

TITLE

Container in the form of a sheet-metal can with sheet-metal lid.

TECHNICAL FIELD

- 5 The present invention relates to a container in the form of a sheet-metal can with sheet-metal lid according to the preamble to the following patent claim 1.

BACKGROUND ART

- For the storage and transport of hazardous goods there are various
10 container solutions, for example having some form of locking ring which holds together the lid and the can even in the event of excess pressure and mechanical action. However, no good solutions have been found for easily closing such containers and easily removing the locking ring for intentional opening of the can.

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DISCLOSURE OF INVENTION

The object of the present invention is to produce a solution in which a container in the form of a sheet-metal can with sheet-metal lid and locking ring can be closed and opened quickly and with simple means.

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Said object is achieved by means of the container according to the invention, the characteristics of which emerge from the following patent claim 1.

BRIEF DESCRIPTION OF DRAWINGS

- 25 The invention will be described in greater detail below with an illustrative embodiment with reference to the appended drawings, in which:

fig. 1 shows a side view of a container according to the invention,

- 30 fig. 2 shows on a larger scale a partially broken portion of the sheet-metal can with lid,

fig. 3 shows a perspective view of the container directly after the locking ring has been broken open with a breaking tool, and

fig. 4 shows in schematic representation flow directions in the injection molding of a locking ring forming part of the container.

MODE(S) FOR CARRYING OUT THE INVENTION

The container 1 according to the invention is primarily intended for the storage and transport of hazardous goods, in which high demands are placed upon the packaging so that this is not accidentally opened if exposed to abnormal forces. The container consists of a sheet-metal can 2 with sheet-metal lid 3, as can be seen from fig. 1. The container 1, i.e. both can and lid, are therefore made of a relatively thin-walled plate, usually tin plate, which is of uniform thickness and is produced from a flat or rolled sheet billet, for example steel plate, with tin-plated surface on at least one side and possibly painted on at least the outer side. The plate can also be painted on the inner side for increased corrosion protection. The plate thickness is, for example, 0.1-1.0 mm, usually 0.1-0.5 mm. In order to reduce material consumption, and hence costs and weight, for paints, for example, relatively small material thickness is chosen, yet in the forming operation, especially in edge portions, a relatively good dimensional stability is acquired.

The can 2 has at the bottom a base 4, which usually is flat and is connected to a circumferential casing wall 5 which extends upward from the base and which usually is slightly conical or possibly cylindrical. The connection to the base is made, for example, in a conventional manner by means of seaming and soldering, so that a leak-tight connection is obtained. The casing wall 5 is closed by means of a plate joint. In the example, a handle 7 is fixed in the casing wall 5 of the can 2.

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As can be seen from the section in fig. 2, the casing wall passes at the top into a circumferential, circular opening edge portion 6, which encloses a can

opening which is normally closed by means of the lid 3. This likewise has a circumferential edge portion 8, which is intended to be sealingly connected to the opening edge 10 of the can and to secure the lid in the closed state.

- 5 The opening edge portion 6 of the can can best be seen from fig. 2 and is formed by an extended portion of the casing wall 5. This means that the same panel which is cut to size to form the casing wall 5 has, apart from the straight-sectioned portion forming the casing wall, an extension portion which forms, firstly, the opening edge portion itself and, secondly, a further portion
10 having a function to be described in greater detail below.

The opening edge portion 6 of the can is formed by the casing wall 5 being bent outward at the top to form a rounded crest 9, for example in the shape of an arc, and passes from there into an outer edge portion 11 angled
15 radially outward down away from the crest, which outer edge portion, in the illustrated example, is straight in cross section and, in its entirety, forms the shape of a truncated conical surface, i.e. is substantially conical.

This conical portion 11 passes at the bottom into an annular shoulder edge
20 12 and extends toward and rests against the shell surface of the can 13 below the opening edge portion and is rolled over to form a concealed edge closure 14 for reinforcement of the structure as a whole.

The lid 3, which is shown clearly in the section in fig. 2, will now be described
25 in greater detail. The lid has a circumferential edge portion 15, which on the outside has an edge flange 16 which, with an intermediate sealing ring 17, bears sealingly against the crest of the can. The edge flange 16 of the lid passes into a substantially cylindrical portion 19 connecting to the inner side
18 of the casing wall of the can, in the example provided with a bead 20,
30 which is in positive-locking engagement with a corresponding bead 21 in the shell surface of the can, whereby the lid is held in the closed state. With the cylindrical portion, the edge portion of the lid forms a U-shaped groove 22 in

order to lose as little volume as possible in the container, i.e. in order that the covering part 23 of the lid shall be situated as high up as possible in relation to the opening edge portion of the can.

