

WASTE DISPOSAL SYSTEM AND METHOD

FIELD OF THE INVENTION

5 This invention relates to waste disposal, more particularly to the disposal of waste from multiple occupancy buildings such as apartments or office blocks.

BACKGROUND OF THE INVENTION

10 The problem of domestic waste disposal is world-wide and applies most to places with a high population density, such as Singapore and European countries, for example the United Kingdom. The amount of waste per household is generally increasing.

15 Singaporeans have been accustomed to an efficient refuse collection for decades. The solid waste collection service in Singapore is very successful due to its highly automated and efficient system. Typically, combustible solid waste is incinerated, and resulting ash and non-combustible waste are disposed of by landfill. However, such a service cannot be taken for granted indefinitely. In land-
20 scarce Singapore, the amount of sanitary landfill sites is limited. Couple this with the ageing workforce and difficulties in recruiting workers and it is clear that there is a pressing need for improvement of the waste disposal cycle in Singapore. Elsewhere, such as in Europe, landfilling with refuse is similarly undesirable.

25 Known waste disposal systems do not discriminate between users who generate different amounts of waste. Instead, users are charged for waste disposal service at a flat rate, and based on the type of houses or flats they reside. . This scheme favours those who have a lot of waste to dispose, hence is unfair to users who dispose less but are nonetheless charged under the same rate

30

 To cater the need of processing the increasingly disposed wastes, more waste disposal facilities are being built. However, the costs of building waste

disposal facilities such as incineration plants are extremely high It is clear that Governments cannot afford to continue subsidizing waste disposal in the conventional way.

5 With respect to the collection of recyclable waste, there are presently two comment methods used, i.e. the "door-to-door" collection and "drop-off / central" collection.

10 Door-to-door collection of recyclables has been successfully done for many years in Singapore, but this may not be the best method for apartment blocks, especially high-rise buildings, due to the fact that the recyclable material must be taken down to ground level from every apartment.

15 The second method requires less manpower as it uses centralized collection points where residents are required to bring recyclables for recycling. However this method is not very successful because it is not as convenient for users as the first method and human nature is such that people will tend to take the easiest way out.

20 As a consequence, residents are asked to bring down their recyclable matter, such as waste paper and cans, and deposit them at bins designated for different categories of waste. This method is preferred as besides being more efficient, it also helps to nurture responsible social behaviour in the long term. Thus, the country is able to cut down on garbage as more people are more
25 inclined to separate outer matter such as bottles, paper, plastics and cans for recycling.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to improve efficiency of waste matter collection from multiple-occupancy buildings, particularly high-rise, multi-storey buildings such as dwellings in apartment buildings, hotels or offices in business areas.

It is a further object of the present invention to encourage people dwelling in apartment buildings or working in office blocks to separate out recyclable matter from their waste. A typical type of recyclable matter arising in both situations is paper which is bulky and takes up a high proportion of the volume of general waste and which may be easily separated out for recycling.

In accordance with a first aspect of the present invention, there is provided a waste collection system for a multiple-occupancy building, the system includes a communal waste collection zone, a waste chute leading to the waste collection zone, a plurality of entry openings into the waste chute each opening for accepting waste from a user, a shutter associated with each opening to selectively allow or prevent passage of waste from the respective entry opening to the waste chute leading to the waste collection zone, a shutter lock for locking the shutter in a first position for preventing movement of the shutter, and a shutter opening device, which enables the shutter to move to a second position for passage of waste through the opening when activated.

The system may include a timer to activate the shutter opening device for a pre-specified period of time. The shutter opening device may simply deactivate the shutter lock.

The waste collection system of the invention may further comprise a measuring mechanism for measuring the amount of waste deposited by the or each user. This may be done by volume, or preferably, weight.

The waste is usually wrapped in a containing material, such as a flexible bag or a rigid box, which may itself be made of recycled or recyclable material, for ease of passage along the chute. The container could be in a standard size to pass easily along the chute. The chute may include a suction device to promote travel of the waste along the chute and thereby to keep it clear. The container may be supplied to users by a central administrator of the waste collection system.

The system may comprise a calculator for costing the waste deposited by each user and also a memory device for recording the calculated cost. Users would pay for the waste collection according to the calculated cost and this will encourage users to minimize generally their waste and also to recycle waste where possible, which will further reduce the waste to be collected.

