

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
14 September 2006 (14.09.2006)

PCT

(10) International Publication Number
WO 2006/096101 A1

(51) International Patent Classification:
B65F 1/06 (2006.01) **G01V 15/00** (2006.01)
B07C 5/34 (2006.01)

(21) International Application Number:
PCT/SE2005/000353

(22) International Filing Date: 11 March 2005 (11.03.2005)

(25) Filing Language: Swedish

(26) Publication Language: English

(71) Applicant (for all designated States except US):
OPTIBAG SYSTEMS AB [SE/SE]; Box 320, S-595
24 MJÖLBY (SE).

(72) Inventors; and

(75) Inventors/Applicants (for US only): **TORÄNG, Christian** [SE/SE]; Riktaregatan 4, S-587 37 LINKÖPING (SE).
ÖJDEMARK, Christer [SE/SE]; Sparregatan 5, S-582
21 Linköping (SE). **HOLMERTZ, Stefan** [US/US]; Kung
Valdermars väg 7, S-592 41 Vadstena (US).

(74) Agent: **AWAPATENT AB**; Platensgatan 9 C, S-582 20
Linköping (SE).

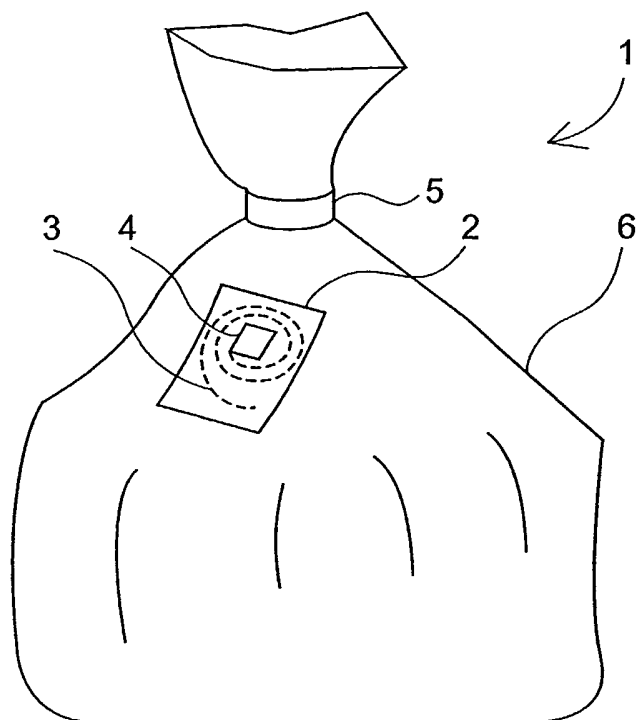
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:
— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: WASTE CONTAINER AND ARRANGEMENT, METHOD AND SYSTEM FOR SORTING OF SUCH WASTE CONTAINERS



(57) Abstract: A disposable waste container (1) is shown, designed to receive a quantity of waste, which waste container is provided with means (2) readable based on radio frequencies. There are also shown a set of parts, an arrangement, a method and a system for sorting of such waste containers.

WO 2006/096101 A1

WASTE CONTAINER AND ARRANGEMENT, METHOD AND SYSTEM
FOR SORTING OF SUCH WASTE CONTAINERS

Field of the Invention

The present invention relates to a waste container, a set of parts and also an arrangement, a method and a system for sorting of such waste containers.

5 Background Art

Arrangements for sorting of waste containers in the form of bags are known from, for instance, SE8901046-6, WO93/06945A1 and EP0759816B1. Methods for sorting of waste are known from, for instance, WO03/039773A1 and
10 WO2004/050264A1.

These prior-art arrangements sort waste containers into two or more fractions. In some of the documents, this is done based on the colours of the waste containers. For example, black waste containers can be
15 sorted into a biodegradable fraction whereas white waste containers are sorted into a combustible fraction. Waste containers with different colours can be used for sorting into respective fractions for, for example, recyclable rigid plastic, metal, glass etc.

