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(54) **Title:** RUBBISH

(57) **Abstract:** A waste collection tool dispensing station comprises means for storing a waste collection tool; an authorisation mechanism to authorise a user; and a locking mechanism adapted to release the tool to an authorised user.

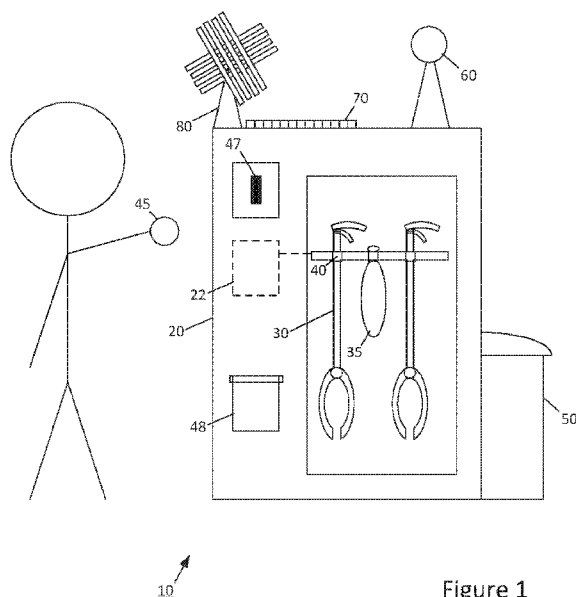


Figure 1

Rubbish

This invention relates to a system for waste or rubbish collection. In particular, a waste collection tool issuing station is described which allows for ad hoc waste collection. The invention is especially relevant for public areas where formal waste collection facilities may not otherwise be provided.

It is a common lament that in the disposable society of today there is all too much waste, often resulting in litter. Public areas, especially remote ones such as beaches, may become over-burdened with plastic bottles and other detritus of human life.

However, whether for reasons of accessibility, other priorities or financial pressures on local authorities, a formal waste collection service is not always provided.

There is therefore a need for a low-cost, low-maintenance waste collection system which can be implemented in a variety of locations.

According to one aspect of the invention there is provided a waste collection tool dispensing station, comprising: means for storing a waste collection tool; an authorisation mechanism to authorise a user; and a locking mechanism adapted to release the tool to an authorised user.

Preferably, the locking mechanism is released by means of one or more of: i) a coin or token; ii) a payment, identification or membership card; iii) a smartcard; or iv) a mobile device such as a smartphone. The locking mechanism may be released by means of a request sent wirelessly.

Preferably, the tool station is adapted to receive a deposit from the user before releasing the tool to the user and to return the deposit to the user when the tool is returned to the tool station.

Preferably, the tool station is adapted to authenticate the user. Authentication of the user may be via biometric data.

Preferably, the tool station is adapted to record user waste collection activity in a database. The tool station may be adapted to share user waste collection data, preferably on a visual display, more preferably on the internet.

Preferably, the tool station is adapted to dispense a waste receptacle with the tool. The tool station may comprise means for storing one or more waste receptacles and optionally a

further locking mechanism adapted to release a waste receptacle to an authorised user. The waste collection tool may comprise means for storing a waste receptacle.

The tool station may be adapted to reward the user, preferably for one or more of the following activities: i) checking out a waste collection tool from the tool station; ii) returning and checking-in the tool at the tool station, optionally in dependence on the time the tool was checked-out for; and iii) depositing waste at a waste collection point, optionally in dependence on the amount and/or type of waste deposited.

The tool station may be adapted to be powered by one or more of: solar, wind, wave, geothermal, and RF-scavenging. The tool station may comprise one or more of: a solar power source, a wind power source, a wave power source, a geothermal power source, and an RF-scavenging power source.

According to another aspect of the invention there is provided a waste collection tool for use with the waste collection tool dispensing station as described.

Preferably, the tool comprises a mechanically-actuated grabber or claw.

The waste collection tool may comprise an identifier and/or an integrated waste receptacle.

According to another aspect of the invention there is provided a waste collection system comprising a waste collection tool dispensing station as described in combination with a waste collection tool as described.

Further aspects of the invention are described by any accompanying claims.

The invention extends to methods and/or apparatus substantially as herein described with reference to the accompanying drawings.