In one embodiment, the system comprises a user-access device, for example a mechanical key, which may be a user-identification device such as a keypad on which users enter their own codes e.g. PIN codes, or a personal smartcard, which is employed to activate the shutter opening. The amount and/or the cost of the waste can be automatically recorded on the smartcard. The user-identification device may alternatively be a fingerprint sensor.

The above-mentioned pre-specified time may be sufficient to insert a plurality of waste items into the chute, such as 20 or 30 seconds. If the amount of waste deposited is measured, the particular waste is isolated, for example by preventing simultaneous use of the chute by a plurality of users. The waste collection system of this invention may be computer-controlled. The depositing period for each user may be specified by the computer and may be set according to the number of apartments in the building. Alternatively, each user may be allocated certain times for depositing waste. The computerized system may incorporate an interactive device at each opening, for data display and input such as an LCD and keypad. This would be useful to organize users who arrive at openings at the same time so that their waste can be weighed separately.

A waste collection system embodying the present invention is of particular use in high rise apartment blocks, where people cannot easily take waste outside to a ground-level collection centre. Openings to the chute may be provided on each floor or even in each apartment.

5

According to a second aspect of the present invention, which may be used independently of or in co-operation with the first aspect of the invention, there is provided a communal waste collection centre, comprising apparatus to obtain data regarding the recyclable nature of waste brought to the centre by each user, a user-identification device, and apparatus for rewarding the user according to the recyclable nature of the waste.

In one embodiment, the degree of recyclability of the waste is rewarded. For example, the amount of reward may depend on the type of and the weight of the waste. Typically, the recyclable waste comprises articles such as newspaper, magazines, white paper, plastics, aluminum and steel cans, glass bottles, batteries, cardboard and metal. The system will encourage people to bring recyclable goods to the waste collection centre, which will not only reduce their general waste but also increase recycling of resources. The system is highly beneficial for apartment buildings or other locations of multiple occupancy or of many dwellings in close proximity. All the recyclable matter is collected centrally, which is monetarily and environmentally economical.

If the centre is employed in conjunction with the waste collection system for a multiple-occupancy building described above, the personal user-identification device may also be used in the communal waste collection centre and a cost balance may be recorded between the waste deposit cost and the recycling reward.

According to another aspect of the present invention, there is also provided a method of using a waste collection system in a community, comprising providing a waste collection system according to the further aspect of the invention, a user

attending a waste entry opening in the chute leading to the communal waste collection zone, the user putting waste into the entry opening against the shutter, following which the shutter is released to drop the waste into the chute so that it travels to the communal waste collection zone, where the waste is deposited.

5

The shutter release may be activated for a pre-selected time, which is typically less than a minute.

10 In accordance with a further aspect of the invention we also provide a method of collecting waste in a community, comprising providing a waste collection system according to the first aspect of the invention, accepting waste through an entry opening of the waste chute leading to the communal waste collection zone, retaining the waste adjacent the waste entry opening against the shutter associated with that opening, and activating release of the shutter, to
15 deposit the waste into the waste collection zone.

In this invention, release of the shutter is preferably achieved by a user-access device, which may be a portable, personal device, for example a smartcard.

20

Furthermore, in another further aspect of the invention, there is provided a method of collecting recyclable waste in a community, comprising receiving, identifying the recyclable nature of a waste deposit from a user, identifying the user depositing the waste, and rewarding the user according to the recyclable
25 nature of the waste.

The degree of recyclability of the waste may be rewarded to encourage recycling. The user may be identified from a list of known users in a community and may be centrally charged for non-recyclable waste collected and rewarded for
30 recyclable waste personally taken to the communal recycling centre. This system is especially effective for a high-density population, for example in a multi-storey building.

In another aspect of the present invention, the waste collection system includes a measuring mechanism mounted in the chute adjacent each shutter, so as to allow simultaneous measuring of the weight of waste deposited by a plurality of users without isolating a particular waste. The system may include a sensor for detecting a presence of the deposited waste, and to count the number of waste units disposed.

According to another aspect of the present invention, which may be used independently of or in co-operation with any of the proceeding aspects of the invention, there is provided a waste bin for draining liquid from the deposited waste before depositing the waste to the waste collection system, the waste bin comprising a bin having a main body, a strainer that sits inside the body of the bin, for receiving the deposited waste and draining liquid from the deposited waste, a bin cover having integrated locking means for securing the cover to the bin so as to prevent children from tampering with the waste bin. The locking means formed on the cover of the bin co-operates with the rim of the strainer to inter-lock the cover and the bin. The bin further includes a groove surrounding the main body and facing upwards to contain liquids , so as to prevent insects such as cockroaches, ants, bugs etc from crawling into the bin.

