ABSTRACT

A device for checking containers for edges of closing parts when the edges are not covered by a covering strip such as a tax stamp. A contact element including a contact finger is mounted on a support in a position where it will pass over the area to be covered by the covering strip. If the covering strip is present the contact finger passes over the edge of the closing part. If, however, the covering strip is absent, the contact finger engages the exposed edge and the engagement causes the activation of an alarm.

18 Claims, 8 Drawing Figures
SWITCH SENSING DEVICE FOR SENSING PRESENCE OF SEAL ON CONTAINERS

BACKGROUND OF THE INVENTION

1. Field of the Invention
This invention relates to a device for checking containers for the presence of exposed edges of the sealing parts of the container such as flaps, tongues, lugs or other similar overlapping strips, and more particularly, to edges of sealing strips, tax stamps, and the like.

2. Description of the Prior Art
Various embodiments of containers with affixed strips are known, particularly in the tobacco or cigarette industry. In this case, the strips affixed in the region of a sealing part of the container may have various functions, for example, they may serve as sealing strips and also as tax stamps which are required on tobacco goods. An affixed tax stamp is a requirement for the retailability of the pack. It is therefore essential that the containers in question should be provided with such tax stamps.

SUMMARY OF THE INVENTION

The aim of the present invention is to provide a device for the fully automatic checking of containers and for sorting out faulty containers, i.e., those which are not provided with the strip in question.

The device according to the invention is characterized in that a contact element or finger, which slides in the region of a strip to be examined on a container or strip, may be moved over the exposed edge of the closing part and if the strip is missing from the exposed edge even though the edge is closed it may be acted on by the contact element to produce a signal.

Accordingly, the device according to the invention works with a contact element which is placed on the container in the region of the strip to be examined. If the strip is present, the contact element slides over the exposed edge of the closing part of the container which is covered by the strip without a signal being issued by the contact element. However, if the strip is missing, the contact element is held on the uncovered exposed edge of the closing part of the container and is acted on so that a signal is produced.

The contact element is preferably disposed on a movable contact head which, when the contact element is acted on as a result of the absence of the covering strip, experiences kinematic changes through the contact element.

The checking process with the device according to the invention takes place with the closing tongue of the container held in the closed position.

According to another feature of the invention a special holding element can be applied to the contact head, this being a clamp which holds the closing tongue of the container in the closed position during the examination process.

BRIEF DESCRIPTION OF THE DRAWINGS

Further details of the invention will now be described with reference to the preferred embodiment shown in the drawings, in which:

FIGS. 1–4 show various containers of the kind to be examined by the device according to the invention,

FIG. 5 is a diagrammatic side view in two positions of a checking device according to the invention,

FIG. 6 is a plan view of the checking element, that is, a part of a contact head during examination of a container according to FIG. 4, with the checking element in the starting position,

FIG. 7 is a side view of the parts of the device according to FIG. 6 during the final stage of checking a container, and

FIG. 8 is a plan view of the position according to FIG. 7.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIGS. 9–11 illustrate the checking device in various operative positions exemplifying structural features illustrated in FIG. 5.

The checking device according to the invention comprises a contact head 10 which is moved together with a contact element such as contact finger 11 in the embodiment shown, over the article to be examined, in this case, a container 12, to carry out the checking process. The examining movement of the contact finger 11 over the container 12 may be effected in various ways. In the case of the example of embodiment represented, a backward and forward movement of the contact head 10 and thus the contact finger 11 is provided.

The contact head 10 is disposed on a mobile support, in the case of the present embodiment, on a pivot arm 13 so as to be able to carry out the examining movements. The pivot arm 13 is pivotable, for example, by means of a cam plate 15 driven in rotation. The cam 15 is operatively connected to pivot arm 13 by a roller 16 under tension of a spring 17. Arm 13 pivots about axis 14 located apart from the contact head 10.

Containers of the most varied nature are represented in the examples of embodiments in FIGS. 1–4 are to be examined by the checking device constructed on this principle for the absence of affixed strips. This affixed strip may be a tax stamp 18 which is a legal requirement in the case of containers for tobacco goods. However, the strips to be examined may also be closing strips 19 whose function is to hold in the closed position a closing part of the container, that is, a closing flap 20. In the case of the examples of containers according to FIGS. 1–3, which are cigarette packs, the tax stamp 18 also has the function of a sealing strip. In the case of a container according to FIG. 4 which is used to hold pipe tobacco, the closing flap 20 is also covered by an additional foil closing strip 19 apart from the tax stamp 18. In all cases, the strips 18 or 19 are so disposed that they pass in the form of a bridge over an edge 21 formed by the closing flap 20. By virtue of the method of closing the container, the edge 21 rests on the container wall located below it, and thus forms a projecting edge.