20 A drawback in prior-art arrangements for sorting of waste containers is that objects, such as newspapers, empty bags, sheets of plastic etc, can get onto the conveyor belt that transports the waste containers during sorting and, thus, wholly or partly block the sensor
25 which records the colours of the waste containers. Also dirt on the waste containers can make it difficult for the sensor to identify them. This may result in incorrect sorting of the waste containers, with the ensuing manual correction work and/or reduced recyclability.

30 US2004/0133484A1 discloses a sorting arrangement for sorting of containers or other articles provided with RFID tags. This arrangement functions, however, only in

situations where discrete containers, which are each provided with an RFID tag, are to be sorted, and is therefore not suited for sorting of domestic waste, which may contain disintegrated and/or sticky material.

5 WO2004/090799A1 discloses a system for sorting of recyclable products, which are each provided with an RFID tag. Also this system requires the articles that are to be sorted to be provided with an RFID tag each.

Summary of the Invention

10 An object thus is to provide a waste container as well as an arrangement and a method for sorting of such waste containers, which wholly or partly eliminate the drawbacks of prior-art technique and which allow an improved sorting quality, especially in sorting of domestic waste.
15

The invention is defined by the independent claims. Embodiments are evident from the dependent claims and from the following description and the accompanying drawings.

20 According to a first aspect, a disposable waste container is provided, designed to receive a quantity of waste. The waste container is provided with means readable based on radio frequencies. Such a waste container can be sorted even if it is not clearly visible to the
25 sensor of the sorting arrangement.

According to one embodiment, the means readable based on radio frequencies is an RFID means. The means can be attached to the waste container by means of an adhesive, such as glue, double-adhesive tape. Alternatively,
30 the means can at least partly be attached to the waste container in the form of what is referred to as polymer electronics.

RFID means can currently be produced at a relatively low cost.

35 The waste container may consist of a bag or box of polymer material, paper, metal, plastic-coated paper, metal-coated plastic or metal-coated paper.

According to a second aspect, a set of parts is provided, comprising a plurality of waste containers as claimed in any one of the preceding claims, wherein at least two of the waste containers differ from each other with regard to a property that can be recorded by a sensor and by a user, said property at least partly representing information derivable from the means which is readable based on radio frequencies. The property is a colour or a shade of colour in the visible spectrum, one or more characters, a pattern and/or a tactile mark, i.e. a character that can be read by blind persons. Thus, the waste containers can be coded in accordance with the manner in which they are to be sorted. The code can in a prior-art manner be used by the user and by the sorting arrangement in order to distinguish different types of waste.

According to a third aspect, an arrangement for sorting a plurality of waste containers as described above is provided. The arrangement comprises a conveyor arranged to transport the waste containers, a first sensor for reading based on radio frequencies, arranged to emit a signal when a waste container transported on the conveyor is recorded by the first sensor, and means for sorting the waste containers based on the signal from the first sensor. In the arrangement, the first sensor is arranged to read means which are readable based on radio frequencies and arranged on the waste containers. The arrangement comprises a second sensor for detecting a second property of the waste container and for emitting a second signal in response to the second sensor recording a waste container with said second property transported on the conveyor, said sorting means being arranged to sort the waste containers based also on said second signal. The first sensor can be an RFID sensor.

Such a sorting arrangement can sort waste containers even if they are not clearly visible to the sensors of the sorting arrangement.

With a second sensor, the sorting quality can be improved by more information being made available before the decision about how each waste container is to be sorted. Moreover, the sensitivity to incorrect reading, or no reading, of a tag readable based on radio frequencies is reduced since also information about the colour or shade of the waste container can be used.

According to a fourth aspect, a method for sorting of waste is provided. The method comprises providing a plurality of waste containers as described above, each containing waste, recording by means of a first sensor waste containers transported on a conveyor, controlling, based on the recording, means for sorting said waste containers, said waste containers being recorded by reading, based on radio frequencies, of means arranged on said waste containers and readable based on radio frequencies.

According to a fifth aspect, a system for sorting of waste is provided, which system comprises a plurality of waste containers, which are designed to be disposable and to receive a quantity of waste, which each are provided with means readable based on radio frequencies, and which differ from each other with regard to a property which can be recorded by a sensor and by a user, said property at least partly representing information derivable from the means which is readable based on radio frequencies. The system further comprises an arrangement for sorting of said plurality of waste containers, comprising a conveyor arranged to transport the waste containers, a first sensor for reading based on radio frequencies, arranged to emit a signal when a waste container transported on the conveyor is recorded by the first sensor, and means for sorting the waste containers based on the signal from the first sensor.