5 For secure closing and securement of the lid 3 on the can 2, the container 1 according to the invention is therefore provided with a locking ring 24, which encloses the opening edge portion 6 of the can and the circumferential edge portion 15 of the lid. The locking ring is made of an elastic plastics material, but nevertheless with good dimensional stability and strength, such as
10 injection-molded thermoplastic. The locking ring 24 is constituted by a fully closed, in the example circular unit, which is designed to in the locking position, as is shown in fig. 1, securely hold the lid 3 in a seal-tight manner on the can 2 by mechanical fastening to the circumferential edges of the can and of the lid.

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As can be seen from the figures, the locking ring 24 is constructed as an annular closed profile having a substantially U-shaped portion 25, which forms a downwardly open annular channel 26 in which the circumferential edges of the lid and of the can are enclosed. On the outer side of the
20 container 1, the U-shaped portion 25 passes into an annular skirt 27, which extends all the way round the can and which on its inner side 28 has a locking bead 29 that, through interaction with the downwardly and outwardly directed shoulder edge 12 or the boss, locks the locking ring 24 and hence the lid 3 on the can 2 in the locking position according to fig. 1 and 2. More
25 precisely, the U-shaped portion 25 has a flange 30 jutting down on the inner side of the lid, which flange bears tightly against the cylindrical portion 19 of the lid and passes at the top into an upper portion 31 which bears against the edge flange 16 of the lid and advantageously has a raised edge bead 32, which facilitates stacking of a plurality of containers. On the outer side of the
30 container, an outer flange 33 of the U-shaped portion 25 juts down and covers over the joint between the lid and the can. The skirt 27 extends around the can at a regular distance from its casing wall 5.

According to the invention, the locking ring 24 has a weakening point 34, which is designed to be broken open under breaking forces which are sufficiently large to open the container to gain access to its content in its interior space, but never under forces of the kind which the container must withstand when the can with its content is otherwise handled, i.e. when the container is in the closed locking state shown in fig. 1 and 2, according to the prevailing standard. The sort of demands, inter alia stresses, with which a container for, for example, hazardous goods must be able to cope is defined in standards and is published, inter alia, in so-called UN certificates following conducted tests.

The weakening point 34 is indicated schematically in fig. 1, but is normally or substantially not visible to the eye. The weakening point 34 therefore extends over the locking ring 24, transversely over or obliquely over or along a non-straight line. It is not in all embodiments entirely necessary for the weakening to extend all the way from the lower outer edge 35 of the locking ring to its lower inner edge 36, but rather it is up to technology to create the weakening and its strength, i.e. that the strength in the weakening can be regulated with the length of the weakening line.

In order to be able to create the necessary breaking forces to break open the locking ring 24 at the weakening point 34, according to the invention a point of engagement 37 for a breaking tool 38, for example a screwdriver, is provided, see fig. 3. The point of engagement 37 is realized as a laterally directed protrusion from the skirt 27 of the locking ring 24 and, in the example, is realized as a bow 39 or bridge, which is open in the upward and downward direction, alternatively as a downwardly open pocket, which is integrated on the outer side of the locking ring 24 close to its lower outer edge 35, on the outer side of the skirt 27, so that a small space 40 is formed for insertion of the blade 41 of the tool, which can rest above the bow against the outer side of the outer flange 33. The point of engagement is situated

beside and in the region of the weakening point, such that, by a rocking motion outward and upward, see the direction of the arrow 42, of the tool 38, sufficiently large breaking forces are generated that the locking ring snaps and is opened at the weakening point 34, whereby the locking ring can be
5 pulled off and the lid can be conventionally removed, for example with a suitable tool which can be inserted between the lid and the can. Possibly there is a flattening of the edge provided somewhere, which allows a tool to be inserted into an active position for lifting of the lid. The protrusion is situated such that it does not project below the lower edge of the skirt and is
10 hence less conspicuous.

