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(54) **Titre :Packaging container for bitumen.**

(57) **Abrégé :**

Large-volume packaging container (2) made of flexible material, preferably of polypropylene fabric, having a rectangular contact area (3) on which the packaging container (2) is supported in the transport position and four shell surfaces (4) and a cover surface (5) for transporting bitumen, wherein the contact area (3), shell surfaces (4) and cover surface (5) are each connected to the neighboring surface(s) by seams, characterized in that each shell surface (4) has the shape of a rectangle and at least one first side length (10, 11) of the contact surface (3) is more than 40%, preferably more than 50% and particularly preferably more than 100% longer than the height (H) of the packaging container (2).

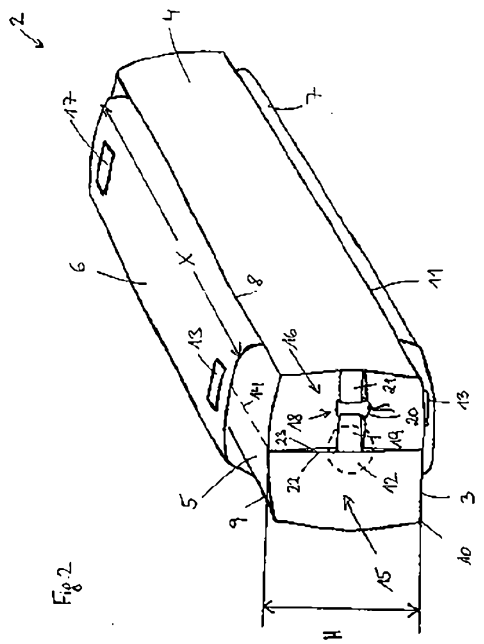

Fig. 2

Polycube Systems GmbH

Packaging container for bitumen

The present invention relates to a large-volume packaging container made of flexible material, preferably made of polypropylene fabric, having a rectangular contact surface, on which the packaging container is stored in the transport position, as well as four lateral surfaces and a cover surface, for transporting free-flowing materials, in particular bitumen, contact surface, lateral surfaces, and cover surfaces each being connected by seams to the adjacent surface(s), each lateral surface having the form of a rectangle and at least one first side length of the contact surface being more than 80% longer, preferably more than 100% longer than the height of the packaging container, according to the preamble of Claim 1.

WO 2008/018878 A1 relates to a lifting pocket for 24,000 pounds (corresponding to approximately 11.9 tons) load having dimensions of 8 x 7 x 4.5 feet (corresponding to approximately 244 x 213 x 137 cm) or 8 x 5.5 x 5.5 feet (corresponding to approximately 244 x 168 x 168 cm) and having multiple carrying belts. The lifting pocket is intended for bulk goods.

The container of US 4 963 037 A has multiple narrow loops on one side for lifting the container as well as straps and rings for stabilization.

The container of US 5 865 540 A has a carrying loop, which connects to opposing side edges of the cover surface to one another via their outer side and is as wide as the side edges are long. Length, width, and height are approximately equal in this container.

The use of large-volume packaging containers made of flexible material for the transport of free-flowing materials, in particular bitumen, is known.

After bitumen was initially decanted into dimensionally-stable containers for transport purposes, for reasons of cost, a transition was made to packaging it through flexible containers such as small packages made of cardboard or plastic film. However, because of the smaller intake capacity of the small packages, this has also proven not to be cost-effective, because of which large-volume packaging containers made of flexible material have been used for the transport of

bitumen. These large-volume packaging containers can accommodate a sufficiently large quantity of bitumen to make the transport cost-effective, on the one hand, they are also very durable because of their structure, on the other hand. They consisted and still consist of polypropylene fabric, preferably having a specific weight per unit area of 200 g/m². An internal bag is typically but not necessarily provided, which is melted at the destination jointly with the bitumen.

In order to make these large-volume packaging containers stackable and therefore capable of transport in spite of the slow flowing of bitumen even in the cold state, it is proposed in AT 9.582 U1 that the lateral surfaces of such large-volume packaging containers be shaped, starting from the lower edge, as a truncated pyramid jacket or continuously merging from a truncated pyramid jacket into a truncated cone jacket. This is to contribute to the container wall, in cooperation with the filled, free-flowing material, being self-stabilizing and the packaging container remaining standing upright in the filled state, without special support means being provided.

