

Twistlock for hoisting devices**Description**

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The invention relates to a twistlock for hoisting devices according to the preamble of patent claim 1.

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The twistlock according to the present invention may be used anywhere twistlocks have to be replaced frequently on spreaders as a result of wear and the installation and disassembly of the twistlocks require significant time and material.

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Spreaders are used for fixing one or more containers to a hoisting device, whereby spreaders pick up one or more containers from a vehicle, load one or more containers onto an airplane or stack one or more containers in a warehouse. As a rule, four twistlock pins are used for securing containers to the spreader.

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The each corner of the containers is equipped with so-called twistlock mounts. The twistlock mounts have an elongated aperture in which the twistlock pins can engage. The twistlock pin is locked in the twistlock mount by turning the twistlock pins by 90 ° around the longitudinal axis. Spreaders are dimensioned such that the twistlock pins projecting from the spreader at intervals coincide with the twistlock mounts. To facilitate handling containers of various sizes, spreaders are equipped with telescopic devices. When attaching the spreaders, all four twistlock pins engage respectively in the twistlock mounts located on the container corners of the container's top side.

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The feelers located in the immediate vicinity of the respective twistlock pin are inserted when attaching the spreader to the container and engaging the twistlock pins in the twistlock mounts. For each twistlock pin there is one feeler. The signal for turning the twistlock pins for release and engagement may only be triggered when at all four corners the feelers mounted at the said corners are completely inserted. The position of the feelers can be monitored individually with the aid of proximity-type position switches. The

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engagement and release moment of the twistlock pins is generated optionally using a hydraulic cylinder on the twistlock pins.

5 DE-OS 29 40 116 discloses a spreader for handling containers, whereby the twistlocks of the said spreader function in this way. If individual parts of a twistlock of the spreader are defective or become worn, a breakdown may occur, affecting the entire spreader or the working unit which moves the spreader.

10 DE-OS 196 32 181 discloses a spreader with twistlocks designed for containers with corner castings, whereby the various twistlock parts on the spreader are mounted on a base plate. This device also has the disadvantage that in case individual parts of the twistlocks have to be repaired, the entire spreader becomes inoperative during repair such that
15 considerable downtimes may arise.

It is the object of the invention to develop a device with which it is possible to implement repair and maintenance work on the individual twistlocks with less
20 downtime.

This is solved with a twistlock based on the characterizing features cited in patent claim 1.

Subclaims reflect additional advantageous embodiments of the invention.

25 The solution according to the present invention relates to a twistlock for hoisting devices, whereby the said twistlock is characterized such that the twistlock pin with its parts is designed as a modular, installable and disassemblable unit which can easily be released and is mounted in a way
30 that it is protected against twisting. This requires that all parts of the twistlock form a compact unit which has a cylindrical form and is implementable as such a unit in a corresponding aperture in the spreader. The twistlock pin with twistlock washer, stop washer, twistlock guide, feeler, feeler retaining washer, feeler spring, twistlock receptacle, lever for turning a twistlock, anti-
35 twist protection of the twistlock receptacle, sensors for detecting position of twistlock and quick coupling for connection of sensors can be arranged in or

on a cylindrical body such that they are implementable easily and quickly in a cylindrical borehole on the spreader. In this regard, it is advantageous if the twistlock receptacle is designed in such a way that the part facing the container possesses a smaller diameter than its upper part such that the upper part as an edge rests on the spreader and bears the twistlock unit and the weight of the load to be transported with the spreader. In the lower part of the disassemblable unit of the twistlock there is a safeguard protecting the twistlock from pulling out of the spreader.

- 5 This can be achieved advantageously owing to the fact that the twistlock guide, which may look like a disk around the twistlock pin, has on its outer circumference a groove in which a key of a T-nut projects.

- 10 The T-nut can be designed as a split ring which is screwable from below into the spreader.

The key of the T-nut can have various forms and may be arranged in the middle of the ring or even above or below the ring.

- 15 The upper diameter of the twistlock unit is only in part of round design such that the missing segments of the circle may engage in a counterpiece of the spreader.

- 20 In its lower area the stop washer is of spherical shape. The twistlock pin is pivotable by up to 0.5° .

