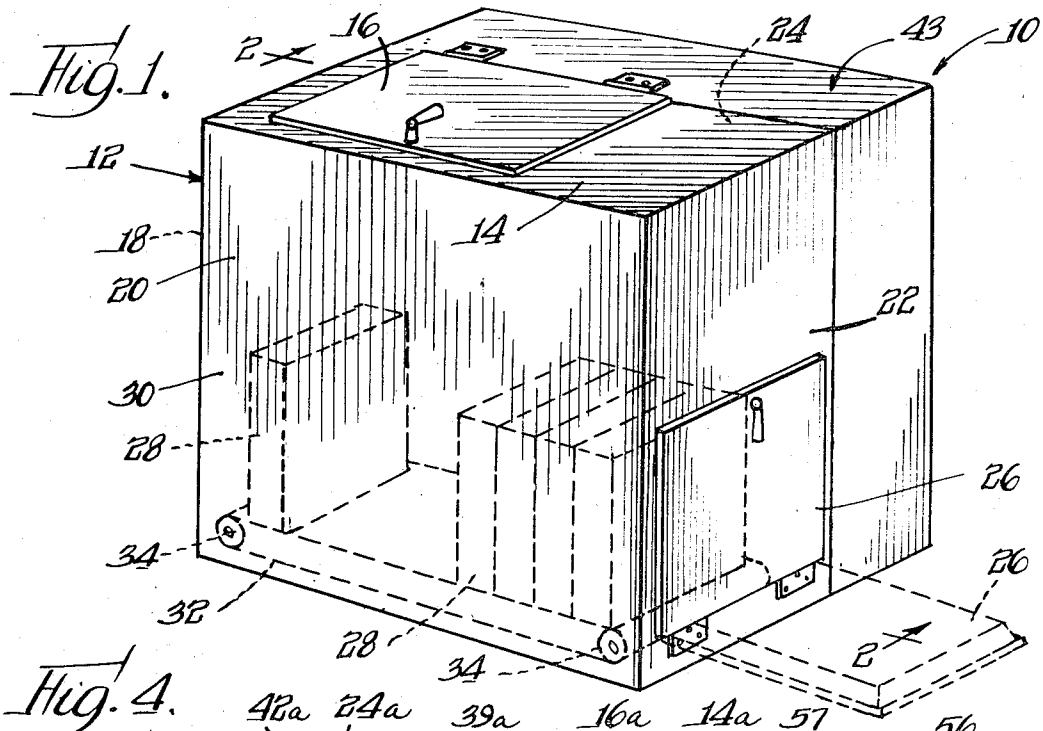


Fig. 4.

