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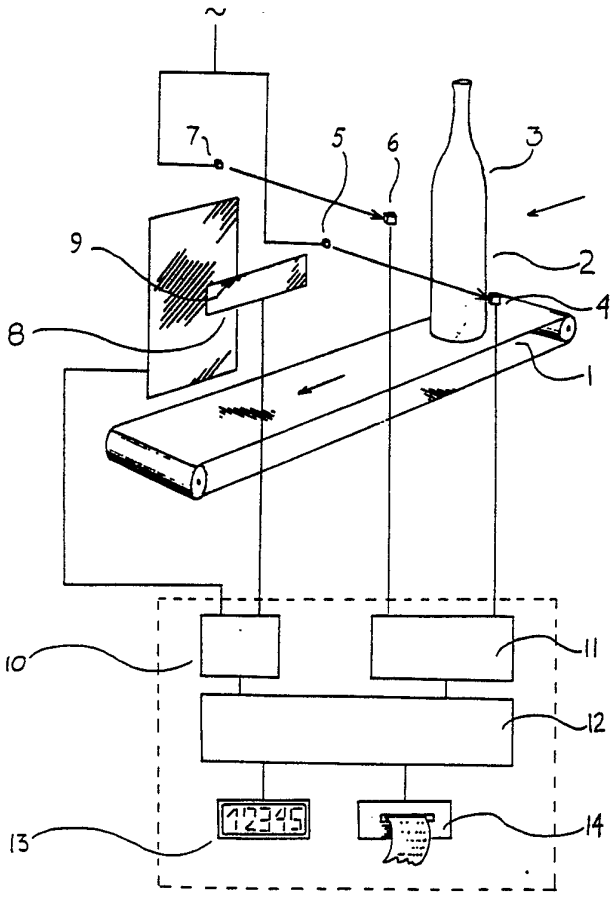
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(54) Title: DEVICE FOR RECORDING DIMENSIONS AND SHAPE OF OBJECTS

(57) Abstract

Device for registration of the size and shape of objects, particularly for identification and counting of bottles. The device comprising means (1) for moving the bottles (2) relatively to two photo cells (4, 6), being located against light emitters (5, 7) standing in different heights of the object, spaced apart in the direction of movement; and further comprising a capacitive sensor (8, 9) arranged for measuring the shape- and material-dependent dielectric factor for a part of the bottle (2).



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Device for recording dimensions and shape of objects.

The invention concerns a device according to the introductory part of claim 1, for registration of the size and shape of objects, especially for identification and counting of bottles or other types of return package of different types, being fed to the device.

Background

Different devices for registration of return packages have been developed, especially for bottles, boxes and cases. Devices for recognizing the contours of bottles have been developed; making it possible to distinguish between different types of bottles, and in this way register bottles etc. of different categories and classes of value.

From NO-patent publication No.152 065 it is known to expose objects which shall be registered to light radiation, and to detect the reflection in a photodetector that can register variations in the light in an axial direction, e.g. the height direction of the object. This method demands expensive equipment both for light emission and for detection.

From NO-patent publication No.162 830 it is known a device for determining the contour of objects for the same purpose by using a sweep technique in correspondance with a reflector. This also demands a complicated equipment, among other things a rotating mirror.

Object of the invention

The main object of the invention is to create a registration device which can be realized in a simpler way than what is required for known equipment. It is particularily an object for the invention to provide a registration device based on static signal means or transducers and detectors so that only a moveable carrying device is needed for the objects.

The invention

The object of the invention can be accomplished according to a device with features as stated in the characteristic part of claim 1. Further features are stated in the independent claims.

With such a device it is possible to make an accurate sensing of bottles and similar objects making it possible to sort these objects in groups depending on shape, size and material quality. Practically, sorting is done in a limited number of classes of value.

Best mode for carrying out the invention

The invention will be described with reference to the drawing showing a schematic perspective view of an embodiment of the invention.

In the drawing it is shown a carrier 1, which e.g. can be a conveyer belt of known kind which is attached to a drive- and control system suited for this task. Alternatively, a rotating disk can be used.

On the carrier 1 a bottle 2 is located, having a known ogivally shaped neck section 3. The main parameters for the bottle 2 are dimentions, primary diameter, shape, primary curvature of the ogivale section, and material quality. Based on these paramteres one can determine the type of bottle, and thus the class of value. One can also decide on bottles which can not be recirculated, and therefore are rejected or registered with zero-value.