Solutions provided by the present invention have many advantages which includes, for example, due to the pay-as-you-throw scheme, unnecessary usages of the disposal system is reduced, and reuse and recycle of wastes are encouraged. The present invention also provides a fair charging system for all the users.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows schematically a high-rise building with a waste collection system according to one embodiment of the present invention.

Figure 2 shows schematically a close-up view of a shutter opening employed in the waste collection system of Figure 1.

Figure 3 is a flowchart illustrating one method of waste collection using the system of Figure 1.

Figure 4 shows schematically a communal waste collection centre embodying a further aspect of the invention for centrally collecting recyclable waste matter.

10

Figure 5 is a flowchart showing schematically one method of waste collection using the waste collection centre of Figure 4.

Figure 6 is a schematic diagram showing a waste disposal system according to another embodiment of the present invention.

15

Figure 7 is a cross sectional view showing a waste bin associated with the waste collection system of the present invention.

20 DETAILED DESCRIPTION OF THE PREFERRED E1BODIMENTS

Reference will now be made in detail to the preferred embodiments of the invention, as illustrated in the accompanying drawings.

25

In accordance with one embodiment of the present invention, a waste collection system for a multiple-occupancy building includes a communal waste collection zone, a waste chute leading to the waste collection zone, and a plurality of entry openings into the waste chute, each opening for accepting waste from a user. As broadly shown in Figure 1, each waste collection system for a multi-storey building 1 includes a communal waste zone 2, a chute 3 joining all the storeys of the building and leading to the waste collection zone 2, and an entry opening 4 on each floor of the building 1 into the chute 3. According to the

30

present embodiment, a shutter 5 is associated with each opening 4 to control the access from the opening into the chute 3.

Referring to Figure 2, each entry opening 4 has an external cover 6 which can be manually opened and closed as required. Interiorly, a motorized shutter 5 is hinged along its upper edge and opening/closing of the shutter 5 is controlled by a computer C on request by a user wishing to use the chute *via* a user-access device D.

The user has a portable access device in the form of a card which remotely unlocks a shutter lock device 10 which triggers a shutter opening device 11, for example a motor to release the shutter 5 for a pre-set period of time, for example 20 seconds.

The exterior cover 6 and the internal shutter 5 are mutually angled so that a waste item (not shown) placed on the inside face 7 of the exterior cover is wedged between the cover and the shutter (when the cover is opened or closed) until the shutter 5 is opened, whereupon the waste item is allowed to fall down the chute 3 aided by the force of gravity.

The bottom end of the chute 3 leads into the waste collection zone 2 *via* a weighing mechanism 8. This weighing mechanism may be in the form of a suspension tray T attached to load cells L. After weighing the waste, the tray opens and drops the weighed waste into the waste collection zone 2. The weight is recorded on the computer. In one example, the weighing mechanism has a maximum capacity of 50 to 100kg and a resolution of, say 0.1 or 0.2 kg. To dampen the impact of waste falling from high up, a thick, sponge say 20cm, may be seated on the weighing tray.

Instead of measuring the weight accurately, labels could be employed to give an approximate idea of the weight, for example small, medium or large.

It should be noted that a manual override may be provided, as a back of the shutter system, in case the motor for the shutter breaks down. When this happens, the user is given a manual override to control the shutter manually so that he could throw the waste down the chute. In such a case, the computer would
5 note the time when the chute is open and would work out the likely weight as fairly as possible within that time period.

The manual override may be in the form of a pin, which the user may pull to enable the shutter to be opened manually.

10

A user is charged for disposing the waste according to the weight of the waste. The system is computer-controlled. Central to the control of the waste disposal is a host computer located at a convenient place within the multi-storey block. This computer may be accessible from the waste collector, for example the
15 Town Council, *via* a built-in modem. A suitable software may be provided to monitor the activities of the chute opening, closing, weighing of the waste, data logging, reporting, accounting and monitoring system. The computer polls every dwelling or office unit, trying to detect the first movement of the chute hopper. There will be one computer to each building that scans data of each dwelling or
20 office unit. At the end of the month, each unit would be sent an automatic log of the activities of the chute including the fees charged according to the total weight of waste collected in the waste collection zone. Statistics shows that the average household throws away an average of 1.5kg per day. If the dwelling or office throws less, then the user would save over the long term. Conversely, users who
25 dispose more waste would be charged more. The "pay-as-you-throw" scheme is thus a fair system for all the users.