According to a variant of the system, the sorting arrangement comprises a second sensor for detecting a second property of the waste container and for emitting a second signal in response to the second sensor record-

ing a waste container with said second property transported on the conveyor, and wherein said sorting means is arranged to sort the waste containers based also on said second signal.

5 Brief Description of the Drawings

The waste container, the sorting arrangement and the method will now be described in more detail with reference to the accompanying schematic drawings.

10 Fig. 1 shows a waste container according to one embodiment of the invention.

Fig. 2 shows a sorting arrangement according to one embodiment of the invention.

Fig. 3 shows part of a sorting method according to one embodiment of the invention.

15 Description of Embodiments

Fig. 1 shows a waste container 1, which consists of a thin-walled bag 6 of a flexible material, such as plastic, paper, metal or a combination thereof. The bag can have a closure 5 to prevent waste in the bag 6 from being spread outside the bag. Moreover, the bag is provided with means 2 which is readable based on radio frequencies, such as an RFID tag or the like. Such a tag may comprise a chip 4 and an aerial coil 3. The chip 4 may comprise a processor and a data memory (not shown). There are currently different types of RFID tags. Two main types are referred to as active and passive RFID tags, which differ from each other by the active RFID tag comprising a current source whereas the passive RFID tag receives its energy from a magnetic field inducing a current in the aerial coil.

When such a passive RFID tag 2 is subjected to a predetermined magnetic field, a current is induced in the aerial coil 3, which current is sufficient to drive the chip 4. As the chip 4 is driven, the processor retrieves information from the data memory and sends via the aerial coil 3 a response signal that corresponds to said information. According to the invention, the information com-

prises at least information about the type of waste for which the waste container 1 is intended. The emitted response signal may be perceived by a sensor 12 (Fig. 2) for reading based on radio frequencies. The sensor 12 can
5 also be arranged to generate the magnetic field.

The tag 2 can be provided in the form of a very thin unit, in which the aerial coil 3 and the chip 4 are arranged on a carrier in the form of a film of plastic or paper, which can be provided with an adhesive. Tags
10 of this type are known and disclosed, for example, in US-6,265,977 and US-6,107,920. The tag can then by means of the adhesive be applied to the waste container.

It will be appreciated that the vital parts of the tag, i.e. the aerial loop and the chip, can be arranged
15 directly on or in the waste container or the material of which it is made, an additional carrier. The term "tag" is thus only to be understood to comprise the parts that are required for the identification of the waste container based on radio frequencies to be possible.

20 According to one embodiment, the RFID circuit can wholly or partly be printed directly on the waste container by means of polymer electronics/paper electronics, for instance of the type discussed in US-2004/0256644.

According to one embodiment, a set of waste containers comprising at least two different waste containers is provided, which are intended for different types of waste and, thus, differ from each other with regard to the information that is available in the data memory of the tag. In one variant of this embodiment,
25 the two different waste containers differ from each other also with regard to the colour or shade of the waste containers. The colour or the shade can thus represent the type of waste for which the respective containers are intended. This colour coding of the waste containers can
30 be used by the users as well as by the sorting arrangement in order to distinguish different types of waste.
35

Fig. 2 is a simplified view of a sorting arrangement 10 for waste containers 1. The sorting arrangement comprises a conveyor 11, in this case a conveyor belt, on which waste containers 1 to be sorted are transported at the left end of the conveyor shown in the Figure. A first sensor 12 is arranged for reading, based on radio frequencies, of tags 2 arranged on the waste containers 1 and readable based on radio frequencies, as described above. When reading the tag 2 of a waste container, the sensor 12 receives a signal corresponding to at least part of the information available in the data memory of the tag 2. The signal is sent to a control unit 14.

The waste container can also pass a second sensor 13, which can be a sensor of the type which is disclosed in SE8901046-6, WO9306945A1 and EP0759816B1 and which identifies a colour or a shade of the passing waste container, a second signal representing said colour or shade being sent to the control unit 14. The first and second sensors 12, 13 can be arranged in any relative order. Thus it need not be important which sensor records the waste container 1 first.