AT 9 644 U1 additionally proposes, in such packaging containers, that the lateral surfaces be designed as equilateral trapezoids. This shape of the lateral surfaces is to contribute to the packaging container being self-righting upon filling with bitumen.

In addition, stiffening the lateral surfaces using folds, seams, or belts is known from AT 505 805 B1.

The proposed shapes or aids do increase the stability of an individual packaging container, but present problems in the stacking ability. Thus, for example, valuable transport volume is already lost if such packaging containers are stacked adjacent to one another due to the shape of the packaging containers, which is essentially conical or a truncated pyramid. On the other hand, however, problems also result when stacking such packaging containers one on top of another, because the contact surface of the upper packaging container is larger than the cover surface of the lower packaging container and therefore the bitumen packed in the upper packaging container, because of its flowing property at transport temperature, therefore flows around the

cover surface of the respective packaging container located underneath during longer transports, i.e., practically forms a type of hood, whereby the destacking is often linked with significant difficulties.

It is therefore the object of the present invention to prevent these disadvantages and to propose a large-volume packaging container made of flexible material for the transport of bitumen having a rectangular contact surface, on which the packaging container is stored in the transport position, as well as four lateral surfaces and a cover surface, contact surface, lateral surfaces, and cover surface each being connected by seams to the adjacent surface(s), which is not only stable per se after filling, but rather also has improved stacking capability and transport capability.

This is achieved according to the invention in a large-volume packaging container made of flexible material in that each lateral surface has the form of a rectangle and at least one first side length of the contact surface is longer by more than 80%, preferably by more than 100% than the height of the packaging container, and
the height is always less than 100 cm, and
at least one, preferably exactly one first carrying loop is provided, which connects to opposing side edges of the cover surface to one another via their outer side and which forms a tunnel with the cover surface, and the width of the at least one, preferably exactly one first carrying loop or the entirety of the widths of the carrying loops on the cover surface is at least three-fourths of the length of the two side edges which it connects to one another, the side edges extending parallel to the first side length of the contact surface, and
a filling opening is provided in one of the two lateral surfaces, preferably in one of the two smaller lateral surfaces.

Because of the rectangular design of the lateral surfaces, in combination with the rectangular contact surface, optimized stacking ability results, as well as the optimum utilization of the transport space available for the transport of the containers.

The specified ratio between a first side length of the contact surface and the height of the packaging container causes an increase of the moment of inertia around the relevant inertial axis,

while simultaneously utilizing the available stability of the lateral surfaces, whereby falling over can be effectively prevented.

The combination according to the invention of the ratio of the first side length of the contact surface to the height of the packaging container with the geometry of the lateral surfaces results in an adaptation of the packaging container in such a manner that the flowing of the bitumen does not result in impairment of the stability of the container, because if the ratios or geometries according to the invention are maintained, the strength of the material of the packaging container can absorb the forces occurring upon the flowing of the bitumen during transport without problems, without deforming in a way that endangers stability. Particularly good results with respect to stability of the packaging container are to be achieved if the length of the first side length is reduced in the range according to the invention with increasing volume of the packaging container. It has been shown that if the features according to the invention are maintained, the design of the lateral surfaces as equilateral trapezoids or the design of the container in the form of a truncated cone, which is proposed as required in the prior art, is not necessary, which greatly improves the transportability. Additional stiffening elements in the lateral surfaces are also not necessary in a packaging container according to the invention.

The height of the packaging container is to be understood as its height in the unfilled state. It therefore corresponds to the length of the upright side edge of a lateral surface in the non-bulging state.

According to the invention with respect to the cover surface and according to a preferred embodiment variant of the invention with respect to the contact surface, it is provided that at least one first/second carrying loop is arranged, which connects two opposing side edges of the cover surface/contact surface to one another via their outer side, the width of the at least one first/second carrying loop or the entirety of the widths of the carrying loops on the cover surface/contact surface being at least three-fourths of the length of the two side edges which they connect to one another.

