# United States Patent

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[72] Inventors **Josef Denk**
**Waiblingen;**
**Otto Ingelfinger, Ludwigsburg, both of,**
**Germany**

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[73] Assignee **Hofliger & Karg**
**Waiblingen near Stuttgart, Germany**

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[33] **Germany**
[31] **P 17 74 394.1**

[54] **DETECTING OF LABELS ON DISCRETE ARTICLES**
**12 Claims, 4 Drawing Figs.**

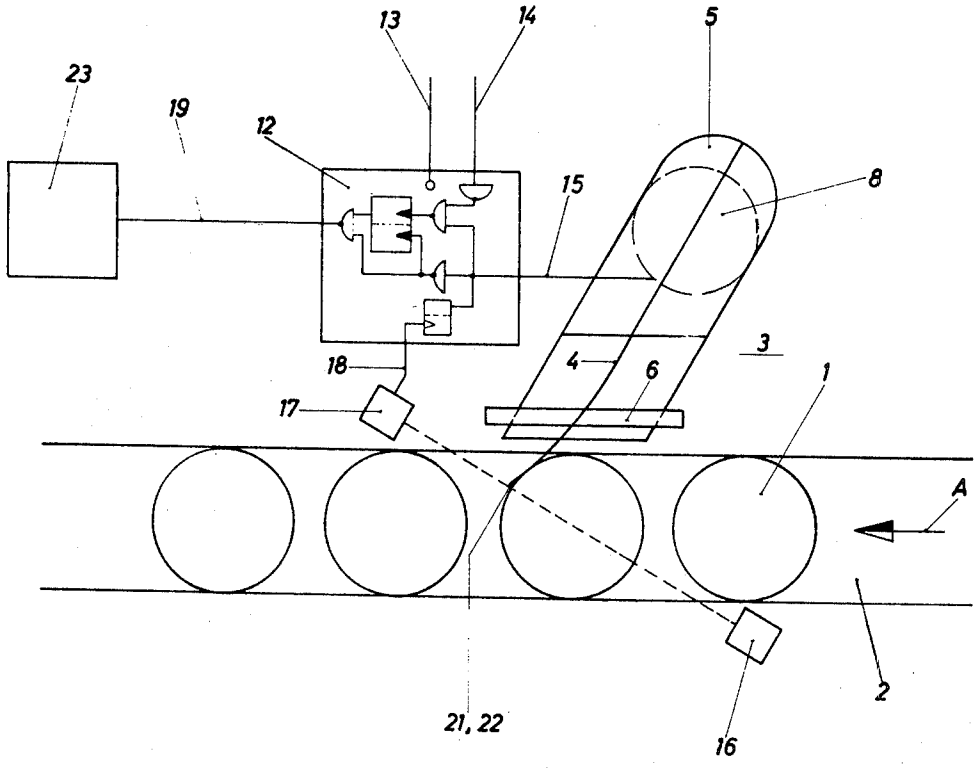
[52] **U.S. Cl.** ..... **209/80**
[51] **Int. Cl.** ..... **B07c 5/00**
[50] **Field of Search** ..... 209/111.7, 80—82, 76

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*Primary Examiner*—Richard A. Schacher
*Assistant Examiner*—Gene A. Chruch
*Attorney*—Michael S. Striker

**ABSTRACT:** Method and apparatus for checking discrete articles for the presence of applied labels. The articles are advanced past a control station where their presence is detected and a scanning device activated in response to such detection. The scanning device mechanically scans the detected article for the presence of a label and generates, in the absence thereof, an indication of such absence.