The checking of the containers 12 for the presence of the strip or strips 18 or 19 is carried out by moving the pivot arm 13 of the contact head 10 until the front end 11a of the contact finger 11 rests on the strip 18 or 19 or on the container 12 in the region of the missing strip 18 or 19. The contact head 10 is moved sufficiently far for the end 11a of the contact finger 11 to be moved across the edge 21 of the closing flap 20 if the strip 18 or 19 is present. On the other hand, if the strip is missing during the examining movement, the front end 11a of the contact finger 11 moves against the now exposed edge 21 of the closing flap 20 and is
acted on or held by the same. The engagement of the contact finger 11 with edge 21 is converted into a control signal which causes the stopping of the device or separating out of the faulty container 12.

The contact head 10 is constructed in the form of a bracket with side walls 23, 24 connected together by a lug 22. The contact head 10 is pivotally disposed about an axis 25 on the pivot arm 13 or on a support 26 of the pivot arm 13. The starting position of the contact head 10 indicated by the solid lines in FIG. 5 is defined by the support 26 coming to rest on a stop 27. A spring 35 moves the pivotable contact head 10 into this starting position.

In the lower region, that is, below the axis 25, the contact finger 11 is pivotally disposed on the contact head 10 about a separate axis 28. The starting position of the contact finger 11 is insured by its coming to rest on a stop 29 by means of a spring 30.

Examination of the container 12 is carried out with a checking device constructed as follows:

The contact head 10 with a contact finger 11 is lowered by the movement of the pivot arm 13 onto the container from the starting position shown in solid lines in FIG. 5 in such a way that the front end 11a of the contact finger 11 is lowered in a parallel movement to the starting position onto the container 12 or onto the strips 18 or 19 if they are present. If the strip 18 or 19 is present, the contact finger 11 is moved away from the strip 18 or 19 by the further movement of the pivot arm 13, without a signal having been issued. The unevenness caused when the contact finger passes the edge 21, covered by the strips 18 or 19, is compensated by pivoting the contact finger 11 relative to the contact head 10.

On the other hand, if the strip 18 or 19 is not present the front end 11a moves against the free edge 21. The contact finger 11 is stopped or acted on by the edge. The force acting on the contact finger 11 produces a torque which pivots the contact head 10 rotatable on an axis 25 about the angle α. This pivot movement of the contact head 10 is converted into a control signal.

In the example of embodiment represented, an inductive sensor is provided for this purpose. The sensor is on or in the support 26 of the pivot arm 13. A surface 31 of the support is activated in a known manner by the movement of the lug 22 of the contact head 10 which is adjacent to surface 31 in the starting position. Another activating element, for example, a microphone or the like, may be provided in place of this inductive sensor.

According to the invention, the closing flaps 20 are fixed in the closed position during examination of the container 12 even if the strip 18 or 19 is not present. In the example of embodiment represented, a clamp 32 is provided for this purpose, said clamp surrounding the contact finger 11 in the form of a bracket (see, in particular FIGS. 6 and 8). During the examination process, the front upwardly bent region of this clamp 32 which is constructed in the form of a sliding shoe rests on the container or on the closing flap 20 of the container 12 and with the contact finger 11 leading presses the flap into the closing position.

As the closing flap 20 cannot be held completely firm in the closed position even with the clamp 32 when the strip 18 or 19 is not present, a catching groove 33 is disposed on the upper side of the contact finger 11 in the proximity of its front end 11a. The edge 21 is caught if necessary in this groove when the strip 18 or 19 is not present and the edge passes beyond the front end 11a of the contact finger 11.

The clamp 32 is disposed on the axis 28 of the contact finger 11 and is rotatable with same as well as being moved by a spring 34 associated with the clamp 32, into the starting position corresponding to the contact finger 11.

What is claimed is:

1. A device for checking containers for the absence of a covering strip over the edge of a closing part thereof, said device comprising:
   a. a contact finger;
   b. a contact head on which said contact finger is movably mounted;
   c. a support on which said contact head is movably mounted;
   d. a first biasing means for biasing said contact head towards a first position with respect to said support;
   e. means for moving said support and containers to be checked relative to each other so that said contact finger
      i. first comes into contact with such containers on the surface of their covering strips, if present, or, if absent, on the surface of the containers in the region of the missing strip, but, in either case, on the portion of the surface which is on the lower side of the edge,
      ii. is then moved towards the edge of the closing part while continuing to be in contact with the covering strip, if present, or, if absent, with the container itself,
      iii. is then moved across the edge of the closing part on the covering strip, if it is present, or, if it is absent, is then held back by the closing part, causing said contact head to move against said biasing means to a second position with respect to said support; and
   f. indicator means operatively connected to said contact head for producing an indication when said contact head is moved to its second position with respect to said support.