Sorting means 15a, 15b are arranged to selectively strike or push a waste container 1 away from the conveyor 11, so that the waste container gets into a collecting vessel 16a, 16b. The control unit 14 can be arranged to produce control signals to the sorting means 15a, 15b based on the time of arrival of the signals from the sensors 12, 13 and knowledge of the transport speed of the conveyor. This results in sorting of the waste container in two collecting vessels 16a, 16b, which, for example, can be intended to contain biodegradable and combustible waste respectively.

It will be appreciated that the sorting arrangement, the conveyor and the sorting means can be designed in various ways. Conveyors of different types can be used, such as belt conveyors, screw conveyors, overhead conveyors, chain conveyors etc. Also pipes in which the

waste containers are made to be transported under the action of excess pressure, negative pressure and/or gravity may constitute conveyors. Also the number of collecting vessels can be varied according to the number of sorting fractions that are desired.

Also the sorting means can be arbitrarily designed.

Fig. 3 illustrates a method in sorting of waste containers. The method comprises recording 101, by reading, based on radio frequencies, of a tag 2 arranged on a waste container 1 and readable based on radio frequencies. The method further comprises, optionally, recording 102 of a colour or a shade of the waste container 1. Subsequently the signals received from the first and second recordings are compared 103, 104. If the signals correspond with each other, i.e. indicate the same type of waste, it is determined 105 to which fraction the waste container 1 is to be sorted. Then a control signal is sent 106 to the sorting means 15a, 15b.

If the signals do not correspond with each other, a measure is initiated 107 in response thereto. Such a measure can be to return 108 the waste container to be sorted once more. Another measure may involve transporting the waste container to a separate vessel 109 for, for instance, manual sorting, controlled deposition or the like.

It will be appreciated that the sorting arrangement can be programmed so that output data from one of the sensors 12, 13 have greater weight, allowing these data to be decisive, should the signals in the comparison 103 not correspond with each other.

It will also be appreciated that the relative order in which the sensors 12, 13 record the waste container 1 is optional, and that the reading can take place sequentially or simultaneously.

The memory of the tag 2 may also contain further information, such as information as basic data for debiting (optionally in combination with a weighing function

in the conveyor 11 or in the collecting vessels 16a, 16b) of waste handling costs or information making it possible to trace the contents of the waste container to a given household or a given retailer of waste containers.

5 According to an alternative embodiment, a first sorting into at least two different fractions can be carried out based on colour or RFID. Subsequently a second sorting of at least one of the two fractions based on colour or RFID takes place. According to a first example,
10 the first sorting can take place based on colour or shade of colour, after which one of the two fractions is sorted based on RFID. According to a second example, the first sorting takes place based on RFID and the second sorting based on colour or shade of colour.

15 According to one embodiment, use is made of "positive separation" as disclosed in WO2004/050264A1, i.e. sensors 12, 13 record a colour and/or an RFID, waste containers 1 with a predetermined colour and/or RFID being separated from the conveyor 11 by the sorting means 15a,
20 15b, and waste containers 1 which do not have said predetermined colour and/or RFID coming along to the end of the belt and getting into a mixed fraction or being returned for new sorting.

 According to an alternative embodiment, "negative
25 separation", as disclosed in WO03/039773A1, is used, i.e. sensors 12, 13 record a colour and/or an RFID, waste containers 1 which do not have a predetermined colour and/or a predetermined RFID being separated from the conveyor 11 by the sorting means 15a, 15b, and waste con-
30 tainers 1 which have said predetermined colour and/or RFID coming along to the end of the belt and getting into a mixed fraction or being returned for new sorting.

 It will be appreciated that the here shown use of tags readable based on radio frequencies can be used
35 independently or in combination with reading of colour-coded waste containers.

According to an alternative embodiment, the waste containers 1 are provided with an optically machine-readable code, which indicates the type of waste for which the respective waste containers are intended. Exam-
5 ples of such codes are characters (letters, numerals or the like) or patterns, such as a bar code or a position-coding pattern of the type disclosed in US-5,852,434, EP-0 578 692, EP-0 171 284 and US-2004113898. In this embodiment, the same, or a third, sensor 13 can be
10 arranged to read the code and send this to the control unit 14 for controlling the sorting means 15a, 15b in accordance with that described regarding the second sensor.