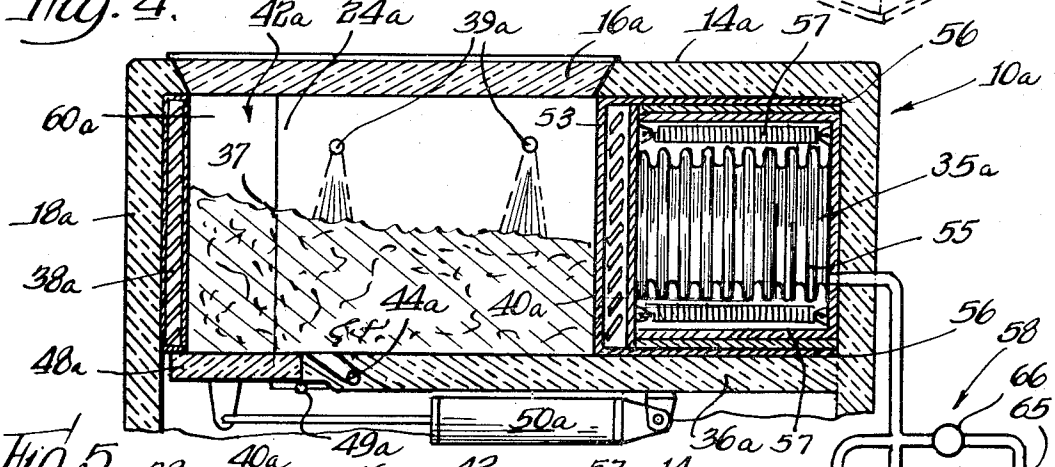
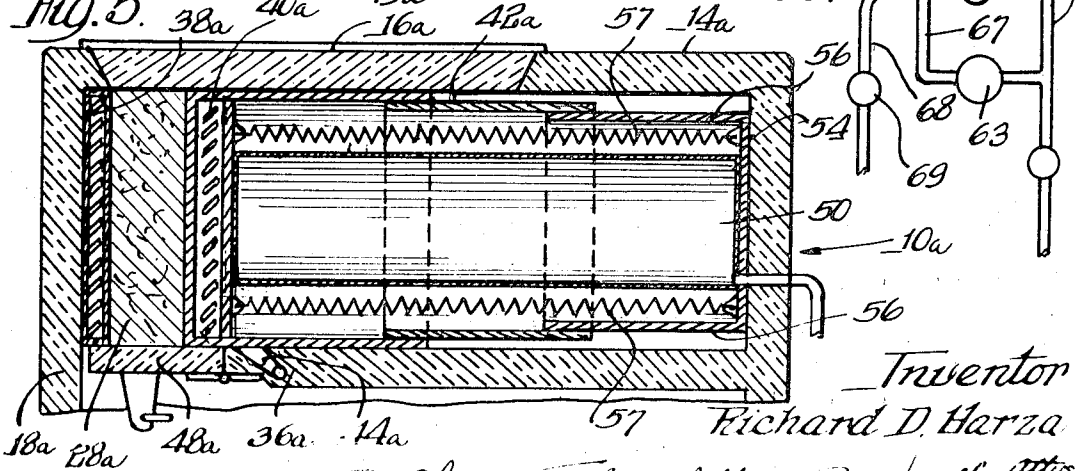


Fig. 5.



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Fig. 2.