Any apparatus feature as described herein may also be provided as a method feature, and vice versa. As used herein, means plus function features may be expressed alternatively in terms of their corresponding structure.

Any feature in one aspect of the invention may be applied to other aspects of the invention, in any appropriate combination. In particular, method aspects may be applied to apparatus aspects, and vice versa. Furthermore, any, some and/or all features in one aspect can be applied to any, some and/or all features in any other aspect, in any appropriate combination.

It should also be appreciated that particular combinations of the various features described and defined in any aspects of the invention can be implemented and/or supplied and/or used independently.

These and other aspects of the invention will become apparent from the following exemplary embodiments that are described with reference to the following figures in which:

Figure 1 shows a waste collection system.

Figure 1 shows a waste collection system 10, comprising a tool dispensing station 20 and at least one waste collection tool 30.

The tool dispensing station 20 comprises a storage rack or a plurality of storage recesses each adapted to hold a waste collection tool 30.

Tool 30 may be a litter picker, a hand-held device comprising a mechanically-actuated grabber or claw at one end of a rod with a user-activated actuation lever at the other end, such as those commonly available in hardware stores (see for example litterpickersdirect.com), which allows a user to pick up litter from an upright position and/or at an extended reach.

Tools 30 are only dispensed to authorised users. Authorisation may simply require users to deposit a coin or token or identify themselves in some way.

A locking mechanism 40 prevents unauthorised use of the tool 30. In some embodiments, locking mechanism 40 is operable by means of a coin or token 45 when inserted into an activation slot 47. Slot 47 may be incorporated into the locking mechanism 40. Such mechanisms are Duraloc™ or others provided by Systec POS-Technology Inc.

In some embodiments, tool station 20 accepts payment for release or check-out of a waste collection tool 30. The payment may be held as a deposit to encourage return of the tool 30 to the tool station 20, at which point (check-in) or shortly thereafter the deposit is refunded, for example via a coin return portal 48.

More advanced options are discussed below.

In some embodiments, tool 30 incorporates a waste receptacle. In other embodiments, tool station 20 issues the user with a waste receptacle 35, such as a plastic refuse bag, along with the tool 30.

In some embodiments a 'Fag-Bag' is provided, comprising a receptacle made of material similar to that of the packets for ground coffee, allowing smokers to discard their spent cigarettes safely and in a tidy fashion.

The collected waste may be deposited at a waste collection point 50, which in some embodiments is integral to the tool station 20.

It is envisaged that in use, say with the tool station 20 deployed at a beach or countryside location, walkers and others can deposit a coin 45 which releases a litter-picker 30 and a plastic bag 35 so that whilst on their walk they can collect rubbish and deposit when they retrieve their coin 45.

5 In some embodiments, the waste collection system operates a reward scheme whereby the user is rewarded for certain activities, for example:

- checking out a waste collection tool 30 from the tool station 20;
- returning and checking-in the tool 30 at the tool station 20, optionally with the time the tool 20 was checked-out for; and
- 10 • depositing waste at the waste collection point 50, optionally in dependence on the amount and/or type of waste deposited.

In this way the collection of waste – whether for disposal or recycling – may be encouraged.

A processor 22 is provided in the tool station 20 for keeping track of tool check-outs and check-ins. There are various options for identifying the tools and optionally the tool users.

15 Tool 30 may comprise integrated identifier, such as a barcode or an RFID circuit.

Use of a coin 45 allows for the tool 30 to be used essentially anonymously or with a token semi-anonymously.

In some embodiments, instead of the use of a coin or token, the user may request a tool 30 and optionally a waste receptacle 35 by means of a card such as a payment, identification or
20 membership card, for example a bank card, driving licence or National Trust or similar organisation membership card. An example of a card-release mechanism is Multiloc™ provided by Systec POS-Technology Inc.

More advanced embodiments of the tool station 20 comprise wireless capabilities 60 to allow requests for and release of tools 30 and receptacles 35 to be made wirelessly by means of a
25 smartcard or via a smartphone or other mobile device, for example via swiping a card with a magnetic strip, via display of a barcode, for example a 2-D QR code, from a smartphone screen, via short-range technologies such as Bluetooth or NFC or via a message sent via SMS, telephone networks such as 3G or 4G or the internet.