As another embodiment, it may be mentioned that the
15 waste container, as a second property, has a fluorescent or luminescent capacity, which is recordable by the second sensor, possibly combined with a source of energy for excitation.

It will further be appreciated that even if the
20 above embodiments are shown with reference to a sorting arrangement with two sorting means 15a, 15b, the principles described above are applicable to sorting arrangements of any size, with any number of sorting means and with sorting into any number of collecting vessels.

25 It will also be appreciated that it is possible to provide an arrangement and a method for sorting of waste containers using the RFID sensor only, i.e. without the second sensor for colour or shade.

According to another embodiment, it is possible to
30 use RFID tags that are also printable. In such an embodiment, it is possible to print, at a weighing station comprising a first sensor/printer, information in the RFID tag, for instance regarding the weight of the waste container, and at a subsequent station, possibly in connection with sorting, i.e. in reading by means of the first
35 sensor 12, read this information and control the sorting means 15a, 15b based also on this information. Such

weighing can take place when supplying the waste container to a waste handling system, for instance adjacent to a refuse chute; when collecting the waste container to be transported to a sorting plant, when the waste container arrives at the sorting plant and/or in direct connection with sorting.

CLAIMS

1. A disposable waste container (1) designed to
5 receive a quantity of waste, c h a r a c t e r i s e d
in that the waste container (6) is provided with means
(2) readable based on radio frequencies.

2. A waste container (1) as claimed in claim 1,
10 wherein the means (2) readable based on radio frequencies
comprises an RFID means.

3. A waste container (1) as claimed in claim 1 or
2, wherein the means (2) is attached to the waste con-
15 tainer (1) by means of an adhesive, such as glue or
double-adhesive tape.

4. A waste container (1) as claimed in claim 1 or 2,
wherein the means (2) is at least partly attached to the
20 waste container in the form of polymer electronics.

5. A waste container (1) as claimed in any one of
the preceding claims, wherein the waste container (1)
essentially consists of a bag (6) or box of polymer mate-
25 rial, paper, metal, plastic-coated paper, metal-coated
plastic or metal-coated paper.

6. A waste container (1) as claimed in any one of
the preceding claims, wherein the waste container essen-
30 tially consists of a thin-walled bag (6) of flexible
material.

7. A set of parts comprising a plurality of waste
containers (1) as claimed in any one of the preceding
35 claims, wherein at least two of the waste containers dif-
fer from each other with regard to a property that can be
recorded by a sensor (12, 13) and by a user, said proper-

ty at least partly representing information derivable from the means (2) which is readable based on radio frequencies.

5 8. A set of parts as claimed in claim 7, wherein said property is a colour or a shade of colour in the visible spectrum, one or more characters, a pattern and/or a tactile mark.

10 9. An arrangement (10) for sorting a plurality of waste containers (1) as claimed in any one of claims 1-8, comprising

 a conveyor (11) arranged to transport the waste containers (1),

15 a first sensor (12) for reading based on radio frequencies, arranged to emit a signal when a waste container (1) transported on the conveyor (11) is recorded by the first sensor (12), and

 means (15a, 15b) for sorting the waste containers
20 (1) based on the signal from the first sensor (12),
 c h a r a c t e r i s e d i n t h a t
 the first sensor (12) is arranged to read means (2) which are readable based on radio frequencies and arranged on the waste containers (1),

25 the arrangement comprises a second sensor (13) for detecting a second property of the waste container (1) and for emitting a second signal in response to the second sensor (13) recording a waste container (1) with said second property transported on the conveyor (11),

30 said sorting means (15a, 15b) being arranged to sort the waste containers (1) based also on said second signal.

 10. An arrangement as claimed in claim 9, wherein
35 the first sensor (12) is an RFID sensor.

11. An arrangement as claimed in claim 9 or 10, wherein the second property is a colour, a shade of colour, one or more characters, a pattern and/or a tactile mark.