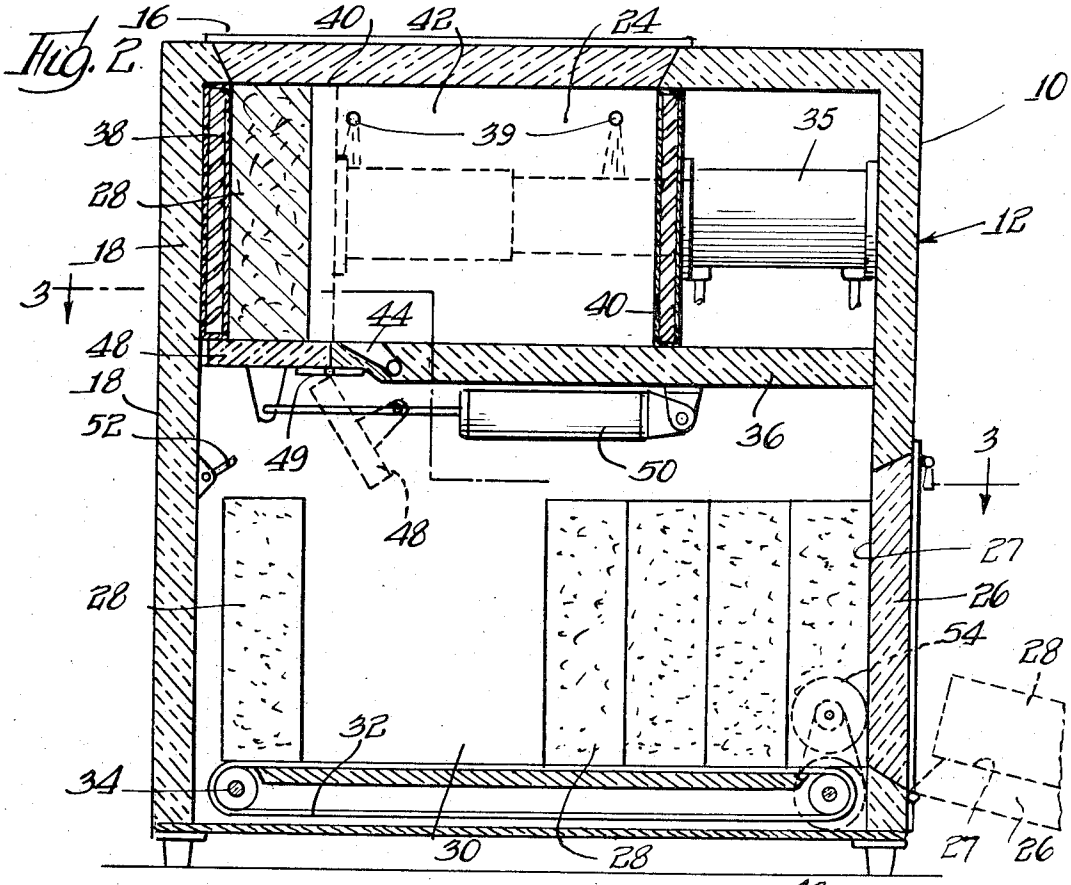
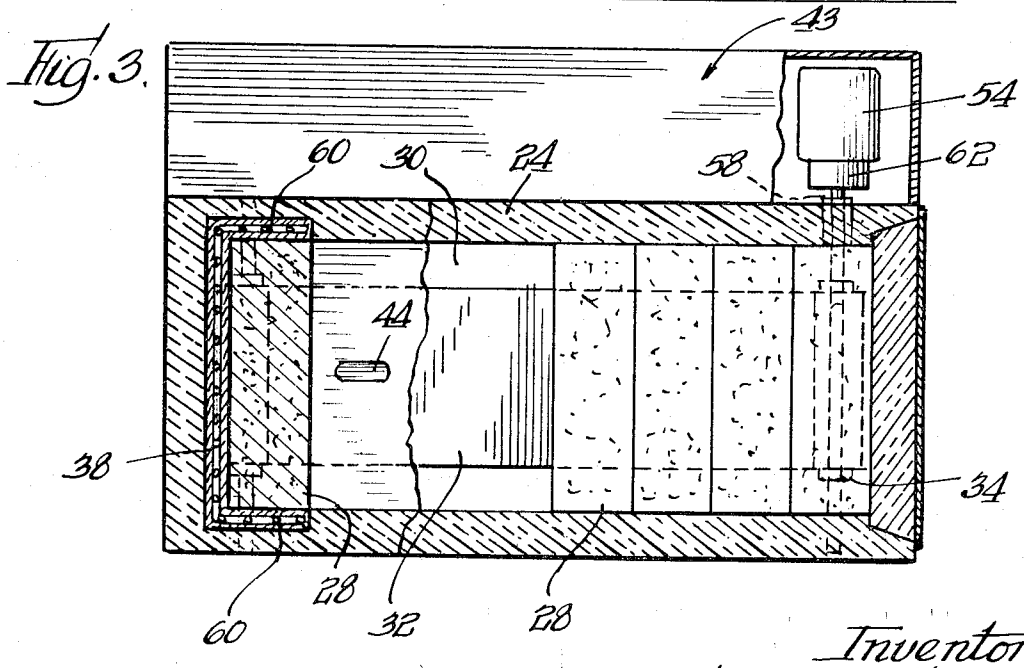


Fig. 3.



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METHOD FOR GARBAGE DISPOSAL

REFERENCE TO RELATED APPLICATIONS

This application is a continuation of abandoned application Ser. No. 824,874, filed May 15, 1969 and entitled "METHOD OF GARBAGE DISPOSAL" which in turn is a division of Ser. No. 677,206 filed Oct. 23, 1967 now U.S. Pat. No. 3,514,969.

