A foldable container has an essentially rectangular bottom wall (11) to which four side walls (5, 6) are moveably attached for movement between a folded position adjacent the bottom wall and an erected position. Locking devices are used for locking adjacent side walls to each other. The locking devices comprise a movably mounted locking lever (1) on one side wall with a locking element for cooperation with a locking surface on the adjacent sidewall (6). The locking lever (1) is movable between a rest position and an unlocking position and biased towards the rest position by means of a spring element (3). According to the invention the locking lever (1) is swingably attached to its associated side wall (5) for swinging around an axis (A) essentially perpendicular to this side wall during the movement between the rest and unlocked positions.
Description

Technical Field of the Invention

[0001] The present invention relates to a foldable container according to the preamble of claim 1.

Background Art

[0002] Containers are known in the art which have an essentially rectangular bottom and four collapsible side walls, one on each side of the bottom, which are folded inwards towards the bottom when the container is in a collapsed state. Locking mechanisms for attaching the adjacent side walls to each other when the container is in an erected state are also known. One example of such a locking mechanism is shown in DE 10137328, wherein a lock setting unit is arranged next to a grip hole in the short end side walls and the ends of which are arranged in slits in stiffening elements on the side wall. By pressing the lock setting unit upwards from below, the locking is released and the user of the container can fold the side walls towards the bottom of the container. However, this known locking mechanism has a number of drawbacks. For instance, it is quite likely that a user would release the locking by accident when gripping the container and by mistake gripping the actuating element instead of the grip hole.

Summary of the Invention

[0003] It is an object of the present invention to alleviate the above mentioned drawbacks and provide a locking device for a container with foldable side walls which provides a reliable locking function, which is easy to release and which ensures that the locking is not released by accident.

[0004] This object is achieved by a locking device having the characterising features of independent claim 1, with preferred embodiments indicated in the dependent claims 2-8.

[0005] In the locking device according to the invention, the foldable container has

- an essentially rectangular bottom wall;
- four side walls movably attached to the bottom wall for movement between a folded position adjacent the bottom wall and an erected position;
- locking devices in two opposite first sidewalls for releasably locking these sidewalls to adjacent opposite second sidewalls;
- each of said locking devices comprising

  • a locking lever movably mounted in its associated first sidewall for movement between a rest position and an unlocking position and having at least one locking element projecting from its free end,
  • a locking surface on an adjacent second sidewall for engagement with an engagement surface on the locking element when said first and second sidewalls are in their erected position and when the locking lever is in its rest position, and
  • a spring element for biasing the locking lever towards its rest position,

wherein the locking lever is swingably attached to its associated first side wall for swinging around an axis essentially perpendicular to said first side wall and movement between the rest and unlocked positions.

[0006] When a user presses on the lever in a location eccentrically positioned from the axis, the lever turns on the axis and locking elements on the lever are released from engagement with the locking surfaces on the adjacent side walls. This gives a simple and secure locking device, which is advantageous since it can very easily be released by a user so that the side walls can be folded towards the bottom and also since it during normal use is very unlikely to be released by mistake by the user.

[0007] The locking lever is preferably a double-armed locking lever being rotatably connected between its ends on a pivot pin defining said axis and having locking elements on each end. The use of the pivot pin is a simple and efficient manner of providing a swingable lever, and the double-armed lever has the advantage of being able to release the locking elements on both ends of the locking lever when a user presses down on one portion of the lever at a distance from the pivot pin.

[0008] The locking lever is preferably connected to the pivot pin substantially halfway from its ends. This gives the advantage of an efficient lifting and lowering, respectively, of the two ends of the lever so that the locking elements are released.

[0009] Preferably, one of the ends of the double-armed locking lever is situated closer to said bottom wall than its other end when the locking lever is in its unlocking position. This gives the advantage of making it possible to release both ends of the lever at the same time.

[0010] The locking surface or each locking surface is formed on one side of a lock lug projecting from its associated second side wall. This is a simple and efficient manner of providing the locking surface.

[0011] The side surface of the lock lug opposite to the locking surface can form a chamfered guiding surface for moving the locking element from its rest position to its unlocking position when moving said first side wall from its folded to its erected position for guiding the locking element past the locking lug and into engagement with the locking surface. This has the advantage that the user does not have to actively manipulate the locking device when moving the side walls from their folded position to their erected position and into a locking engagement with the adjacent side wall, but instead only press the side walls up towards their erected position. The locking element/s simply slide on the projection/s and
end up in their locking position when the user has erected the side walls.