To be able to determine the diameter of the bottle, a first photo cell 4 is located in line with the transversal light emitter 5 at the same height as the lower part of the bottle. With this photo cell, the time intervall T 1 for passing the lower part can be registrated.

In a distance from the first photo cell 4 seen in the direction of movement, is located an additional photo cell 6 in line with the transversal second light emitter 7 in the height of the neck section 3. With this, the passing time intervall T 2 for a different characteristic section of the bottle can be established. Furthermore, with these two measurements one can find the speed for the bottle movement, and thereby, in a suitable electronic circuit, determine the dimensions of the two levels. As an alternative to the photo cells, different light sensing elements can be used, e.g. small solar cells or similar.

A strip shaped plate-electrode 8 is located, in addition to the two photo cells 4 and 6, at the same height as the ogivale section 3 on one side of the carrier 1, while an electro-plate 9 is located on the opposite side relatively to the bottle so that the plates

8 and 9 together form a capasitive sensor where a bottle moving between will be registered as dielectricum. The capasity sensor is connected to an oscillator 10 controlling the frequency in dependance of the material quality and a shape factor for the bottle in the area covered by the electrode 8. The connection between the dielectrical value measured; and the material quality and the shape factor is determined by testing of different bottles in question.

The device also comprises suitable electronic circuits, such as a measurement circuit 11, for determine the dimensions of the bottles, and a microprocessor-circuit 12 for evaluating the measurement results. The microprocessor curcuit 12 can be attached to a display element 13 and a printer 14 in a per se known manner.

The special advantage of the equipment described above is the simple construction and its permanent placement. By placing the platestrip 8 with its central line in a height of appr. 200 mm above the carrier, it will cover the upper section of most bottles beings in the marked today.

In an alternative embodiment is arranged an additional photo cell (not shown) having a light source producing a light barrier in the height of the lower photo cell 6 and located in the longitudial direction under the upper photo cell 4. With this barrier it is possible to provide signals for the rate of movement also for particular low bottles.

Claims:

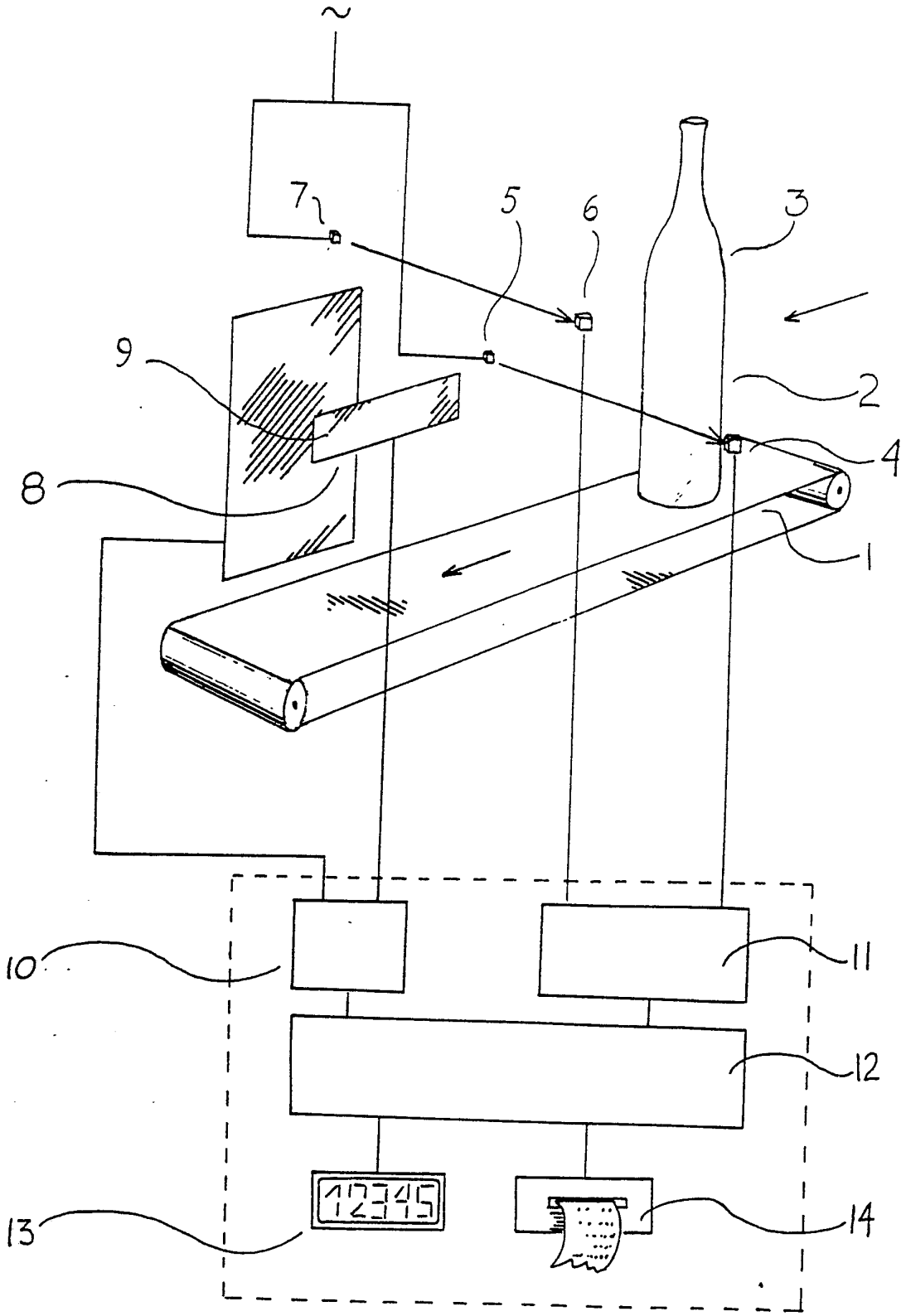
1. Device for registration of the size and shape of objects, particularily for identification and counting of bottles and other types of return packages being fed to the device, comprising means (1) for moving the object (2) relatively to a registration element (5), especially a registration element communicating with a signal transmitter or transducer, where a capasitive sensor is provided to determine the material quality, **characterized** by further comprising two light sensing elements, especially photo cells (4,6), being located against the light emitters (5,7) standing in different heights relatively to the object, spaced apart in the direction of movement; and by a capasitive sensor (8,9) is arranged for measuring the shape- and materialdependent dielectric factor for a part of the bottle (2).

2. Device according to claim 1,
characterized by light emitters (5,7) located at level with the lower part of the bottle and the ogivale section (3), respectively.

3. Device according to claim 1 or 2,
characterized by the capasitive sensor comprising a strip-formed electrode (8) extending transversally to the axis of the bottle, in the ogivale section of the bottle.

4. Device according to on of the claims 1-3,
characterized by comprising a further light sensing element being located in height of the lowest photo cell and after this in the direction of movement, having a light emitterattached, whereby the light sensing element is attached to the measurement circuit 11 for providing a signal indicating the rate of movement.

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INTERNATIONAL SEARCH REPORT

International Application No PCT/NO 91/00138

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC5: B 07 C 5/04

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
IPC5	B 07 C, G 07 F, G 01 B

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched[8]

SE,DK,FI,NO classes as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category *	Citation of Document,[11] with indication, where appropriate, of the relevant passages[12]	Relevant to Claim No.[13]
Y	EP, A, 0020108 (THE MEAD CORPORATION) 10 December 1980, see the whole document --	1
Y	EP, A, 0363115 (EMHART INDUSTRIES, INC.) 11 April 1990, see the whole document --	1

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* Special categories of cited documents:[10]

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
9th June 1992	1992 -06- 17
International Searching Authority	**Signature of Authorized Officer**
SWEDISH PATENT OFFICE	INGEMAR JOSEFSSON

Form PCT/ISA/210 (second sheet) (January 1985)

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.PCT/NO 91/00138

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
The members are as contained in the Swedish Patent Office EDP file on 30/04/92
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Patent document cited in search report	Publication date	Patent family member(s)		Publication date
EP-A- 0020108	80-12-10	US-A-	4259571	81-03-31
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		US-A-	4888824	89-12-19
		US-A-	4972566	90-11-27
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		JP-A-	2163648	90-06-22
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