BACKGROUND OF THE INVENTION

The present invention relates generally to the disposal of refuse or garbage, and more particularly to the initial collection or disposition of garbage or refuse prior to its ultimate disposition.

Presently, when a housewife, etc., wants to deposit garbage, she does so in a garbage can or container located on the premises. Because the garbage is exposed to the atmosphere, in not too long a period after being placed in the can it begins to decay and becomes rancid. As the garbage decays an offensive odor is given off thereby and vermin tends to collect about the garbage and in turn causes the possible breeding of bacteria and the spread of disease. Furthermore, the garbage gathered in these cans or containers is most commonly removed by trucks into which loose or partially wrapped garbage is placed. Often these trucks have an offensive odor, and as they travel from pick-up to pick-up sometimes lose particles of garbage on the public thoroughfares.

If the housewife is more fortunate she may have a garbage disposal of the type which grinds the garbage into small finely cut pieces and which then flushes these pieces into the drain pipe. This type of garbage disposal also has its drawbacks, namely, the fact that the disposal will not accommodate bones, stringy meat particles, plastics, and the like, and it tends to be noisy in operation. It also tends to overload sewage disposal or processing plants.

SUMMARY OF THE INVENTION

Accordingly, it is a general object of this invention to provide a method and apparatus for disposing of garbage which avoids the disadvantages of the prior art garbage collection or disposing methods and apparatus mentioned above.

It is a more specific object of this invention to provide a garbage disposal to be used in a home, restaurant, etc., that receives practically all forms of garbage and renders it into a dense, stable and non-offensive condition.

It is still another object of this invention to provide garbage disposal apparatus in which garbage may be stored without giving off an offensive odor or becoming rancid, and after which may be easily transported to its ultimate disposition.

It is yet another object of this invention to provide a method and apparatus for changing loose garbage into a compact, compressed, solid article which may be easily disposed of as land fill or through incineration, and from which usable materials may be reclaimed.

Briefly, a preferred embodiment of the garbage disposal unit according to the invention comprises a housing into which garbage is placed. Included in the housing are means for spraying the garbage with a freezable solution and further means for compressing

the garbage into a compact state. After the garbage is sprayed and compressed, it is frozen to a solid state by refrigeration means also located in the housing. Subsequently, the frozen garbage block or pellet is stored in a separate freezer compartment also in the housing. The frozen pellets of garbage remain in the storage compartment until they are to be picked up and neatly and odorlessly transported to their ultimate place of disposition.

DESCRIPTION OF THE DRAWINGS

A better understanding of the invention and its organization and construction may be had by referring to the description below in conjunction with the accompanying drawings, of which:

FIG. **1** is a perspective view of a garbage disposal apparatus according to the invention;

FIG. **2** is a sectional view of the apparatus of FIG. **1**, taken along the line **2—2** thereof;

FIG. **3** is a sectional view of the garbage disposal unit of FIG. **2**, taken along the line **3—3** thereof;

FIG. **4** is a portion of a side section view of an alternative embodiment of a garbage disposal unit according to the invention; and

FIG. **5** is a side section view of the apparatus of FIG. **4** showing the compressing means in its operated state.

DETAILED DESCRIPTION

Referring now to the drawings more in detail, FIG. **1** thereof shows a garbage disposal unit **10** according to the invention. The unit comprises a housing portion **12** which includes a top wall **14** having a door therein, two sidewalls **20** and **24** and two endwalls **18** and **22**. Attached to wall **24** is an additional portion **43** provided to enclose a motor hereinafter to be disclosed. Door **16** in top wall **14** is provided to receive in compartment **42** of unit **10** refuse and garbage of practically any kind, including food wastes, tin cans, metal bottle tops, paper boxes, glass, plastic, small metal objects, and the like, which is to be compressed and made into frozen pellets such as **28**, shown in the lower portion **30** of unit **10**. Outlet door **26** located in endwall **22** is provided so that the stored frozen garbage pellets **28** may be removed from the lower freezer section **30** of the unit when they are to be ultimately disposed of. A looped conveyor belt **32** which runs on rollers **34** in the freezer compartment **30** of the garbage disposal unit is provided to move the frozen garbage pellets **28** from a point in the freezer compartment adjacent the endwall **18** to the other endwall **22** near the outlet door **26** for removal therefrom.