The carrying loops therefore have sufficient stiffness and form a tunnel jointly with the cover surface or the contact surface. Threading a technical lifting means is thus made easier in relation to packaging containers having less wide and therefore less dimensionally-stable carrying loops.

Because its stiffness also increases with increasing width of a carrying loop and therefore the tunnel shape is maintained even in the rest state of the packaging container, the carrying loops therefore do not collapse or fall over, the threading of a technical lifting means is also made easier in this regard. The implementation of the described tunnel also causes a more uniform load distribution and, accompanying this, less deformation and strain of the packaging container.

In a particularly preferred embodiment variant, it is provided that exactly one first carrying loop is arranged on the cover surface, connecting two opposing sides thereof, and exactly one second carrying loop is arranged on the contact surface, also connecting two opposing sides thereof, both carrying loops having a width of at least three-fourths of the length of the two side edges. In this case, threading a technical lifting means proves to be particularly simple, because the technical lifting means must only be threaded into the carrying loops once per packaging container.

The contact surface, the lateral surfaces, the cover surfaces, and the at least one first/second carrying loop are preferably manufactured from identical material, which simplifies the production.

In a particularly preferred embodiment variant of the invention, the side edges of the cover surface, which are connected to one another by the at least one first carrying loop, and the side edges of the contact surface, which are connected to one another via the at least one second carrying loop, are side edges extending parallel to one another, so that the large-volume packaging container can be accommodated relatively easily by means of the fork of a forklift, on the one hand, but the carrying loops can also be used as engagement points for clamping or holding means, if, according to a further preferred embodiment variant of the invention, a filling opening for decanting bitumen is provided in one of the lateral surfaces, preferably the two smaller lateral surfaces. Because of the oblong, tubular design of the packaging container

according to the invention, the arrangement of the filling opening in one of the two smaller lateral surfaces offers the advantage of a more stable filling capability along the longitudinal axis of the packaging container.

In order to simplify the filling procedure, each carrying loop can have a holding opening, preferably in the form of a holding eye, in the end area facing toward the filling opening, in which lifting means can engage in order to lift the packaging container or to open the filling opening in the lateral surface by pulling the carrying loops in respectively opposite directions.

A particularly stable embodiment results if, according to the invention, a second side length of the contact surface is shorter by more than 25%, preferably by more than 50%, than the first side length of the contact surface and is at least equal to the height of the packaging container.

A further embodiment variant of the invention provides that two opposing lateral surfaces are connected to one another by an intermediate wall, which divides the volume of the packaging container into two chambers, whereby two smaller units can be filled in one packaging container, which provides advantages upon the melting of the bitumen.

An exemplary embodiment will be described in greater detail hereafter. In the figures:

Figure 1 shows an oblique view of a packaging container for bitumen known from the prior art

Figure 2 shows an oblique view of a packaging container for bitumen according to the invention

Figure 1 shows a large-volume packaging container 1 for bitumen known from the prior art, which has a wide contact surface and becomes narrower with increasing height. The lateral surfaces are implemented as trapezoidal and are provided with seams for the purpose of additional stiffening.

As is immediately and directly obvious, problems result in the stacking capability or during transport because of the shape of the container.

Figure 2 shows a filled large-volume packaging container 2 according to the invention, comprising a contact surface 3, lateral surfaces 4, and a cover surface 5. Each lateral surface 4 has the shape of a rectangle, a square is therefore also possible, so that a packaging container which can be stacked and transported well is formed. Because the packaging container is shown filled in Figure 2, it has bulges, so that the appearance results that the lateral surfaces do not have a rectangular shape. However, these bulges result because of the stretching capability of the lateral surfaces. The rectangular shape can be recognized particularly well in the unfilled state.

Furthermore, at least one first side length (10, 11) of the contact surface is more than 50% longer, preferably more than 80% longer than the height H of the packaging container, whereby the packaging container also has the stability required for the transport of bitumen, so that the viscous flowing bitumen cannot cause the packaging container to tip over even after the filling.

A first carrying loop 7 is arranged on the outer side of the contact surface 3, preferably on its side edges 10, 11. A second carrying loop 6 is arranged on the outer side of the cover surface 5, preferably on its side edges 8, 9. First and second carrying loops 6, 7 connect the respective opposing side edges 8 and 9 or 10 and 11, which are preferably the longer side edges of the contact surface/cover surface 3, 5.

