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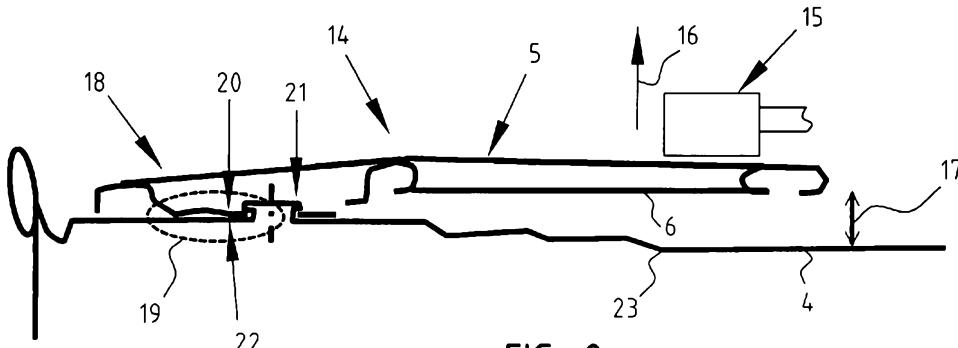


FIG. 2

(57) **Abstract:** The invention relates to a can (1), comprising a body (2) provided with a panel (4) and a tab (5) connected to the panel, which tab has a front tab part (7) and a rear tab part (6) for by gripping and tilting forming with the tab front part an opening in the panel along a panel score line (3), wherein the tab is in a tilted position due to a deformation of the tab -panel connection, to a panel and to a method of making the panel and/or can.

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**CAN, PANEL FOR A CAN AND A METHOD FOR MAKING SUCH
A PANEL FOR CAN.**

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The present invention relates to a can, to a panel for a can and to a method for making such panel or can.

The can according to the invention may be of the 10 type of a so called easy opening closure. An easy opening closure is a metal closure for a can in which an opening may be formed by using one or more fingers and without the requirement of a separate opening tool. To that extent the can is provided with a tab for forming an 15 opening in the panel of the can. The tab functions as a lever. The tab comprises a tab rear part for gripping by the consumer with one or more fingers. The tab is actuated by levering the tab whereby the tab front part contacts the panel. The panel is provided with an opening 20 defined by a score line which is formed in the panel surface. After popping the score line with the tilted tab front part the opening in the panel is formed along the score line. If intended, the central part of the panel circumvented by the score line may be torn off using the 25 tab. Accordingly, an easy opening can is a can in which an opening may be formed without the need of using a separate opening tool.

Such can may be filled and subsequently closed by seaming or soldering the easy opening panel onto the can. 30 Thereafter the filled easy opening can may be subjected to heating or cooling and further handling for packaging and transport. This requires that the tab, in particular the tab rear part remains within the confinement of the can (in particular within the can seaming edge) such that

interference by a projecting tab part is substantially avoided. This requirement counters the requirement for easy access of the tab rear part for gripping with one or more fingers by the consumer.

5 Accordingly, there is a continuous need for providing an easy opening panel for a can which combines optimal conditions for the supplier of the panel and can and, for the consumer.

It is an object of the present invention to overcome or
10 ameliorate at least one of the disadvantages of the prior art, or to provide a useful alternative.

The present invention has for its object in at least one preferred form, to provide a can and a panel for such a can which provides an optimal finger access underneath the
15 rear tab part, and/or allow a lower force to lift the rear tab part and form the opening in the can.

Accordingly, a first aspect of the present invention provides a can, comprising a body provided with a panel and a tab connected to the panel, which tab has a front tab part
20 and a rear tab part for by gripping and tilting forming with the tab front part an opening in the panel along a panel score line, wherein the tab is connected to the panel via a structural connecting element, and wherein the tab is in a tilted position due to a deformation of the tab-panel
25 connection, wherein deformation is in the structural connecting element.