FIG. **2** of the drawings, as mentioned above, is a sectional view of the unit **10** of FIG. **1** taken along the line **2—2** thereof. As can be seen in FIG. **2**, the door **16** into which garbage is placed in the unit **10** is closed and the compression mechanism **35**, here shown as a telescoping, hydraulic cylinder unit, is in solid lines in a retracted position and in dotted lines in its extended position; i.e., in a position for compressing the garbage into a densely compacted pellet. A freezer plate **38** located along end wall **18**, and against which the compressed garbage **28** is packed, with extensions **60**, surrounds the garbage on three sides thereof, as shown in FIG. **3** of the drawings. The plate **38** is used to freeze the garbage into a compact solid pellet. Prior to the

freezing and immediately after the garbage has been placed into the unit through door **16**, sprayers **39**, which are embedded in the sidewall **24** of compartment **42** of the unit, douse the uncompressed garbage with a spray of freezable liquid, such as water. After the spraying of the garbage takes place, mechanism **35**, forces plate **40** against the moistened garbage and compresses it into a compact unit **28**. As the garbage is being compressed, the excess water provided by sprayers **39** is drained from the compartment **42** of the unit through drain **44** thereof to a nearby sewer, or the like. Plate **40** attached to the compressing mechanism **35** preferably, but not necessarily, includes refrigeration means so that the compressed moistened garbage may be frozen more quickly and thoroughly.

After the freezing of the garbage is accomplished, the refrigeration plates are warmed briefly at a high temperature partially to melt the surface of the frozen pellet so that the frozen pellet will be released therefrom to drop into freezer compartment **30** in the lower portion of unit **10**. The warming of the freezer plates **38** and **40** may be provided by heating coils embedded therein, or in some other suitable manner. The dropping of the frozen garbage pellet into the freezer compartment is accomplished by means of a trap door **48**, (shown closed in solid lines and open in dotted lines) connected by a hinge member **49** to divider wall **36**, shown in FIG. **2**. The door, as can be seen therein, is hydraulically operated by means of a hydraulic cylinder unit **50**. It may, however, be operated in some other suitable manner. When the door **48** is opened, the pellet **28** descends into the compartment **30** of the unit, tripping a switch **52** located along the inside of endwall **18** of the unit, which in turn closes to operate motor **54** located in the enclosure **43** attached to sidewall **24** to in turn cause conveyor **32** to move toward the outlet door **26** thereof. After the tripping of switch **52** by the descending pellet, conveyor **32** moves for a fixed period of time, sufficiently long to move a frozen garbage pellet from beneath the door **48** to a point in front of door **26**.

As more garbage is placed into the unit and wetted, compressed and frozen, a number of pellets become lined up along belt **32** of freezer compartment **30** of the unit. Periodically, or when compartment **30** is filled, the pellets are removed therefrom and disposed of. This is accomplished, as explained briefly above, by means of door **26** which when opened, as shown in FIG. **2**, allows for the removal of the pellets. The pellets may be tilted and then slid along the inner surface **27** of the door **26**. From there they may be placed by means of conventional ice tongs, or similar device, into a refrigerated truck and carried away. This eliminates the need for a conventional type garbage truck which more often than not includes costly apparatus for compressing the garbage into a smaller, denser mass. By eliminating the conventional type garbage truck, the odor and vermin breeding disadvantages mentioned above are also eliminated.