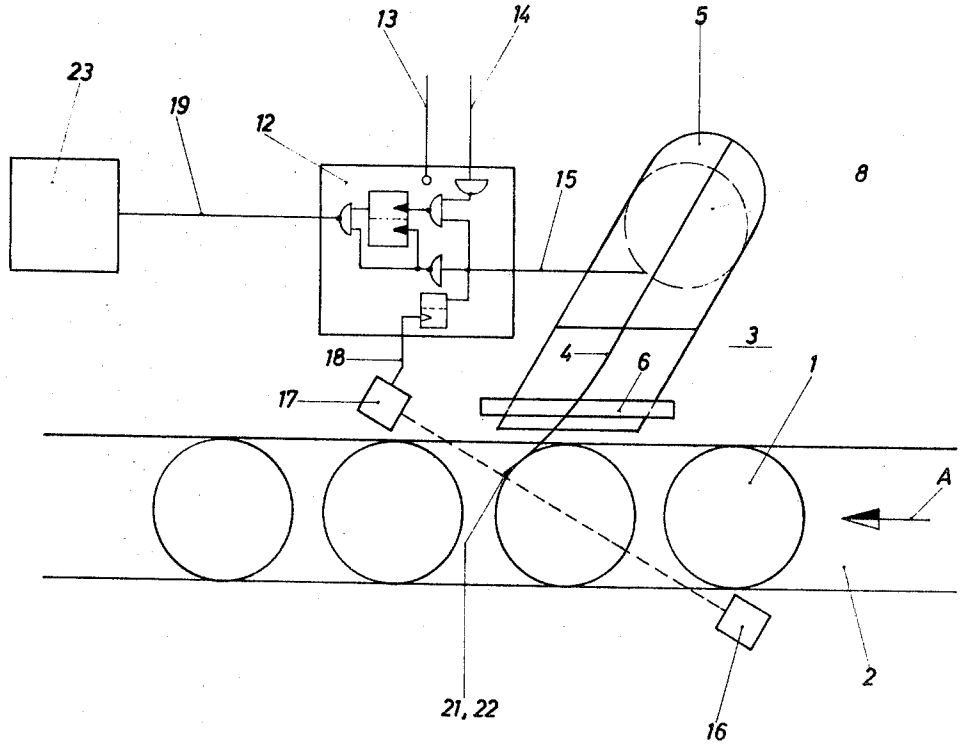


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SHEET 1 OF 2

Fig. 1




INVENTORS
JOSEF DENK
OTTO INGELFINGER
By: Michael S. Striker
Attorney

Fig.2

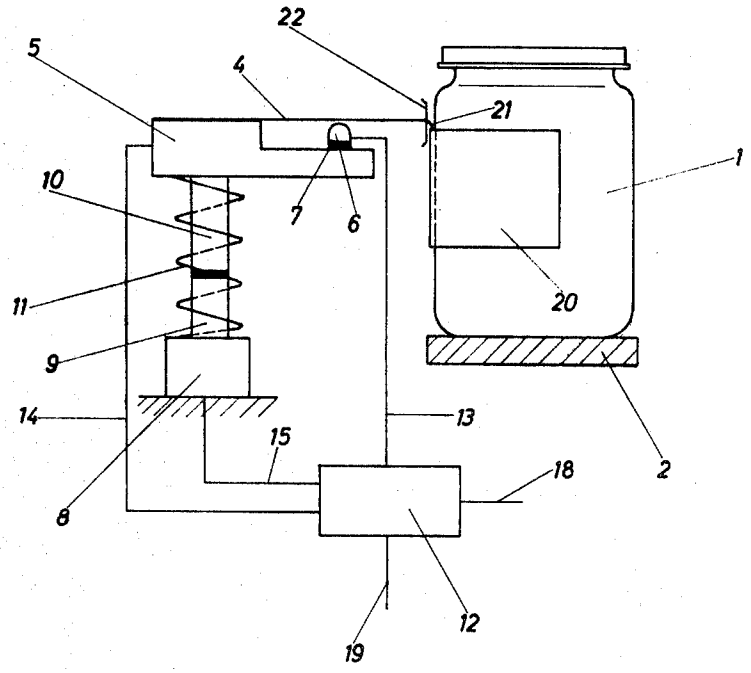



Fig.3

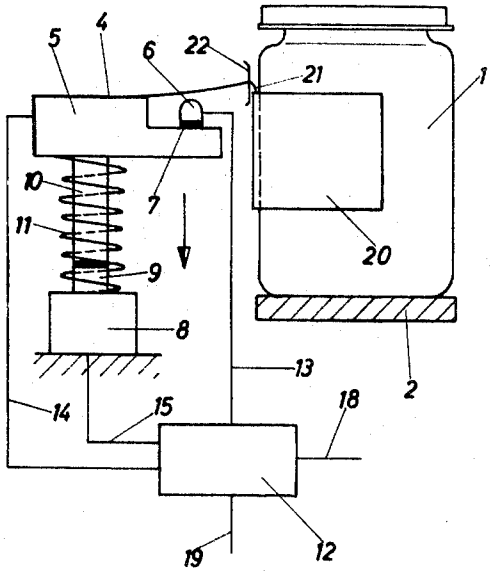
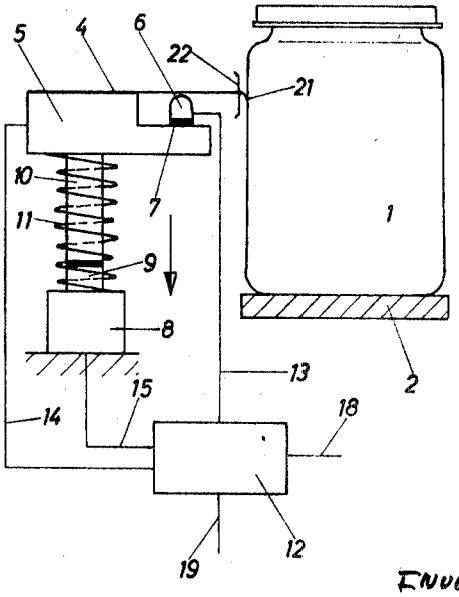