In the event that two or more users are to dispose at the same time, the computer would allow one user access and inform the other users to wait for a few
30 seconds, for example *via* an LED signal that signifies the chute is busy. Each user is restricted to use the chute for a pre-set period of time for one disposal, for example 20 seconds. If he has more than one waste item, he has to signal to the

computer that he has more than one to dispose of. Otherwise the computer will close the shutter automatically after the pre-set time period expires, and give the other user the right to use.

- 5 If a user leaves the chute cover open, the computer will detect this situation and emit a reminder signal, and close the shutter.

Referring to Figure 3, in one embodiment, a user attends a waste entry opening in a chute leading to a communal waste collection zone, and may show
 10 an access device (step 51). The user then puts waste into the waste chute (step 53) after having opened the chute cover, if there is one (step 52). The waste may be in a wrapping such as a bag. The shutter is then opened and waste is released down the chute (step 4). Next, the waste may be weighed and the weight is recorded, for example on a central computer (step 55). Finally, the
 15 waste is deposited in the waste collection zone (step 56).

Referring to Figure 4, a recycling centre 9 is located on the ground floor of the multi-storey building 1. Residents within the block are encouraged to bring down recyclable waste such as newspaper, glass bottles and plastics, etc. to the
 20 Bin Centre. The Bin Centre has a weighing tray 12 on a conveyor belt 13. A closed-circuit camera 14 would identify the type of waste. The user could then continue to weigh other waste materials and credit corresponding to the value of the materials would be given to the user. Identification could be by either a smartcard given to each dwelling or business unit, or by fingerprint identification or
 25 other data input device which may be portable. The smartcard works on the principle of proximity to a sensor 15 and so the user does not need to slide the card through a sensor or even take it out for reading. The user would be rewarded according to the type of waste and the weight of the waste they have brought for recycling. The system is controlled by a central computer 16.

30

After the waste is weighed, the Bin Centre employs a hydraulic pusher for pushing newspapers to a specified bin designated according to the type of waste

e.g. newspaper bin 17, glass bin18, and cans bin 19. A bin may also be provided for plastics as may a crusher to compress cans and bottles for ease of handling. The newspapers should be tightly packed for ease of handling while cans should be empty and relatively clean.

5

At the end of a specified collection time period, e.g. a week or as and when the Bin Centre is full, a sensor attached to each bin triggers a signal to notify an operator that the bin is full and requests the bin to be collected and cleared for re-use, or replaced.

10

Advantages of the recycling scheme are:

- The Bin Centre is sensible and straightforward to use.
- The reward can be adjusted remotely to provide an incentive.
- The Bin Centre could double up as an announcement/notice board.
- 15 • The system is efficient and saves manpower.
- The scheme is inherently fair to all users.
- It provides an incentive to recycle more and generate less waste.

Figure 5 shows a further method of collecting recyclable waste in a community according to an embodiment of the present invention. A user deposits waste at a collection centre (step 57) and the user identifies themselves (step 58). The recyclable nature of the waste is identified, for example by weighing 15 the waste (step 59) and/or by identifying the type of waste, for example by identifying the material the waste is made of, possibly employing a camera to do so (step 60). 20 The user is then rewarded according to the recyclable nature of the waste (step 61). 25

One of the advantages of the system is its inherent fair charge scheme. If the cost of managing trash is a flat rate, residents who recycle and minimize waste subsidize neighbours' wastefulness. Under the Pay-As-You-Throw scheme 30 made possible by embodiments of the present invention, users pay only for what they dispose.

Waste minimization requires the systematic prevention or reduction of raw material, water and energy consumption and benefits from the re-use and recycling of waste at a simple site. This is encouraged by having a rebate /
5 incentive system for users who use the recycling collection to dispose recyclable wastes such as newspapers, plastics, cans, glass bottles, batteries, etc.

Recycling is a business operation and so has to be efficient and cost effective to be sustainable. Users need to make a special effort to bring down their
10 recyclable goods to the centralized collection points to make the system workable. Embodiments of the present would help users to make that crucial effort.