In a preferred embodiment of the garbage disposal unit according to the invention, the dimensions of the pellets are approximately 12 inches by 12 inches by 2 inches. These dimensions, it has been found, provide for adequate freezing of the moistened garbage. If the pellets are wider than two inches, a problem of freezing them rapidly may arise.

Referring now to FIG. **3** of the drawings, the motor **54**, located in enclosure **43** and which is activated for a predetermined length of time by means of switch **52**, can be seen attached to one of the rollers **34** which carries the conveyor belt **32**, by means of an axle **58**. The motor **54** is provided with a slip clutch **62** so that, if a frozen block or pellet **28** is adjacent door **26** of the unit and the belt **32** continues to be propelled, no damage will come to the motor **54** because of the additional forces applied thereagainst. As mentioned previously, freezer plate **38** is preferably U-shaped to wrap about the sides of pellets **28** so that rapid, adequate freezing thereof can be accomplished. The extensions **60** of freezer plate **38**, as can be seen, are positioned to make contact with movable plate **40** which also preferably comprises refrigeration coils. Thus, when the two plates are in contact with each other, the entire pellet except for the top and bottom thereof is surrounded by a freezing unit. It should be noted that the walls **18, 20, 22, 24** of the unit, as well as wall **36** which divides compartment **42** and compartment **30**, are all adequately insulated, much as in a conventional freezer chest.

In order to enhance the understanding of the invention, an alternative embodiment thereof is set forth in FIG. **4** of the drawings. In this alternative form of the invention, like numerals have been used to designate like parts with the suffix letter *a* being employed to relate the elements associated with FIGS. **4** and **5** of the drawings to those of FIGS. **1** through **3** thereof. Because it is the compressing mechanism **35***a* of the garbage disposal unit **10***a* which has been modified, only this portion of the unit has been shown in FIGS. **4** and **5**.

As can be seen in FIG. **4**, the top wall **14***a* of the unit **10***a* also includes a door **16***a* through which garbage **37** is placed into compartment **42***a* thereof. Spray nozzles **38***a* are likewise implanted in the inside sidewall **24***a* thereof, and freezer plate or panel **38***a* is provided adjacent the endwall **18***a* thereof. It likewise is seen that a hydraulic cylinder **35***a* is provided to open trap door **48***a* to allow the frozen pellets **28***a*, shown in FIG. **5** of the drawings, to descend from compartment **42***a* into the freezer compartment below (not shown). The mechanism **35***a* shown in this embodiment of the invention comprises, like the compressing mechanism **35** of the previously described embodiment, a movable plate **40***a* for compressing the refuse placed into compartment **42***a* of the unit. The plate as shown here includes freezing coils **53** to aid the freezer plate **38***a* in the freezing of the moistened garbage pellets (not shown).

The compressing mechanism **35***a* in this version of the invention includes a substantially cylindrically shaped bellows-like inflatable bag member **55** shown in its normal, collapsed position in FIG. **4** of the drawings. Around the bellows section **55** of the mechanism **35***a* are located spring members **57** and cylindrical tube members **56** which, as shown in FIG. **5** of the drawings, are telescopically elongated upon the inflation of bellows **55**. These tube members provide a rigid structure to stabilize and guide the bag member as it is inflated, end springs **57** aid in restoring the bag member **55** to its original, non-inflated position. The bag is inflated by a pressure mechanism **58** shown attached thereto. Initially, the bag is filled with water from the municipal water supply through pipe **65** and valve **66** using only the pressure applied by the normal flow of water

therefrom. In order that the refuse be compacted very tightly, an additional pumping circuit **63** is provided to apply to the bellows **55** a water pressure of 100 pounds per square inch, which is adequate to cause plate **40***a* of the unit to press firmly against the refuse in order that it may be compressed into a compact state. When the water is diverted through pumping station **63**, valve **66** is closed and the water passes through pipe **67**. After the moistening and compressing of the refuse by means of mechanism **35***a*, the refrigeration plates **38***a* and **40***a* are operated to freeze the moistened, compacted refuse into a frozen pellet, after which the pellets are dropped to the freezer compartment (not shown) and stored just as in the garbage disposal unit of FIGS. **1** through **3** of the drawings.