Unless the context clearly requires otherwise, throughout the description and the claims, the words "comprise", "comprising", and the like are to be construed in
30 an inclusive sense as opposed to an exclusive or exhaustive sense; that is to say, in the sense of "including, but not limited to".

In one aspect, the present invention is based on the insight that a part of the opening procedure may be carried
35 out by the producer of the panel or the supplier of the can prior to making the can available to the consumer. The starting part of the opening procedure goes through an

elastic deformation and subsequent plastic deformation of the tab-panel connection up to the popping of the score line whereafter the initial opening and access to the container occurs. It is in this starting part of the opening procedure 5 up to just before popping which is to be carried out prior to making the can available to the consumer. Obviously, the start of the opening procedure is to be carried out to such extent that the tab in the tilted position will not interfere with the production and filling of the can and the transport 10 to the consumer. Furthermore, due to carrying out the tilting of the tab to the desired extent, the tab-panel connection will deform first elastically and subsequently plastically. This will result in a required lower force to be applied by 15 the consumer for popping the opening and/or the tab remains in the tilted position due to the applied elastic and subsequently plastic (permanent) deformation of the tab-panel connection.

According to one embodiment the deformation occurs in only the tab part of the tab-panel connection. In another 20 embodiment the deformation occurs in only the panel part of the tab-panel connection. In both these embodiments is the tab directly connected to the panel by seaming, soldering or gluing.

The structural connecting element could be an integral 25 part of the panel or could be a separate structural element such as a rivet. Obviously, in all these embodiments it is also possible that the deformation not only occurs in the tab part, in the panel part or in the structural connecting element, but occurs in the assembly of the tab and panel or 30 tab, structural connecting element and panel, which form the tab-panel connection or assembly.

In order to avoid any interference with the general or standard production and filling operations it is preferred that the rear tab part resides within the can confinement.

35 The finger access of the tab rear part with the tab in the tilted position, may be further improved when the rear tab part resides above a depressed panel part.

As indicated above the start of the opening procedure goes through an elastic and subsequent plastic deformation of a tab-panel connection. Plastic deformation is substantially permanent. However, elastic and plastic deformation may occur 5 at the same time in different parts of the tab-panel connection. In order to have a secured tilted position of the tab, it is preferred that the deformation of the tab-panel connection comprises at least partially plastic deformation.

A second aspect of the present invention relates a 10 panel for a can as defined in the first aspect.

A third aspect of the invention relates to a method of making a panel according to the second aspect, or a can according to the first aspect. This method comprises steps of (i) connecting a tab to a panel via a structural connecting 15 element, and (ii) tilting the tab thereby deforming the tab-panel connection such that the tab remains in the tilted position wherein deformation is in the structural connecting element. According to one embodiment is the tilting step carried out by hooking (such as with a hook) by levering 20 (such as by using a lever) and/or by helix spinning (using a spinning helix). In all these embodiments an additional mechanical element is gripping beneath the rear tab part for the subsequent carrying out of the tilting operation.

In another embodiment is the tilting step carried out 25 by glue pulling or magnetic pulling. Both these types of pullings occur with a mechanical element which is not gripping beneath the tab but makes contact with the upper surface of at least the rear tab part. In glue pulling the mechanical element temporarily contacts and pulls due to a 30 glue action on the tab. Preferred is magnetic pulling such as by using an electro-magnet using magnetic force.

Finally the present invention relates to a panel or can obtainable with method according to the third aspect.

Mentioned and other features and characteristics of the panel, can and method for making will be further illustrated by making reference to an embodiment which is different for illustrative purposes only and not intended 5 to limit the present invention to any extend.

In this respect reference will be made to the annexed figures in which:

Figures 1 and 2 are cross sectional views of the two steps in making a can provided with a panel according to 10 the invention which was brought into the tilted position.

Figure 1 shows a can 1. The can 1 comprises a body 2 to which is connected via a seam 3 an easy opening panel 4. The panel 4 comprises a tab 5 having a rear tab part 6 and a front tab part 7.