Fig.4




INVENTORS.
JOSEF DENK
OTTO INGELFINGER
By: Mason, Fenwick & Lawrence
Attorneys

# DETECTING OF LABELS ON DISCRETE ARTICLES

## BACKGROUND OF THE INVENTION

The present invention relates to the detection of applied labels on discrete articles. More particularly, the invention relates to a method of detecting such labels and to an apparatus for carrying out the method.

Articles of great variety, such as bottles, boxes, cans and the like to name only a few, are provided with labels to identify their contents as well as to advertise the name of the maker and/or a brand name. The commercial production of the quantities of articles which must be so labeled day-in and day-out is so large as to prohibit manual affixing of the labels. It is therefore known to use automatic machines which affix labels to the respective articles at production rates which may be very high indeed. Generally speaking, this is entirely satisfactory. However, machine error being impossible to preclude, a certain percentage of the articles is not provided with labels by the machine. Evidently, such nonlabeled articles must be rejected from further processing steps—such as packing and shipping—so that necessary corrective action can be taken with respect to them, for instance by applying labels. Scanning the total output of the labelling machines with the help of operators may or may not be possible, depending on the output speed. However, even if it is possible, it is an expensive approach to solving the problem.

One attempt to effect the scanning by machine which has become known involves optical scanning procedures. However, this is practical only if there is a sufficient brightness gradient between the article and the label, and further devices utilizing this procedure are decisively influenced by the color of the glass or plastic—if the article is a bottle or similar container—and the contents. It follows from this that scanning by optical methods is feasible only for a limited range of applications.

## SUMMARY OF THE INVENTION

The present invention has as its general object to provide for scanning of articles for the presence or absence of labels in such a manner that the aforementioned limitations are overcome.

More particularly, the present invention resides in a method of scanning such articles for the presence and absence of labels, wherein brightness gradients between the article and the label, color of the article material and color or consistency of the contents are of no consequence.

An additional object of the invention is to provide an apparatus for carrying out the method.

In pursuance of the above objects, and others which will become apparent hereafter, one feature of our invention resides in a method of checking discrete articles for the presence of applied labels, this method briefly stated comprising the steps of advancing a plurality of discrete articles in a predetermined path and past a control station, detecting the arrival of each article at the control station and generating a signal in response to such detection, and scanning the respective detected article at the control station for the presence of a label on a predetermined portion of the article in response to generation of the signal. In the absence of the label from the predetermined portion of the article, an impulse is generated which indicates such absence and the fact that the article is rejected. Such impulse may, of course, be in form of a signal such as a visual or auditory indication, or it may be in form of activation of a device which segregates the thus-rejected article from the remaining articles.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawing.



## BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a diagrammatic top-plan view of an apparatus according to the present invention;

FIG. 2 is a diagrammatic elevation, on an enlarged scale, of the apparatus in FIG. 1 as seen from the direction opposite the arrow A therein;

FIG. 3 is a view similar to FIG. 2 but showing the apparatus in a different operative condition; and

FIG. 4 is a view similar to FIG. 2 also but showing the apparatus in still a further operative condition.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

Discussing now the drawing in detail, and firstly FIG. 1, it will be seen that a plurality of articles 1 are advanced in a predetermined path by suitable guide means 2 past a control station 3. The particular shape of the articles, which will be seen in FIGS. 2—4 in form of small bottles, is of no consequence and the showing in the drawing is by way of example only.