Looking more closely now at FIG. **5** of the drawings, it can be seen that the bellows or inflatable member **55**, as well as springs **57**, are completely outstretched and the side telescoping cylinders **56** are in an elongated state. After the pellet is dropped to the freezer compartment the liquid is withdrawn from bellows **55** through pipe **68** by means of suction pump **69** or by natural drainage and may be stored for recirculation into the bellows at a later time.

The steps of the method of disposing of garbage and the sequence of operation of the respective means included in the garbage disposal unit according to the invention to carry out this method are very important and should for best results be as follows: First, the raw garbage must be placed into compartment **42** of the unit, after which the spray nozzles **39** are turned on to moisten or spray the garbage or refuse placed therein with a freezable substance. Next, the moistened garbage is compressed and at the same time the excess water used to moisten the garbage is removed therefrom through a drain located in divider wall **36** of the unit. Once the wetted garbage has been compressed sufficiently, the U-shaped refrigerator plate **38** and movable refrigerator plate **40** are chilled to freeze the garbage into a solid state, after which the plates are heated briefly to loosen the pellet therefrom. The pellet is then dropped or removed from the first compartment and stored in the refrigerated compartment below.

Thus, the method and the disposal unit, according to the invention provide for the clean odorless, germ-free collection, storage and disposal of various types of garbage in a home, restaurant, apartment house, etc. Furthermore, because the refuse is in a frozen state, it is easy to transport to its ultimate place of disposition, and this in turn eliminates the necessity of expensive, noisy disease-bearing garbage trucks of the type now in use. Furthermore, smaller, less expensive trucks can be used, since the garbage is greatly compacted; i.e., to about one-tenth original volume, and since grinding or shredding in some sort of compacting mechanism can be omitted from the trucks. (Conversely, larger trucks can carry heavier and more efficient loads).

While no means are shown, it is contemplated that a preferred embodiment of the garbage disposal unit according to the invention will incorporate cycling apparatus to automatically cause the various steps of the disposal operation to take place, much as in the case of the cycling apparatus of a dish washer, washing machine, or the like.

It will be obvious to those skilled in the art that changes and modifications may be made without departing from this invention in its broadest aspects and therefore the aim of the appended claims is to cover all such changes and modifications as come within the true spirit and scope of the invention.

What is claimed:

1. A method for disposing of nominally heterogeneous and at least partly dry refuse comprising the steps of: dumping said refuse in random disarray normally having voids therein at a disposing station; moistening said refuse with water at said station; compressing said moistened refuse substantially to eliminate voids and to bring the components of said refuse into close contiguous relation whereby said refuse forms a compacted structure at said station; draining the excess water from said moistened refuse simultaneously as the refuse is being compressed, freezing said moistened, compacted structure at said station while maintaining pressure thereon at least at the start.

2. A method for disposing of refuse as claimed in claim **1** further including the step of storing the frozen, compacted refuse structure in a freezer chamber to await the ultimate disposition thereof.

3. A method of disposing of refuse as set forth in claim **1** wherein the step of compressing the refuse comprises compressing the refuse between a ram and back-up member.

4. A method of storing compactable and freezable waste comprising the steps of: dumping said waste in random disarray normally having voids therein at a disposing station; adding sufficient water at said station if necessary to freeze said waste into a coherent block; applying a compressive force to the waste at said station substantially to eliminate voids and to bring the components of said waste into close contiguous relation in order to compact said waste into a dense mass of a predetermined geometric shape; draining any excess water from said waste; removing sufficient thermal energy from said waste so as to cause said dense mass to retain its compact geometric shape; and storing said waste at a temperature below the freezing point of water.

* * * * *