[0012] Further, the locking element can be tapered in the direction away from the engagement surface for presenting a narrow engagement line engaging said guiding surface. This gives the advantage of further facilitating the moving of the locking elements on the guiding surfaces when erecting the side walls and making it easier for the user to erect the side walls and lock them in the erected position.

[0013] The second sidewalls preferably have stop surfaces for engagement with the first sidewalls in the erected position of the sidewalls when the locking elements engage with the locking surfaces. This ensures that the first side walls are securely positioned in their erected position and that they cannot be folded outwards from the bottom.

[0014] These and other aspects of the invention will be apparent from and elucidated with reference to the embodiments described hereinafter.

Brief Description of the Drawings

[0015] Fig 1 is a perspective side view of a lever according to the invention.

Fig 2 is a perspective view from the inside of a container towards a corner of the container, where the locking elements and the projections are in a non-locking position.

Fig 3 is a perspective view showing part of the outside and part of the inside of the container with the locking elements and projections in locking engagement.

Fig 4 is a side view of part of the side wall with the locking elements and projections in a locking position.

Fig 5 is a perspective view of the foldable container according to the invention.

Fig 6 is a perspective, sectional view of the lever mounted on the side wall.

Detailed Description of Preferred Embodiments of the Invention

[0016] In Fig. 5 a foldable container 4 is shown. The container has four side walls 5, 6 and a bottom wall 11. Two first side walls 5 are arranged opposite each other, and between the first side walls 5, two opposite second side walls 6 are arranged. The side walls 5 and 6 are hingedly attached to the bottom 11 of the container so that they can be folded down towards the bottom 11.

[0017] The container 4 is provided with a locking device which consists of a locking lever 1 mounted on each of the adjacent first side walls 5.

[0018] The lever 1 is a double-armed lever and is rotatably mounted on a pivot pin 12 which defines an axis A, which is perpendicular to the first side wall 5, as shown in Fig. 6.

[0019] In Fig. 1 the lever 1 is shown in more detail and separate from the rest of the container 4. The lever has spring elements 3 and locking elements 2 which have engagement surfaces 2a.

[0020] On the second side wall 6 lock lugs 7 are provided. The projections 7 each have a bevelled or chamfered guiding surface 7a and a locking surface 7b.

[0021] At the corners of the container 4 stop surfaces 10 are provided on the second side walls 6, which extend around the corners of the container 4 to provide a stop for the first side walls 5 when in erected position.

[0022] The lever 1 has a flattened portion 8 and the side wall 5 is provided with a cut out 9 on the edge remote from the connection with the bottom, which makes it easy for the user to reach the flattened portion 8 with for instance his or her thumb. The lever 1 can have two flattened portions 8, one on each side of the crossing point of the axis A with the lever 1.

[0023] To release the locking elements 7 from the locked position as shown in Fig. 3 or 4, the user presses down the lever 1 at a location at a distance from the pivot pin 12, through which the axis A extends. Preferably the user presses down the lever at the flattened portion 8. Then the end of the lever closest to the pressed down flattened portion 8 and the locking elements 2 thereon are moved downwards. Then the locking elements 2 no longer are locked behind the projections 7, since the engagement surfaces 2a slide down below the locking surfaces 7a and are no longer engaged with these.

[0024] At the other end of the lever 1, due to the fact that the lever 1 is swingably attached to the side wall 5 on a pivot pin 12, that other end at the same time moves upwards with the locking elements 2 thereon as the lever 1 swings on the pivot pin 12 around the axis A. Thus, the engagement surfaces 2a slide on the locking surfaces 7a upwards to a location above the projections 7 and the engagement surfaces 2a are no longer engaged with the locking surfaces 7b.

[0025] Thus, both ends of the side wall 5 are free and the side wall is free to move inwards and be folded towards the bottom 11 of the container 4. The user then folds the side walls 5 towards the bottom 11 of the container, and thereafter folds the side walls 6 towards the bottom of the container 4 on top of the side walls 5.