5

12. A method for sorting of waste, comprising providing a plurality of waste containers (1) as claimed in any one of claims 1-8, each containing waste, recording (101) by means of a first sensor (12) waste containers (1) transported on a conveyor, controlling (106), based on the recording, means (15a, 15b) for sorting said waste containers (1), said waste containers (1) being recorded by reading, based on radio frequencies, of means (2) arranged on said waste containers (1) and readable based on radio frequencies.

13. A method as claimed in claim 12, further comprising recording (102) by means of a second sensor (13) a second property of said waste containers (1) transported on the conveyor, and controlling (106) said sorting means (15a, 15b) based also on the recording of said second property.

14. A method as claimed in claim 13, wherein the second property is a colour or a shade of colour in the visible spectrum, one or more characters, a pattern and/or a tactile mark.

15. A method as claimed in claim 13 or 14, wherein one of said waste containers (1) is directed to a sorting container (16a, 16b) based only on the signal from the first sensor (12) or based only on the signal from the second sensor (13).

35

16. A method as claimed in claim 13 or 14, wherein one of said waste containers (1) is directed to a sorting

container (16a, 16b) if, and only if, the signals from the first sensor (12) and from the second sensor (13) correspond with each other with regard to which sorting container (16a, 16b) the waste container (1) is to be
5 directed to.

17. A method as claimed in claim 13 or 14, wherein, if the signals from the first sensor (12) and from the second sensor (13) do not correspond with each other,
10 the waste container (1) is returned for new reading by at least one of said first and second sensors (12, 13).

18. A method as claimed in claim 13 or 14, wherein, if the signals from the first sensor (12) and from the second sensor (13) do not correspond with each other, the
15 waste container is directed to a sorting container for unsorted waste.

19. A method as claimed in any one of claims 12-18, wherein waste containers that do not give rise to a valid signal from said first sensor (12) are removed from the conveyor (11).
20

20. A method as claimed in any one of claims 12-18, wherein waste containers that do not give rise to a valid signal from at least one of said first and second sensors (12, 13) are removed from the conveyor (11).
25

21. A system for sorting of waste, said system comprising
30 at least two waste containers (1),
which are designed to be disposable and to receive a quantity of waste,
which each are provided with means (2) readable
35 based on radio frequencies, and
which differ from each other with regard to a property which can be recorded by a sensor (12, 13) and by a

user, said property at least partly representing information derivable from the means (2) which is readable based on radio frequencies; and

an arrangement (10) for sorting of said plurality of waste containers (1), comprising

a conveyor (11) arranged to transport the waste containers (1),

a first sensor (12) for reading based on radio frequencies, arranged to emit a signal when a waste container (1) transported on the conveyor (11) is recorded by the first sensor (12), and

means (15a, 15b) for sorting the waste containers (1) based on the signal from the first sensor (12).

22. A system as claimed in claim 21, wherein the sorting arrangement comprises a second sensor (13) for detecting a second property of the waste container (1) and for emitting a signal in response to the second sensor (13) recording a waste container (1) with said second property transported on the conveyor (11), and

wherein said sorting means (15a, 15b) is arranged to sort the waste containers (1) based also on said second signal.