First and second carrying loops 6, 7 are manufactured from the same material as the packaging container 2 per se, namely from polypropylene fabric. This fact and the fact that the width x of the carrying loops 6, 7 is at least one-fourth, preferably three-fourths of the length of the side edges 8, 9 or 10, 11 contributes to the carrying loops 6, 7 having a high stiffness and spanning the contact surface 3 or the cover surface 5 like a tunnel at least sectionally. An ability to easily thread in technical lifting means, for example, the fork of a forklift, also results in particular from the symmetrical arrangement of the carrying loops 6, 7 with regard to the longitudinal axis of the packaging container 2.

A filling opening 12 is implemented on one lateral surface 4, preferably on one of the two smaller lateral surfaces of the packaging container 2. For the purpose of filling, each carrying loop 6, 7 has a holding openings 13 in the area facing toward the lateral surface 4 having filling opening 12, which can be implemented as holding eyes and on which the packaging container 2 can be suspended. Alternatively thereto, holding openings 17 can also be provided on the opposing end areas to improve the handling capability.

The filling opening 12 is covered by tabs 22, 23 situated over it, which are implemented on the lateral surface 4 having the filling opening. The tabs can be moved into a position which covers the filling opening 12 by means of a closure 18. For this purpose, one of the tabs 22 is provided with a loop 19, which is fastenable using a belt 20 on a further loop 21, which is attached on a seam delimiting the lateral surface 4 which has the filling opening 12. By knotting the belt 20, the two loops 19 and 21 are drawn together and thus close the filling opening 12 via the tabs 22, 23.

In addition, it can be provided that two opposing lateral surfaces are connected by an intermediate wall 14, which divides the volume of the packaging container 2 into two chambers 15, 16. Two filling openings (not shown) are to be provided accordingly in this case.

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CLAIMS

1. A large-volume packaging container (2) made of flexible material, preferably made of polypropylene fabric, having a rectangular contact surface (3), on which the packaging container (2) is stored in the transport position, as well as four lateral surfaces (4) and one cover surface (5), for the transport of bitumen, contact surface (3), lateral surfaces (4), and cover surface (5) being connected, preferably each by seams, to the adjacent surface(s), each lateral surface (4) having the form of a rectangle and at least one first side length (10, 11) of the contact surface (3) being longer by more than 80%, preferably by more than 100% than the height (H) of the packaging container (2) **characterized in that** the height (H) is always less than 100 cm, and at least one, preferably exactly one first carrying loop (6) is provided, which connects two opposing side edges (8, 9) of the cover surface (5) to one another via their outer side and which forms a tunnel with the cover surface (5) and the width of the at least one, preferably exactly one first carrying loop (6) or the entirety of the widths of the carrying loops on the cover surface (5) is at least three-fourths of the length of the two side edges (8, 9) which it connects to one another, the side edges (8, 9) extending parallel to the first side length (10, 11) of the first contact surface (3), and a filling opening (12) is provided in one of the two lateral surfaces (4), preferably in one of the two smaller lateral surfaces (4).

2. The large-volume packaging container according to Claim 1, **characterized in that** at least one, preferably exactly one second carrying loop (7) is provided, which connects two opposing side edges (10, 11) of the contact surface (3) to one another via their outer side and the width of the at least one, preferably exactly one second carrying loop (7) or the entirety of the width of the carrying loops on the contact surface (3) is at least one fourth, preferably three-fourths of the length of the two side edges (10, 11) which it connects to one another.

3. The large-volume packaging container according to Claim 1 or 2, **characterized in that** the contact surface (3), the lateral surfaces (4), the cover surface (5) and the at least one,

preferably exactly one first and/or second carrying loop (6, 7) are manufactured from identical material.

4. The large-volume packaging container according to one of Claims 1 to 3, **characterized in that** the side edges (8, 9) of the cover surface (5) which are connected to one another by the at least one, preferably exactly one first carrying loop (6), and the side edges (10, 11) of the contact surface (3) which are connected to one another by the at least one, preferably exactly one second carrying loop (7) are side edges which extend parallel to one another.