As the articles 1 advance in the direction of the arrow A in FIG. 1, moved in suitable manner by one of the many well-known arrangements for this purpose which need not be further described but which, for purposes of the present explanation, shall be diagrammatically symbolized by the arrow A, they pass through the light beam—shown in broken lines—which issues from a source 16 located at one side of the path and is received by a detector 17 located at the opposite side of the path but downstream from the light-source 16. The source 16 and the detector 17 together thus constitute a well-known photoelectric device. The scanning arrangement located at the control station 3 comprises, as is more fully shown in FIGS. 2—4, an elongated feeler member 4 consisting of a resiliently yieldable material, such as a springy material, and having a front portion provided with a contact tip 21, an intermediate portion and a rear portion which is secured in suitable manner to a support means 5. An abutment portion is so arranged, and preferably constitutes a unit of the support means 5, that the intermediate portion of the feeler member 4 may rest on it, as for instance shown in FIG. 2. This abutment portion carries a member 6 which is elongated in the direction of movement of the article 1, as shown in FIG. 1, and on which the intermediate portion of the feeler member 4 actually rests. A suitable electrically insulating material 7 is interposed between the abutment portion which in the illustrated embodiment is of one piece with the support means 5, and the member 6.

An electromagnetic 8 is provided whose armature 9 is arranged to attract a projection 10 provided on the support means 5. An expansion spring 11 is located intermediate the electromagnet 8 and the support means 5 and urges the latter away from the electromagnet 8, that is upwardly in FIGS. 2—4. Thus, when the electromagnet 8 is activated, it must attract the projection 10 of the support means 5 against the opposition of the spring 11 with the result that, when the electromagnet 8 is subsequently deenergized, the spring 11 will urge the support means 5 upwardly away from the armature 9.

An electrical control device 12 is provided which is connected with the member 6 via a conductor 13, and with the electrically conductive support means 5 via a conductor 14. A further conductor 15 connects the control device 12 with the electromagnet 8, and a conductor 18 connects it with the detector 17 of the photoelectric device. Finally, a conductor 19 connects the control device 12 with a diagrammatically illustrated impulse-receiving device 23 which, on receiving an impulse in the manner still to be described, may produce a visual signal, and auditory signal, or be of such character as to be capable of effecting segregation of a rejected article from the remaining articles. Such devices are well known and need not be further described, but inasmuch as they do not form a part of the present invention, the device 23 being shown only for explanatory purposes.

As the articles 1 advance in their predetermined path in the direction indicated by the arrow A in FIG. 1, they contact the

front portion of the feeler member 4 which, as indicated in broken lines in FIG. 1, extends at an acute angle across the path of the articles 1. During movement in the direction of the arrow A, the articles deflect the front portion of the feeler member 4 in the direction of the arrow A, as is illustrated on hand of one of the articles in FIG. 1, so that it assumes the full-line position shown in FIG. 1. During such movement the intermediate portion of the feeler member 4 slides on the member 6 in the direction of the arrow A. When the articles 1 reach a predetermined position, they interrupt or otherwise influence the light beam coming from the source 16 in such a manner as to cause the detector device 17 to generate a signal which is transmitted to the control device 12 from where, in turn, the electromagnet 8 is energized. This caused the armature 9 of the electromagnet 8 to attract the projection 10 of the support means 5, moving the latter downwardly as seen in FIGS. 2—4. Because the feeler member 4 is rigidly connected with the separate means 5, the feeler member 4 will similarly move downwardly.

FIG. 2 shows the apparatus at the moment at which an article 1 is detected by the detector 17 but before the electromagnet 8 is energized.

FIG. 3 shows the device after the electromagnet 8 is energized. If, as will normally be the case, a label 20 is provided on the predetermined portion of the article 1, the tip 21 of the feeler member 4, which latter tip slides over and is in engagement with the surface of the article 1, will abut against the upper edge of the label 20. Accordingly, downward movement of the support means 5 from the position in FIG. 2 to the position in FIG. 3 as a result of energization of the electromagnet 8, will cause the member 6 to move out of engagement with the feeler member 4, which latter is flexed in the manner illustrated in FIG. 3. This interrupts the electrical circuit through the switch of which the member 6 constitutes one contact whereas the feeler member 4 constitutes the other contact. While this has not been specifically illustrated, it is emphasized that the circuit arrangement will be of course so constructed that the opening of the circuit does not cause generation of an impulse in the device 12. Thus, the properly labeled article 1 in FIG. 3 continues to advance in the direction of the arrow A (see FIG. 1) until it has passed the control station 3.