1/2

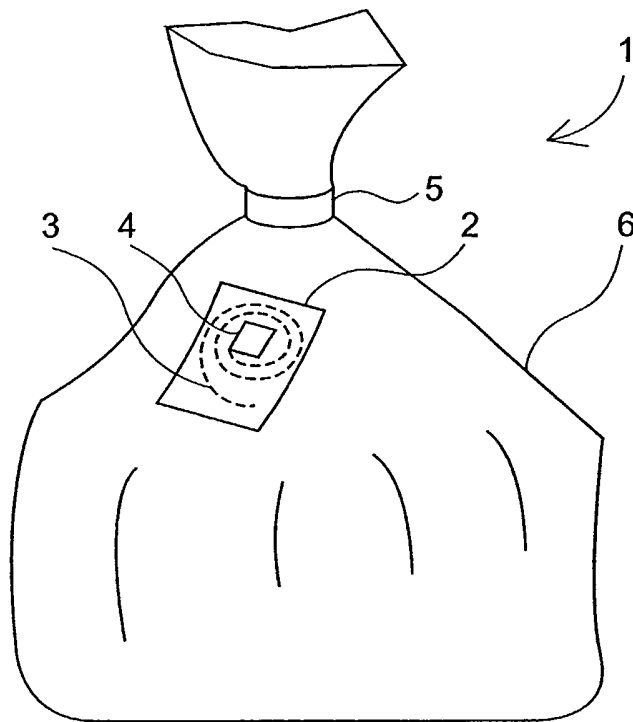


Fig 1

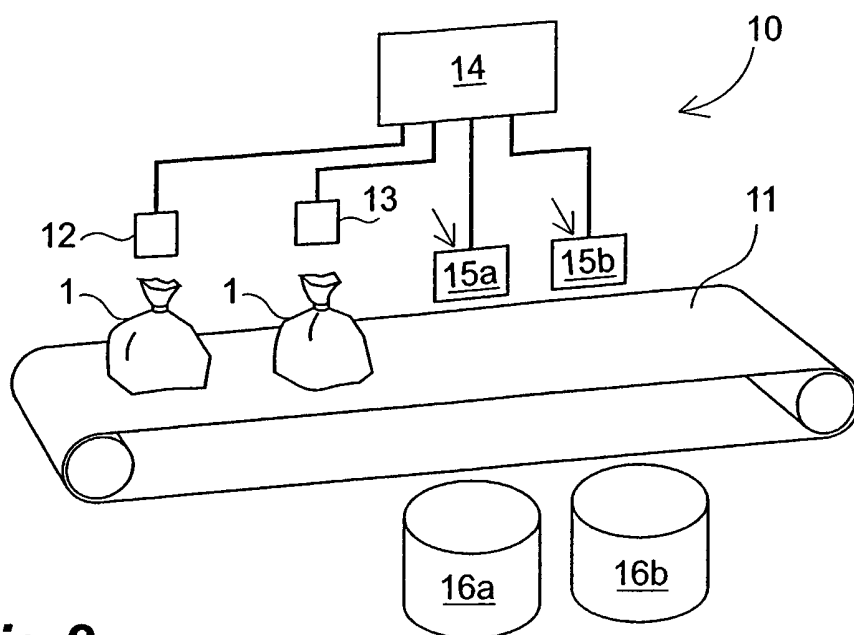


Fig 2

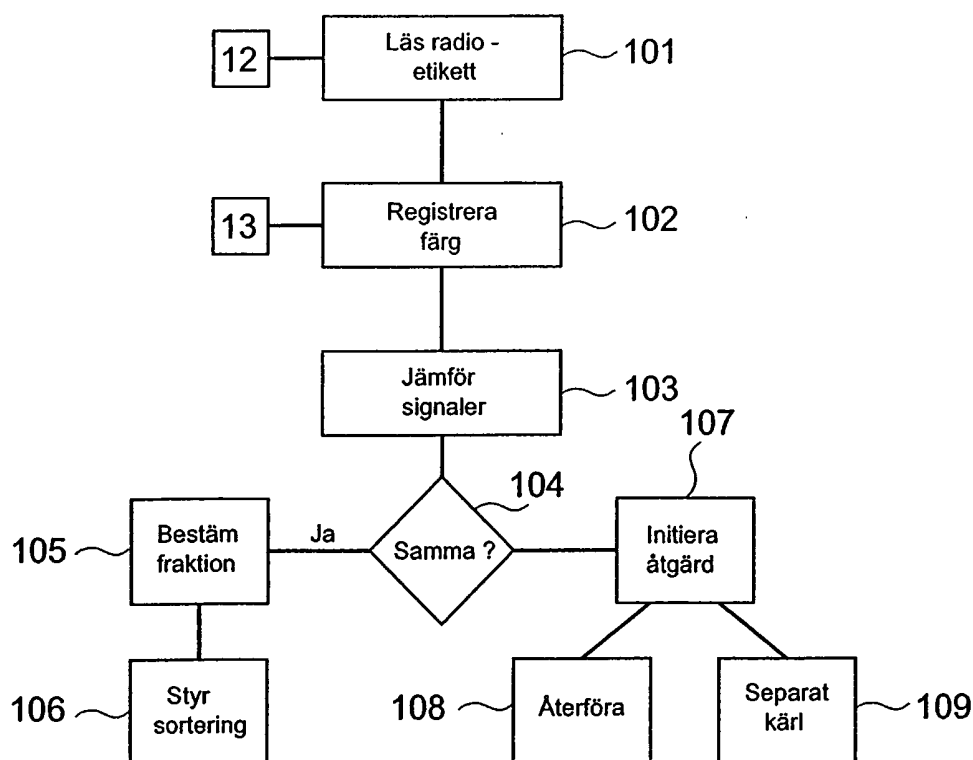


Fig 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 2005/000353

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: B65F 1/06, B07C 5/34, G01V 15/00

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)

IPC7: B65F, G01V, H04B, B07C

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

SE,DK,FI,NO classes as above

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

EPO-INTERNAL, WPI DATA, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 20105939 U1 (FA. MITSYSTEM GMBH), 15 November 2001 (15.11.2001), whole document --	1-8,12,21
X	DATABASE WPI WEEK 200413 DERWENT PUBLICATIONS LTD., LONDON, GB; Class P43, AN 2004-12761 & JP 2004018201 A (TOKYO SHIBAURA ELECTRIC CO), 22 January 2004(2004-01-22) abstract --	1-8,12,21
X	FR 2806502 A1 (PLAZUR SOCIETE ANONYME-FR), 21 Sept 2001 (21.09.2001), whole document --	1-8,12,21

 Further documents are listed in the continuation of Box C. See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"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

17 October 2005

Date of mailing of the international search report

18-10-2005

Name and mailing address of the ISA/
Swedish Patent Office
Box 5055, S-102 42 STOCKHOLM
Facsimile.No. +46 8 666 02 86

Authorized officer

Lars Jakobsson /itw
Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 2005/000353