[0026] When the user wishes to erect the side walls 5 and 6 of the foldable container 4, he or she folds up the side walls 6 and the side walls 5 in the same manner as with known foldable containers and erect them, and due to the guiding surfaces 7a on the projections 7, the locking elements 2 slide into locking position behind the projections 7 as in Fig. 2 so that the locking surfaces 7a lie against the engagement surfaces 2a.

[0027] The locking element 2 is tapered in the direction away from the engagement surface 2a which further facilitates the moving of the locking elements 2 since
this provides a narrow engagement line engaging the guiding surface 7a.

[0028] In Fig. 3 the container 4 is shown with the locking elements 2 in a locking position behind the projections 7.

[0029] The spring elements 3 ensure that the locking elements 2 are biased towards their rest position, in which the locking surfaces 7a are engaged with the engagement surfaces 2a when the side walls are erected, so that the user does not have to make any manipulations of the lever 1 to bring the locking elements 2 into locking position.

[0030] The lever and the container are preferably made of a plastic material. Further, the spring elements are preferably made of a slightly flexible plastic material.

[0031] In the figures a lever with two locking elements, in a fork shaped configuration, at each end of the lever, is shown. It is also possible to use only one locking element in each end.

[0032] Hence, a foldable container has an essentially rectangular bottom wall 11 to which four side walls 5, 6 are moveably attached for movement between a folded position adjacent the bottom wall and an erected position. Locking devices are used for locking adjacent side walls to each other. The locking devices comprise a movably mounted locking lever 1 on one side wall with a locking element 7 for cooperation with a locking surface 7b on the adjacent sidewall 6. The locking lever 1 is movable between a rest position and an unlocking position and biased towards the rest position by means of a spring element 3. According to the invention the locking lever 1 is swingably attached to its associated side wall 5 for swinging around an axis A essentially perpendicular to said first side wall and movement between the rest and unlocked positions.

Claims

1. A foldable container having

   - an essentially rectangular bottom wall (11);
   - four side walls (5, 6) movably attached to the bottom wall for movement between a folded position adjacent the bottom wall and an erected position;
   - locking devices in two opposite first sidewalls (5) for releasably locking these sidewalls to adjacent opposite second sidewalls (6);
   - each of said locking devices comprising

      • a locking lever (1) movably mounted in its associated first sidewall for movement between a rest position and an unlocking position and having at least one locking element (7) projecting from its free end,
      • a locking surface (7b) on an adjacent second sidewall (6) for engagement with an

   engagement surface (2a) on the locking element (7) when said first and second side walls are in their erected position and when the locking lever is in its rest position, and
   - a spring element (3) for biasing the locking lever (7) towards its rest position,

   characterised in that the locking lever (1) is swingably attached to its associated first side wall (5) for swinging around an axis (A) essentially perpendicular to said first side wall and movement between the rest and unlocked positions.

2. Container according to claim 1, wherein said locking lever (1) is a double-armed locking lever being rotatably connected between its ends on a pivot pin (12) defining said axis (A) and having locking elements (7) on each end.

3. Container according to claim 2, wherein said locking lever (1) is rotatably connected to the pivot pin (12) substantially halfway from its ends.

4. Container according to claim 2 or 3, wherein one of the ends of the double-armed locking lever (1) is situated closer to said bottom wall (11) than its other end when the locking lever is in its unlocking position.

5. Container according to any of claims 1-4, wherein the locking surface (7b) or each locking surface (7b) is formed on one side of a lock lug (7) projecting from its associated second side wall (6).

6. Container according to claim 5, wherein the side surface of the lock lug (7) opposite to the locking surface (7b) forms a chamfered guiding surface (7a) for moving the locking element (2) from its rest position to its unlocking position when moving said first side wall (5) from its folded to its erected position for guiding the locking element (2) past the locking lug (5) and into engagement with the locking surface.

7. Container according to claim 5 or 6, wherein the locking element (2) is tapered in the direction away from the engagement surface (2a) for presenting a narrow engagement line engaging said guiding surface (7a).

8. Container according to any of the preceding claims, wherein the second sidewalls (6) have stop surfaces (10) for engagement with the first sidewalls (5) in the erected position of the sidewalls (5, 6) when the locking elements (2) engage with the locking surfaces (7b).
Fig. 4
## DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
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<tr>
<th>Category</th>
<th>Citation of document with indication, where appropriate, of relevant passages</th>
<th>Relevant to claim</th>
<th>CLASSIFICATION OF THE APPLICATION (Int.Cl.)</th>
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