5. The large-volume packaging container according to one of Claims 1 to 4, **characterized in that** each of the at least one, preferably exactly one first and second carrying loops (6, 7), in its end area facing toward the lateral surface (4) having filling opening (12), has a holding opening (12, 13), preferably in the form of a holding eye.

6. The large-volume packaging container according to one of Claims 1 to 5, **characterized in that** a second side length of the contact surface (3) is shorter by more than 25%, preferably by more than 50% than the first side length (10, 11) of the contact surface and is at least equal to the height (H) of the packaging container.

7. The large-volume packaging container according to one of Claims 1 to 6, **characterized in that** contact surface, lateral surfaces, and cover surface are lined with a film on their inner side.

8. The large-volume packaging container according to one of Claims 1 to 7, **characterized in that** two opposing lateral surfaces (4) are connected to one another by an intermediate wall (14), which divides the volume of the packaging container (2) into two chambers (15, 16).

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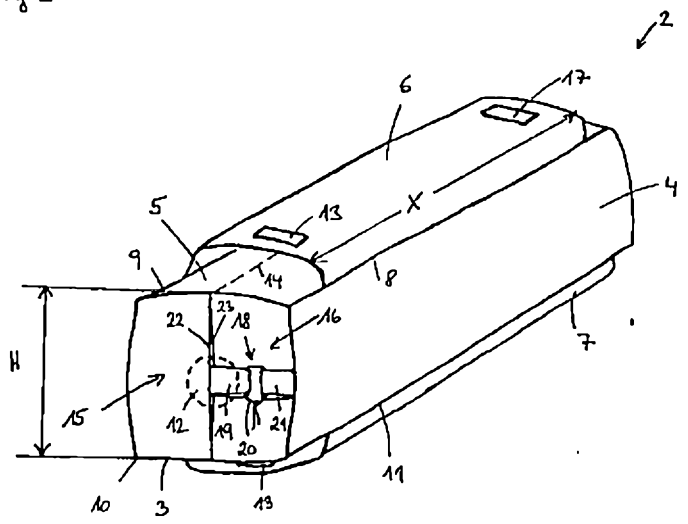
Planche de l'abrégé