By transforming waste materials into useable resources, recycling provides a way to manage solid waste while reducing pollution, conserving energy, creating
15 jobs and building more competitive manufacturing industries. As with burying waste in landfills or burning it in incinerators, recycling also costs money. Assessing society's commitment to recycling requires a full appraisal of the environmental and economic benefits and costs.

20 Use of the communal waste collection centre in conjunction with the waste chute system described earlier, allows efficient waste collection from a multiple-occupancy building, particularly a multi-storey building such as a high-rise apartment block. This is significant in areas with many high-rise buildings, such as offices and hotels, as well as domestic dwellings.

25

Reference is now made to Figure 6. A waste disposal system 600 for a building 602 according to a further embodiment of the present invention includes a communal waste zone 610, a chute 620 joining some or all the storeys of the building 602 and leading to the waste collection zone 610, and an entry opening
30 630 on each floor of the building 602 into the chute 620. A shutter 640 is associated with each opening 630 to control the access from the opening 630 into the chute 610.

A sensor 650 is installed along the disposal passage of the wastes, for example near the opening 630, for detecting the presence of the deposited waste 62. The sensor 650 may also be one capable of detecting the material of the type of bags wrapping the waste 62.

Further included in the system 600 is a controller 680 installed adjacent to each opening 630, and coupled to the shutter 640, internal cover 642 and sensor 650.

When a waste is to be disposed of, a user firstly inserts a control card, for example a cash-card 68, into the controller 680. The controller 680 will prompt the user to select the number of waste bags to be disposed, e.g. 1 or 2. When a selection is provided, for example by the user pressing the "1" button 682, the controller 680 will capture this selection signal, and opens the shutter 640 for the waste 62 to be disposed therein at which, the waste 62 is detected by the sensor 650. In the meantime, the controller closes the internal cover 642.

If the sensor detects that the waste 62 is wrapped by a plastic bag, the controller 680 will not allow the internal cover 642 to open, but to prompt the user that a plastic bag is used, which is now allowable. This way, waste disposal by using plastic bags is prevented.

Assuming that the waste is wrapped by an acceptable material, for example paper or other types of bio-degradable material, the sensor 650 will recognize this material and send the material information to the controller 680. The controller 680 will then open the internal cover 642, allowing the waste 62 to be disposed into the chute 620, and collected by central bin 606 which may be sit on a insect-repellent blanket 608.

By detecting the presence / absence status of the waste passing through, the information associated with the number of the disposed waste bag is obtained

by the sensor 650 which, is further transmitted to the controller 680. The controller 680 will in turn displays the number of bags information on its display screen 686, as well as the amount charged based on the number, and to be deducted from the cash-card 68.

5

In another embodiment, the user opens the shutter to dispose the waste. Under this embodiment, the sensor 650 may be configured to detect an opening and/or closing status of the shutter 640. A standard time period may be set, for example 20 seconds, for the user to make disposal. Before this time period expires, the user is expected to close the shutter. If not, the system will alert the user to do so, for example by producing an alarm sound. If the user ignores the alert and keep the shutter open, the system will record the further time during which the shutter is in the open status, and charge the user accordingly.

10

15

Alternatively, if it is preferable to measure the waste by weight, the system may be provided with a weighing device 670 installed inside the chute 620 and below each of the opening 630 and coupled to the controller 680. Note that although Figure 6 shows a system with both the sensor and the weighing device, it is understood that systems with either the sensor or the weighing may well be suitable for waste disposal under the inventive concept of the present invention.

20

When the waste bag is allowed to be disposed into the chute 620, the weighing device 670 receives and temporally holds the waste bag, and measures its weight. A weight information is then transmitted to the controller 680, and displayed on the display screen 686. The user may then be charged for this disposal according to the weight of the waste instead of the number of the waste bag, he has disposed of.

25

When the charged amount is deducted for the cash-card 68, the weighing device 670 opens its bottom plate 672, to allow the waste bag to drop down to the waste collection zone 610.

30

According to another embodiment, the system may include a meter 690, installed near the communal waste zone 610. Meter 690 is coupled to the sensors installed at each of the openings, and receives information associated with the number of bags disposed of by each user. As an alternative of the cash-
5 card charging scheme illustrated above, the users may dispose wastes without the need of providing a cash card. Instead, the numbers of bags disposed of by a particular user during a specified time period (e.g. a month) is collected by the meter 690. At the end of the time period, the user is billed based on the information collected by the meter 690, i.e. number of waste bags he disposed of
10 during this time period.