Yet more advanced embodiments authorise and/or authenticate users by biometric data
30 such as a fingerprint, voice or retina scan.

Hence the tool 30 may be released by the tool store 20 to an authorised, potentially authenticated, user. In such instances, some embodiments of the system provide for an online user account against which data regarding waste collection sessions (including any of time/date, location, waste type and quantity) are recorded in a database. For smartphone
5 users an app may be provided for a similar purpose. Either may allow sharing of the data with other users and/or the public via the internet, for example via social media – or say via a video display - which may also encourage waste collection activities.

Monitoring the replacement of tools 30 after use at the tool station 20 may be done at the station itself, the information being retrieved, for example by a remote server, for later
10 processing. Alternatively, the information on tool use may be relayed directly to a remote server or via a 'cloud' near-instantaneously.

Evidently, embodiments using a simple coin or token-operated mechanism may not require a power source (other than for any communications and/or monitoring activity that may be required). More advanced embodiments will have a power source, typically supplied via
15 conventional cabling although preferably via solar panels 70 or other renewable sources (eg, wind, wave or geothermal) trickle charging cells within the tool station 20. Other power options include RF-based energy scavenging and harvesting by means of a suitable antenna 80 – as for example proposed by Powercast Corporation and Freevolt™ by Drayson Technologies.

20 It will be understood that the present invention has been described above purely by way of example, and modifications of detail can be made within the scope of the invention.

Each feature disclosed in the description, and (where appropriate) the claims and drawings may be provided independently or in any appropriate combination.

Reference numerals appearing in the claims are by way of illustration only and shall have no
25 limiting effect on the scope of the claims.

Claims

1. A waste collection tool dispensing station, comprising:
 - means for storing a waste collection tool;
 - an authorisation mechanism to authorise a user; and
 - 5 a locking mechanism adapted to release the tool to an authorised user.
2. A tool station according to claim 1, wherein the locking mechanism is released by means of one or more of:
 - i) a coin or token;
 - 10 ii) a payment, identification or membership card;
 - iii) a smartcard; or
 - iv) a mobile device such as a smartphone.
3. A tool station according to claim 2, wherein the locking mechanism is released by means of a request sent wirelessly.
- 15 4. A tool station according to any preceding claim, adapted to receive a deposit from the user before releasing the tool to the user and to return the deposit to the user when the tool is returned to the tool station.
- 20 5. A tool station according to any preceding claim, adapted to authenticate the user.
6. A tool station according to claim 5, adapted to authenticate the user via biometric data.
- 25 7. A tool station according to claim 5 or 6, adapted to record user waste collection activity in a database.
8. A tool station according to claim 7, adapted to share user waste collection data.
- 30 9. A tool station according to claim 8, adapted to share the data on a visual display.
10. A tool station according to claim 8 or 9 adapted to share the data on the internet.
- 35 11. A tool station according to any preceding claim, adapted to dispense a waste receptacle, preferably with the tool.

12. A tool station according to any preceding claim adapted to reward the user.

13. A tool station according to claim 12, adapted to reward the user for one or more of the following activities:

- i) checking out a waste collection tool from the tool station;
- ii) returning and checking-in the tool at the tool station, optionally in dependence on the time the tool was checked-out for; and
- iii) depositing waste at a waste collection point, optionally in dependence on the amount and/or type of waste deposited.

14. A tool station according to any preceding claim, adapted to be powered by one or more of: solar, wind, wave, geothermal, and RF-scavenging.

15. A waste collection tool for use with the waste collection tool dispensing station according to any preceding claim.

16. A waste collection tool according to claim 15, wherein the tool is adapted to be locked and released by said locking mechanism.