According to an advantageous embodiment, the weakening point 34 is formed by the fact that the locking ring 24 is produced by injection molding in a substantially closed mold having an annular cavity with a single delivery
15 point, a sprue, for liquid thermoplastic, which is therefore heated to liquid form. As illustrated schematically in fig. 4, by choosing the sprue, see the arrow 43, diametrically opposite the position for the intended weakening point 34, air being simultaneously evacuated at the weakening point, the annular mold will be filled with two simultaneous flows of liquid thermoplastic,
20 see the arrows 44, 45, which flow at mutually identical speed and finally form two substantially semicircular ring halves, in which the two fronts of the thermoplastic mass meet at the position for the intended weakening point and converge there. The weakening point 34 is therefore not visible in practice, but is shown in fig. 1 and 4 for easier comprehension. By virtue of
25 the fact that the surface of the mass has a somewhat lower temperature than the interior of the mass, a fully homogenous fusion having the same strength as the rest of the thermoplastic does not occur, thereby giving rise to a weakened spot which constitutes the weakening point once the thermoplastic mass has solidified with lowering of the temperature and a necessary time
30 delay for full solidification. The mold is configured with a small channel to form the bow-shaped point of engagement.

The fact that the weakening point 34 is inconspicuous and virtually invisible and the protrusion, too, is inconspicuous, and that tools are required to break open the locking ring 24, serves to markedly reduce the risk of, for example, a child or other unauthorized person spontaneously breaking open the container, whereby a high degree of security is achieved.

The invention is not limited to the examples described above and shown in the drawings, but can be varied within the scope of the following patent claims. For example, the can and the lid can have a different shape, for example an oval shape or a shape having a plurality of, for example, four corners, which are rounded. The fitting of the locking ring can be realized in various steps and can be enabled by the interacting conical surfaces 11 of the can 2 and the surface below the locking bead 29. The locking ring can also be injection molded on the spot. This is of interest, inter alia, when the locking ring is wholly integrated with the lid and is injection molded against the opening edge portion of the lid, i.e. sits firmly on the lid as long as the locking ring is not broken, since the ring must be easy to remove. In principle, two or more weakening points and two or more points of engagement for the breaking tool are conceivable, though it is not self-evident that the number of weakening points and points of engagement are equal. Two or more weakening points are formed, for example, if two or more delivery points are arranged symmetrically in the mold, in which case a corresponding number of plastic flows are formed which meet at half way and together form two or more weakening points.

CLAIMS

1. A container in the form of a sheet-metal can (2) with removable sheet-metal lid (3) for the closure and exposure of a storage space for a goods
5 item, wherein the container is rotationally symmetric about an axis of symmetry (1) and has at the bottom a base (4) and a thereto connected casing wall (5), which at the top has a circumferential opening edge portion (6) delimiting a container opening (7) which, when the lid is fitted, is closed by interaction between the circumferential edge portion (15) of the lid and the
10 opening edge portion of the can, wherein the lid is secured against accidental opening by means of an elastic plastics locking ring (24), which is constructed as an annularly closed profile having a substantially U-shaped portion (25) forming a downwardly open annular channel (26) that encloses the circumferential edge portion of the lid and the opening edge portion of
15 the can and secures the lid and with an annular bead (29) engages below a radially projecting portion (12) of the opening edge portion (6) of the can, wherein the opening edge portion is formed by an extended portion of the casing wall (5), which portion is bent over to form the radially projecting portion, wherein the locking ring (24) has at least one weakening point (34)
20 designed to be broken open for opening of the container when the weakening point (34) is exposed to breaking forces exceeding a fixed maximum load in the handling of the container, and the locking ring has a point of engagement (37), situated in the proximity of the weakening point, for a breaking tool (38) so as to be able with a rocking motion to break open
25 the locking ring at the weakening point, characterized in that the weakening point (34) is substantially invisible to the eye and the point of engagement (37) for a breaking tool (38) is constituted by a laterally directed protrusion of the locking ring (24), situated on the outer side of the ring below the engagement bead (29) of the ring, and in that the protrusion extends close to
30 the lower edge of the skirt (27) and has an opening which is open at least in the downward direction.

2. The container as claimed in patent claim 1, characterized in that the weakening point (34) is formed by production of the locking ring (24) by means of injection molding in an annularly closed mold having a delivery point for each weakening point.

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3. The container as claimed in patent claim 1, characterized in that the locking ring (24) is a separate element which, in the locking state, is positively locked to the circumferential portion (6) of the lid by virtue of its profile having an embracing upper edge portion (25).

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4. The container as claimed in patent claim 1, characterized in that an interspace is arranged between the inner side of the locking ring and the projecting portion of the opening edge portion (15) in order to allow the locking ring to be pressed in during a breaking motion.

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5. The container as claimed in patent claim 1, characterized in that the protrusion is realized as a bow portion (39) which is open in both upward and downward.

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6. The container as claimed in patent claim 1, characterized in that the protrusion is solely laterally directed and does not jut down below the lower edge (35) of the skirt.