If, however, no label is present on the article 1, as illustrated in FIG. 4, the tip 21 of the feeler member 6 will simply slide downwardly over the surface of the article 1 in response to downward movement of the support means 5 on energization of the electromagnet 8. There is now no upper edge of the label present to engage the tip 21 and prevent it from such sliding movement. Accordingly, and as clearly shown in FIG. 4, the circuit will not be interrupted by separation of the contacts constituted by the members 4 and 6. This leads to an issuance of an impulse by the control device 12 which is transmitted through the conductor 19 to the device 23 and there produces, depending upon the nature of the device 23, a visual signal, an auditory signal, or an action on the part of the device 23 which results in segregation of the rejected nonlabeled article 1. As mentioned before, devices which can effect such segregation are well known in the art, they may be grippers, they may be baffles which divert the rejected article into a branch passage, or they may be constructed in any of many other suitable ways. In any case, with the issuance of an impulse by the control device 12 and transmission of this impulse through the conductor 19, the nonlabeled article 1 has been indicated as nonstandard and as requiring rejection.

In order to provide for proper guidance of the tip 21 of the feeler member 4, particularly in the case of bottles having in their upper region a shoulderlike configuration, a transverse portion 22 is provided at the front portion of the feeler member 4 proximal to the tip 21. This prevents that the shoulder of such an article so deflects the tip 21 that it cannot contact the label 20 if such a label is present.

It is emphasized, as will be evident in any case, that changes may be made in the illustrated embodiment without departing from the spirit and scope of the invention. Thus, it is evidently possible to provide a differently configurated feeler member, to utilize means other than the spring 11 for effecting the function of the same, to lay out the circuitry in such a manner that an impulse will be produced if the switch whose contacts are constituted by the members 4 and 6 opens in the absence of the label instead of remaining closed, and others.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of applications differing from the types described above.

While the invention has been illustrated and described as embodied in an apparatus for detecting the presence of applied labels on discrete articles, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims.

We claim:

1. A method of checking discrete articles for the present of applied labels, comprising the steps of advancing a plurality of discrete articles in a predetermined path and past a control station; detecting the arrival of each article at said control station, and generating a signal in response to such detection; contacting the respective detected article at said control station with a scanning instrumentality in response to generation of said signal, and effecting displacement of said instrumentality normal to said path and relative to said article in the presence of a label on a predetermined portion of said article; and generating, in the absence of such displacement and consequently of the label from said portion, an impulse indicative of such absence and of the rejection of the article.

2. A method as defined in claim 1, and further comprising the step of segregating the thus rejected article in response to generation of said impulse.

3. Apparatus for checking discrete articles for the presence of applied labels, comprising in combination, advancing means for advancing a plurality of discrete articles in a predetermined path past a control station; detecting means for detecting the arrival of each article at said control station, and for generating a signal in response to such detection; scanning means associated with said detecting means and including an elongated feeler member extending across said path for engagement with the respective articles and mounted for displacement normal to said path by a predetermined extent in response to encountering of a label on a predetermined portion of the article; and impulse-producing means associated with said scanning means and operative for generating, in the absence of said displacement of said feeler member and consequently in the absence of a label from said portion, an impulse indicative of such absence and of the rejection of the article.

4. Apparatus as defined in claim 3, said detecting means comprising a photoelectric detecting device including a light-source at one side and a detector located at the other side of said path.

5. Apparatus as defined in claim 3, wherein said feeler member extends across said path at an acute angle.

6. Apparatus as defined in claim 3, wherein said feeler member consists at least in part of elastically yieldable material.

7. Apparatus as defined in claim 3, said feeler member including a front portion arranged to contact said articles, a rear portion remote from said front portion, and an intermediate portion; and further comprising support means connected to and supporting said rear portion.

8. Apparatus as defined in claim 7, said scanning means further comprising an abutment portion located below said intermediate portion laterally of said path, said intermediate portion normally resting on said abutment portion and being deflectable upwardly away therefrom.

9. Apparatus as defined in claim 8, wherein said abutment portion is a portion of said support means and constitutes with the same a unit.

10. Apparatus as defined in claim 8, wherein said feeler member constitutes one contact of an electrical switch; and further comprising a contact member provided on said abutment portion for engagement by said feeler member and constituting the other contact of the switch.

11. Apparatus as defined in claim 7, said front portion of said feeler member having a contact tip arranged to engage said portion of said article; and said scanning means further



comprising actuating means associated with said support means and operative for effecting movement of the same, and thereby of said feeler member, in direction normal to said path in response to generation of a signal by said detecting means so that said contact tip of said feeler member slides over said portion of said article scanning the same for the presence of a label.

12. Apparatus as defined in claim 11, said actuating means being electromagnetic means.