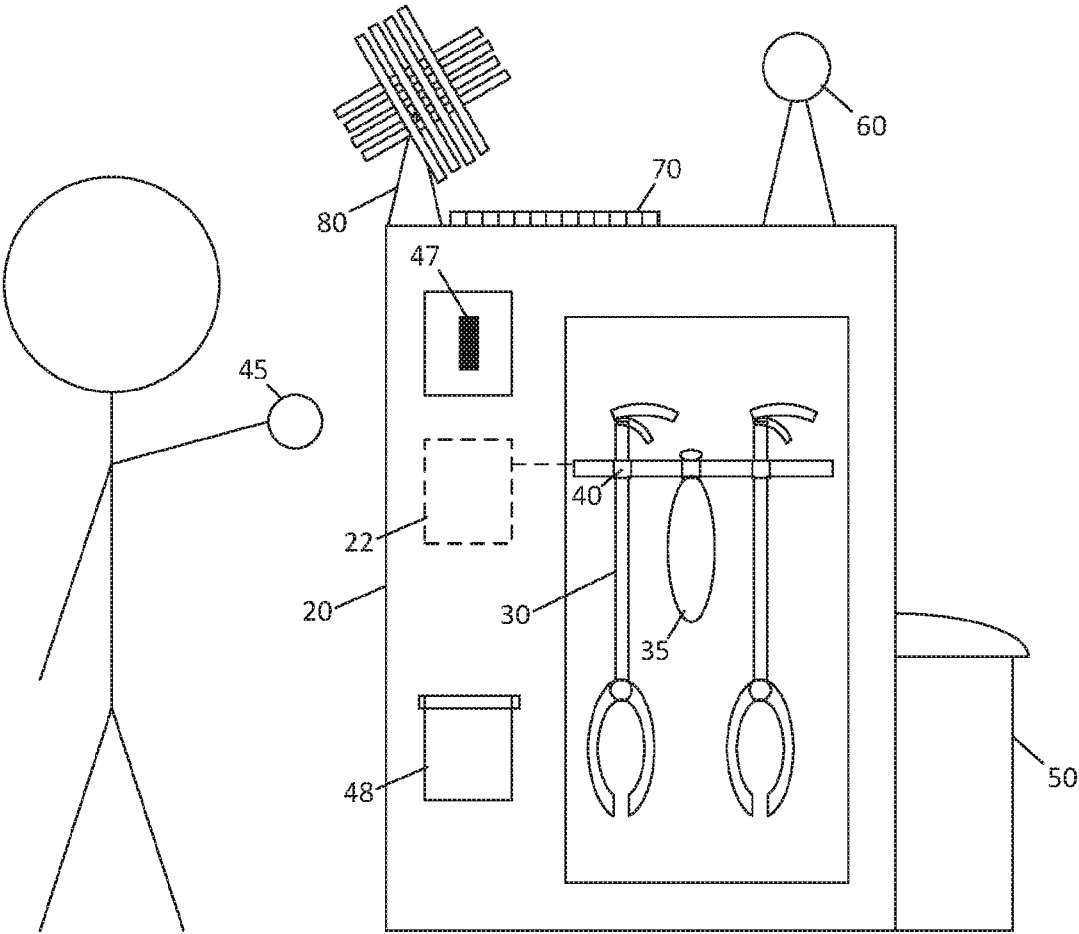
17. A waste collection tool according to claim 15 or 16, wherein the tool comprises a mechanically-actuated grabber or claw.

18. A waste collection tool according to any of claims 15 to 17, wherein the tool comprises an identifier.

19. A waste collection tool according to any of claims 15 to 18, wherein the tool comprises an integrated waste receptacle.

20. A waste collection system comprising a waste collection tool dispensing station according to any of claims 1 to 14 in combination with a waste collection tool according to any of claims 15 to 19.

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Figure 1

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2017/050667

A. CLASSIFICATION OF SUBJECT MATTER
INV. G07F17/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G07F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2005/101331 A1 (FRANCE TELECOM [FR]; MOREL THIERRY [FR]; MAZOUÉ MARC [FR]; JOFFRAY MAR) 27 October 2005 (2005-10-27) abstract page 1, lines 7-19 page 7, line 11 - page 9, line 7 page 10, line 6 - line 15 page 11, line 1 - line 10 page 12, line 3 - line 23 page 13, line 12 - line 25 page 15, line 21 - page 16, line 5 figure 1	1-20
X	EP 2 846 315 A1 (MANDO CORP [KR]) 11 March 2015 (2015-03-11) the whole document ----- -/-	1-20



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

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Name and mailing address of the ISA/

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INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2017/050667

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2017/050667

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