2. A device as claimed in claim 1, wherein said contact head is pivotably mounted on said support.

3. A device as claimed in claim 1, wherein said contact finger is pivotably mounted on said contact head and further comprising a second biasing means for biasing said contact finger towards a first position with respect to said contact head, in which first position said contact finger may be brought into initial contact with a container or with a covering strip thereon, as the case may be, said contact finger being free to pivot against said second biasing means to a second position with respect to said contact head when said contact finger is moved across the edge of the closing part on a covering strip, thereby compensating for the unevenness caused by the presence of the edge beneath the covering strip without producing an indication from said indicator means.

4. A device as claimed in claim 1 wherein said contact finger is mounted so that, in the absence of a covering strip, it is held back by the edge of the closing part perpendicular to the motion of said contact finger, whereby said indicator means produce an indication of the absence of the covering strip without the closing parts being destroyed or even raised.
5. The device as set forth in claim 1 wherein said indicator means includes an inductive sensor mounted on or in said support and an actuator mounted on said contact head, whereby the movement of said contact head with respect to said support moves said actuator with respect to said inductive sensor thereby producing an indication.

6. A device as claimed in claim 1 and further comprising closing means mounted on said contact head for maintaining the closing parts of containers being checked in their closed positions when said contact finger engages the closing parts due to the absence of covering strips, whereby said indicator means produce an indication of the absence of the covering strips without the closing parts being destroyed or even raised.

7. The device as set forth in claim 6, wherein said closing means comprises a clamp pivotally connected to said contact head, said clamp surrounding said contact finger.

8. The device as set forth in claim 7, wherein said contact finger is connected to said contact head on the same axis as said clamp.

9. A device as claimed in claim 1 wherein a catching means is mounted on the upper side of said contact finger, said catching means being adapted to receive the edges of the closing parts of containers in the absence of covering strips.

10. In a device for checking containers for the absence of a covering strip over the edge of a closing part thereof, said device comprising:
   1. a contact finger;
   2. a contact head on which said contact finger is mounted;
   3. a support on which said contact head is movably mounted;
   4. a first biasing means for biasing said contact head towards a first position with respect to said support;
   5. means for moving said support and containers to be checked relative to each other so that said contact finger
      i. first comes into contact with such containers on the surface of their covering strips if present, or, if absent, on the surface of the containers in the region of the missing strip, but, in either case, on the portion of the surface which is on the lower side of the edge,
      ii. is then moved towards the edge of the closing part while continuing to be in contact with the covering strip, if present, or, if absent, with the container itself,
      iii. is then moved across the edge of the closing part on the covering strip, if it is present, or, if it is absent, is then held back by the closing part, causing said contact head to move against said biasing means to a second position with respect to said support; and
   6. indicator means operatively connected to said contact head for producing an indication when said contact head is moved to its second position with respect to said support, the improvement wherein said contact finger is movably mounted on said contact head and said device further comprises a second biasing means for biasing said contact finger towards a first position with respect to said contact head, in which first position said contact finger may be brought into initial contact with a container or covering strip thereon, as the case may be, said contact finger being free to move against said second biasing means to a second position with respect to said contact head when said contact finger is moved across the edge of the closing part on a covering strip, thereby compensating for the unevenness caused by the presence of the edge beneath the covering strip without producing an indication from said indicator means.

11. A device as claimed in claim 10, wherein said contact finger is pivotally mounted on said contact head and the motion thereof from its first to its second position is pivotal.

12. A device as claimed in claim 10, wherein said contact finger is pivotally mounted on said contact head.

13. A device as claimed in claim 10 wherein said contact finger is mounted so that, in the absence of a covering strip, it is held back by the edge of the closing part perpendicular to the motion of said contact finger, whereby said indicator means produce an indication of the absence of the covering strip without the closing parts being destroyed or even raised.

14. The device as set forth in claim 10 wherein said indicator means includes an inductive sensor mounted on or in said support and an actuator mounted on said contact head, whereby the movement of said contact head with respect to said support moves said actuator with respect to said inductive sensor thereby producing an indication.

15. A device as claimed in claim 10 and further comprising closing means mounted on said contact head for maintaining the closing parts of containers being checked in their closed positions when said contact finger engages the closing parts due to the absence of covering strips, whereby said indicator means produce an indication of the absence of the covering strips without the closing parts being destroyed or even raised.

16. The device as set forth in claim 15, wherein said closing means comprises a clamp pivotally connected to said contact head, said clamp surrounding said contact finger.

17. The device as set forth in claim 16 wherein said contact finger is connected to said contact head on the same axis as said clamp.

18. A device as claimed in claim 10 wherein a catching means is mounted on the upper side of said contact finger, said catching means being adapted to receive the edges of the closing parts of containers in the absence of covering strips.

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