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 1041504 A2 (MOBA-MOBILE AUTOMATION GMBH), 4 October 2000 (04.10.2000), whole document	1-8
	--	
X	EP 1041505 A2 (MOBA-MOBILE AUTOMATION GMBH), 4 October 2000 (04.10.2000), whole document	1-8
	--	
A	US 20040133484 A1 (BARRETT M. KREINER ET AL), 8 July 2004 (08.07.2004), abstract	1-22
	--	
A	WO 2004090799 A1 (QINE-TIO LIMITED [GB/GB]), 21 October 2004 (21.10.2004), abstract	1-22
	--	
A	US 5100005 A (JOHN W. NOBLE ET AL), 31 March 1992 (31.03.1992), abstract	1-22
	--	
A	EP 0554207 A2 (F.P.INDUSTRISERVICE A/S), 4 August 1993 (04.08.1993), abstract	1-22
	--	
A	US 3438489 A (M. J. CAMBORNAC ET AL), 15 April 1969 (15.04.1969), abstract	1-22
	--	
A	US 3750167 A (JOHN B. GEHMAN ET AL), 31 July 1973 (31.07.1973), abstract	1-22
	--	

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/SE 2005/000353

DE	20105939	U1	15/11/2001	NONE		
FR	2806502	A1	21/09/2001	DE	60018389 D	00/00/0000
				EP	1153312 A,B	14/11/2001
				US	6690164 B	10/02/2004
EP	1041504	A2	04/10/2000	DE	29905841 U	24/06/1999
EP	1041505	A2	04/10/2000	DE	29905840 U	10/06/1999
US	20040133484	A1	08/07/2004	NONE		
WO	2004090799	A1	21/10/2004	GB	0308468 D	00/00/0000
US	5100005	A	31/03/1992	AU	6152790 A	11/03/1991
				WO	9101818 A	21/02/1991
EP	0554207	A2	04/08/1993	AT	157285 T	15/09/1997
				DE	69313313 D,T	02/04/1998
				DK	10492 A	29/07/1993
				DK	168151 B	21/02/1994
US	3438489	A	15/04/1969	BE	699837 A	13/12/1967
				FR	1531508 A	05/07/1968
				FR	2032166 A	20/11/1970
				GB	1168509 A	29/10/1969
				LU	53872 A	22/04/1969
				NL	6708280 A	20/11/1968
US	3750167	A	31/07/1973	NONE		