15 The tab 5 is connected to the panel 4 via a structural connecting element 8. This element 8 is integral with the panel 4 and has the form of a rivet. The rivet 9 is inserted in an opening 10 and is locked into the opening by a widened upper section 11.

20 The front tab part 7 is provided with a nose 12 which could operate with a score line 13 formed into the panel 4. By tilting the tab 5 after gripping the rear tab part the nose will contact in the area near the score line and after applying sufficient force will ultimately 25 pop open the panels 4 along the score line 13.

The can 1 shown in figure 1 may be considered an intermediate can to be used in the method according to the invention for producing a panel and can according to the invention.

30 Figure 2 shows the can 14 according to the invention with the tab 5 brought into the illustrated and shown tilted position.

According to the preferred production method, an electro magnet 15 was brought into contact with the rear

tab part 6 and under magnetic force the tab 5 was lifted according to the arrow 16 thereby generating a finger access 17 between panel 4 and rear tab part 6.

The tab 5 remains in this shown tilted position
5 due to a deformation 18 in the tab panel connection 19 systematically indicated by the oval area. The tilting may have resulted in a deformation of the tab part 20, and or the rivet part 21 and or panel part 22 all forming part of the tab-panel connection. The deformation in the
10 tab 5, in the rivet 9 and or panel 4 may be elastic and/or plastic. Preferably and ideally is the deformation at least partially plastic because it is a permanent deformation and then the tab is secured in the tilted position.

15 Finally it is noted that the step according to the invention for bringing the tab in the tilted position may be carried out with a modified or additional tooling used in a current apparatus used in the production of easy opening panels and cans. Such apparatus comprises an
20 easy opening conversion press, a labeller machine for filled cans and the like. Obviously, a stand alone machine may be used and inserted in any possible area of the production line of easy opening panels and cans.

Finally, as shown in figure 2 is the finger access optimal and even maximal if beneath the rear tab part 6 lies a depressed panel part 23.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. Can, comprising a body provided with a panel and a tab connected to the panel, which tab has a front tab part and a rear tab part for gripping and tilting forming with the front part an opening in the panel along a panel score line, wherein the tab is connected to the panel via a structural connecting element, and wherein the tab is in a tilted position due to a deformation of the tab-panel connection, wherein deformation is in the structural connecting element.
2. Can according to claim 1, wherein deformation is in the tab part of the tab-panel connection
3. Can according to claim 1 or 2, wherein deformation is in the panel part of the tab-panel connection.
4. Can according to any one of claims 1-3, wherein the structural connecting element is an integral part of the panel.
5. Can according to any one of claims 1-4, wherein the structural connecting element is a separate structural connecting element, such as a rivet.
6. Can according to any one of claims 1-5, wherein the tab rear part resides within the can confinement.
7. Can according to any one of claims 1-6, wherein the tab rear part resides above a depressed panel part.
8. Can according to any one of claims 1-7, wherein the deformation comprises at least partially plastic deformation.
9. Panel for a can, as defined in any one of claims 1-8.
10. Method for making a panel according to claim 9, or a can according to any one of claims 1-8, comprising the steps of:
 - i) connecting a tab to the panel via a structural connecting element; and
 - ii) tilting the tab thereby deforming the tab-panel connection such that the tab remains in the tilted position wherein deformation is in the structural connecting element.
11. Method according to claim 10, wherein the tilting

step ii) is carried out by hooking, levering and/or helix spinning.

12. Method according to claim 10 or 11, wherein the tilting step ii) is carried out by glue pulling or magnetic 5 pulling.

13. Panel or can obtainable by the method according to any one of claims 11-13.

14. A can substantially as herein described with reference to any one of the embodiments of the invention 10 illustrated in the accompanying drawings and/or examples.

15. A panel substantially as herein described with reference to any one of the embodiments of the invention illustrated in the accompanying drawings and/or examples.