Fig.2



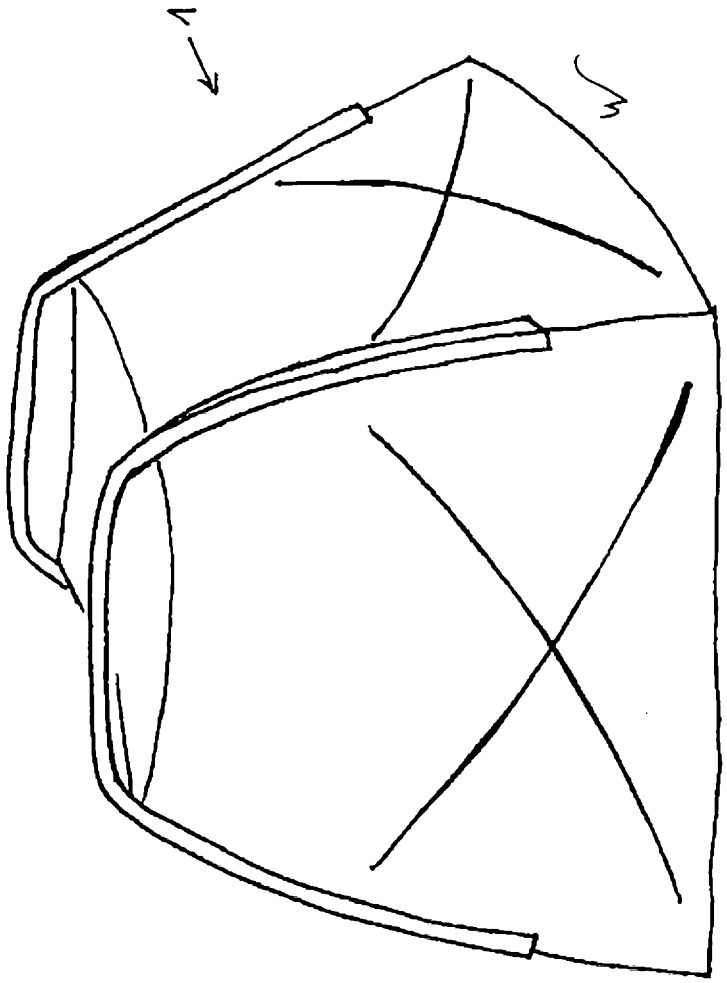


Fig.1

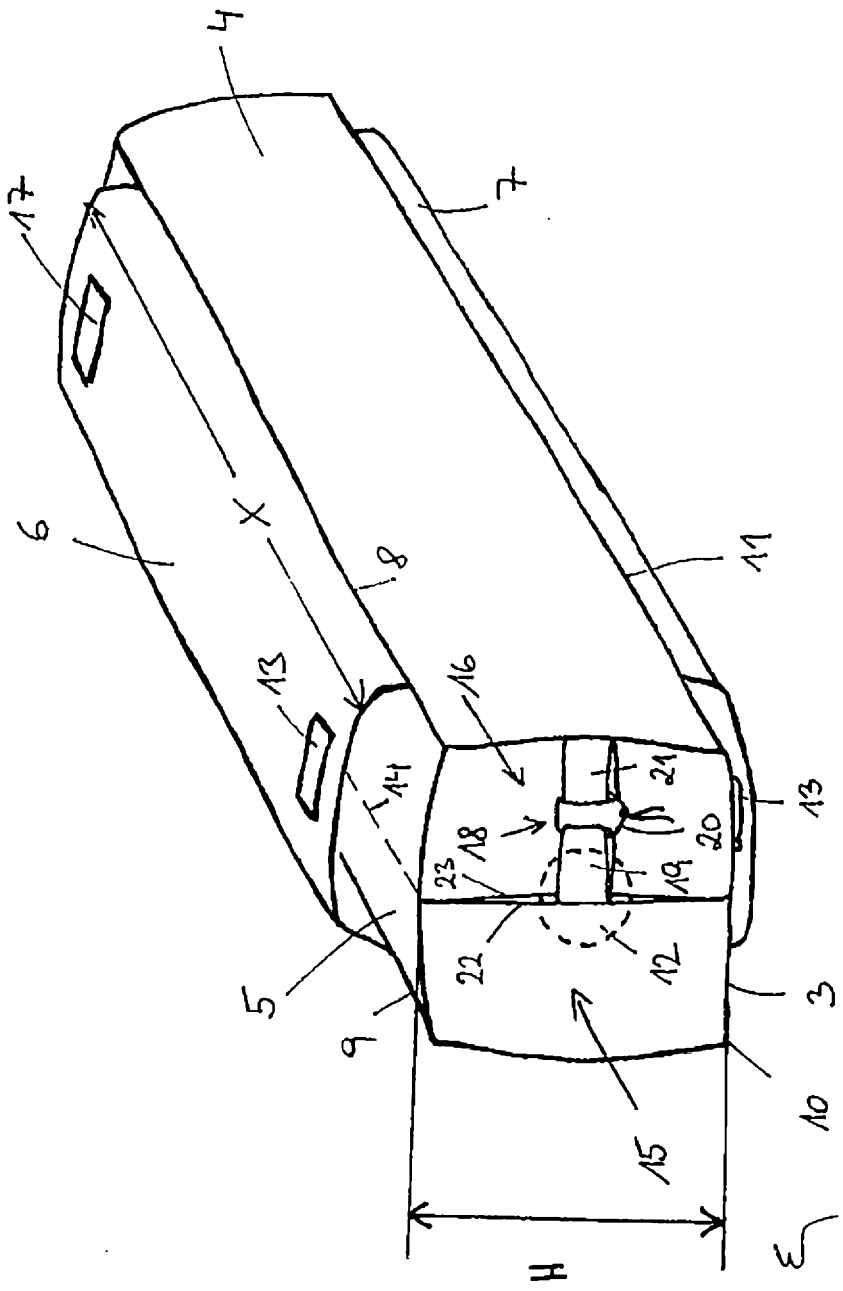


Fig.2