For some types of wastes that are wet, embodiments of the present invention further provides a waste bin to drain off the wet content, so as to enable the waste to be wrapped by a paper bag. Referring now to Figure 7, a waste bin
15 700 for draining wet content 74 from waste 72 has a hollow main body 710 and a strainer 720 that sits inside the main body 710, for receiving wet waste 72. The wet content 74 (e.g. water and/or oil contents) can then be drained off from the waste 72 via holes 722 provided at the bottom of the strainer 720. Once the majority of the wet content is drained off, the waste 72 can then be wrapped by a
20 paper bag for disposal.

The bin 700 further includes a shallow annular channel 730 formed at the bottom portion, surrounding the main body 710. The annular channel 730 may be filled with water, so as to prevent insects such as cockroaches, ants, bugs etc
25 from crawling into the waste bin.

Other embodiments of the invention will be apparent to those skilled in the art from consideration of the specification and practice of the invention disclosed herein. It is intended that the description be considered as exemplary and the
30 scope and spirit of the invention are indicated by the following claims.

CLAIMS

1. A waste processing system comprising:
 - a waste collection zone,
 - 5 a chute leading to said waste collection zone with a plurality of entry openings into said chute for placing waste into said chute wherein said chute channels waste into said waste collection zone,
 - a plurality of shutters wherein each of said plurality of shutters covers one of said plurality of entry openings;
 - 10 a measuring mechanism between said waste collection zone and said chute for measuring a weight of waste deposited by a user through one of said plurality of entry openings; and
 - a controller for controlling each of said plurality of shutters to selectively allow disposal of waste through one of said plurality of entry
 - 15 openings.
2. The system of claim 1, further comprising a timer to activate each of said plurality of shutters for a pre-specified time.
- 20 3. The system of claim 1, wherein said measuring mechanism comprises a weighing tray.
4. The system of claim 3, wherein said measuring mechanism comprises a sponge above said weighing tray for dampening an impact of waste falling onto
- 25 said measuring mechanism.
5. The system of claim 1, wherein said measuring mechanism includes a sensor for detecting an opening of one of said plurality of shutters.
- 30 6. The system of claim 5, wherein said sensor is to detect a type of material used to wrap the waste.

7. The system of claim 1, further comprising a calculator for calculating a cost of waste deposited and a payment device to allow said user to pay said calculated cost.

5 8. The system of claim 7, further comprising a memory device for recording said calculated cost and a charging device for charging said calculated cost to an account of said user.

9. The system of claim 1, further comprising a user-access device for
10 activating said one of said plurality of shutters.

10. The system of claim 9, wherein said user-access device comprises a user-identification device.

15 11. The system of claim 1, further comprising a device to isolate each waste deposit while measuring.

12. The system of claim 1, further comprising computerized control and an interactive device at each of said plurality of openings for data display and input.
20

13. The system of claim 1, for use in a multi-storey building and wherein said plurality of entry openings are distributed through said multi-storey building.

14. The system of claim 13, wherein said multi-storey building is a high-rise
25 dwelling block.

15. A method of processing waste comprising providing a waste collection system according to claim 1, accepting waste through one of said plurality of entry openings, retaining said waste in said one of said plurality of entry openings
30 against one of said plurality of shutters associated with said one of said plurality of openings, and activating release of said one of said plurality of shutters, disposing said waste into said waste collection zone.

16. The method of claim 15, wherein each of said plurality of shutters is released for a pre-selected time period.

5 17. The method of claim 16, further comprising measuring an amount of waste deposited.

18. The method of claim 17, further comprising calculating a cost of said waste deposited according to said amount of waste measured.

10

19. The method of claim 18, further comprising recording said calculated cost and charging said calculated cost to a user.

15 20. The method of claim 15, further comprising activating said release of one of said plurality of shutters by a user-access device.

21. The method of claim 20, further comprising identifying said user.

20 22. The method of claim 15, further comprising isolating waste deposit while measuring.

23. The method of claim 15, further comprising receiving waste from one of said plurality of entry openings distributed throughout a multi-storey building.

25 24. The method of claim 23, further comprising measuring separately each of a plurality of waste deposits.

30 25. The method of claim 24, further comprising delaying measuring said waste deposit of a second user where two users attempt to simultaneously deposit waste into said chute.