16. A method for making a panel substantially as herein 15 described with reference to any one of the embodiments of the invention illustrated in the accompanying drawings and/or examples.

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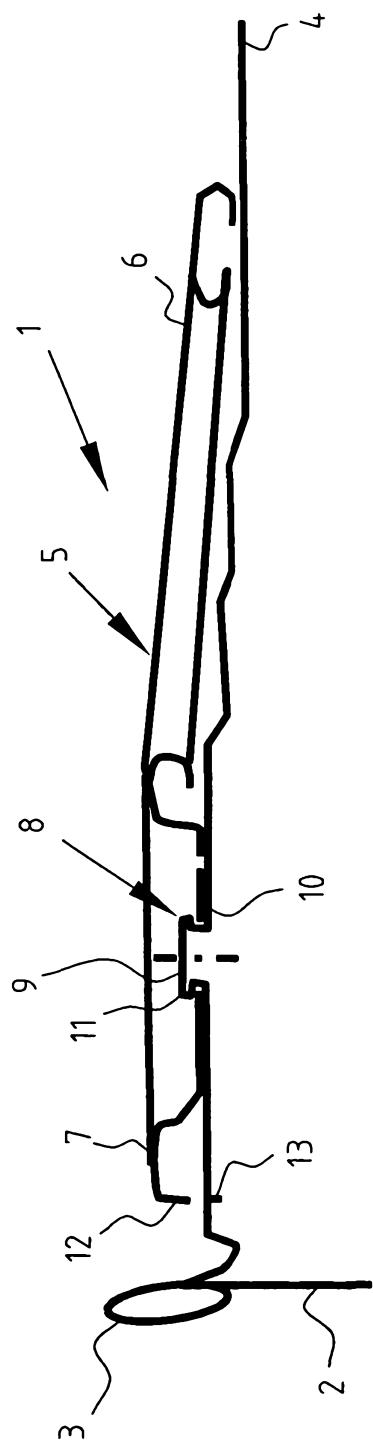


FIG. 1

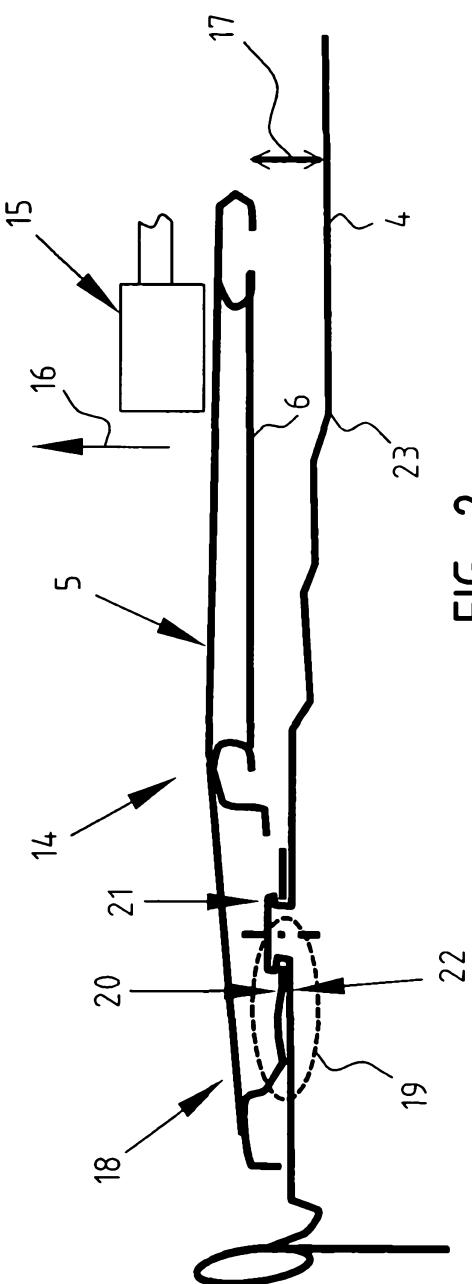


FIG. 2