The position of the feelers is monitored individually with the aid of proximity-type position switches.

The feelers are arranged within the cylindrical contour of each twistlock unit.

- 25 The solution according to the present invention has the advantage that after loosening the T-nut and the pin which connects the lever for turning the twistlock with a corresponding control element, each twistlock can be removed immediately and replaced and a sensor technology triggers the quick coupling. Repair and maintenance work on the individual twistlocks can be implemented outside the spreader such that only insignificant downtimes can be expected.
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Moreover, a quick installation and securing is made possible as a result of the upper part of the twistlock receptacle, in particular due to the anti-twist protection.

- 5 Since the sensors are located inside the twistlock unit, they are extensively protected against damage from weather conditions, dirt contamination and mechanical damage.

10 Another advantage is using the sensor technology for detecting the position of the feelers. Moreover, it is advantageous to be able to replace the sensor technology together with the twistlock unit.

Since the sensor technology is integrated in the twistlock unit, it is protected against dirt and corrosion. Because of the anti-twist protection and form-fit design, complex adjustment and alignment work are unnecessary.

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The present invention is described below in more detail by way of reference to the accompanying three drawings, in which:

20 Fig. 1 shows a sectional view of a twistlock unit according to the invention in a locked state with two T-nuts,

Fig. 2 is an assembly drawing of the said inventive twistlock unit of Fig. 1 with two T-nuts,

25 Fig. 3 shows a sectional view of the inventive twistlock unit on the spreader (schematic representation).

Fig. 1 shows the twistlock unit according to the present invention and which is designed as a cylindrical body and consists of a rotatable twistlock pin 16 in the twistlock receptacle 7 which is held by a washer 1 over the stop washer 2. The feeler 4 is arranged with key 6 parallel to the twistlock pin 16. 30 The position of the feeler 4 is determined by the sensor 11. The lower limit of the twistlock unit is formed by the twistlock guide 3 that has a circumferential groove in which the key of the T-nut 8 projects. The upper end of the twistlock unit is equipped on one side with an anti-twist protection 10 that 35 represents a separated segment of a circle and engages in a counterpiece on the spreader 15.

Fig. 2 illustrates the parts of Fig. 1 in an assembly drawing that also shows the lever 9 which turns the twistlock and has a hole for a pin for the drive element and a sensor technology which detects the position of the lever. The drawing also shows the sensors 12 and 13, which register the twistlock in
5 locked and unlocked position.

Fig. 3 shows a spreader 15 which has on one end a round opening in which the cylindrical-shaped twistlock unit is inserted, whereby the twistlock receptacle 7 is designed such that its upper diameter bears the twistlock unit
10 with the weight of the spreader 15. The twistlock guide 3 with its circumferential groove is held at the bottom by the T-nuts 8 on the spreader 15 and thus prevents the twistlock unit from being pulled out. Both T-nuts 8 are secured to the spreader by means of bolts in holes which can be seen in the Figs. 1 and 2.

15 Fig. 3 moreover shows that the twistlock receptacle 7 supports the spherically designed bearing of the twistlock pin 16 which as a result is pivotable by approx. 0.5° , whereby a floating suspension is attained.

Reference Codes

	1	Twistlock nut
	2	Stop washer
5	3	Twistlock guide
	4	Feeler
	5	Feeler retaining washer
	6	Feeler spring
	7	Twistlock receptacle
10	8	T-nut
	9	Lever for turning the twistlock
	10	Anti-twist protection of the twistlock receptacle
	11	Sensor for the position of feeler correctly inserted
	12	Sensor for the position of twistlock in position unlocked
15	13	Sensor for twistlock in position locked
	14	Multipin quick coupling for connection of sensor technology
	15	Spreader
	16	Twistlock pin
	17	Borehole for sensor cabling
20	18	Feeler disk
	19	Feeler for sensor

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Patent Claims

1. Twistlock for hoisting device for engagement in the corners of containers, consisting of a pintle, feeler and parts for actuation, such as lever, and parts for detection of twistlock position, such as sensors,
5 **characterized in that**
the twistlock pin (16) with its parts (1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 16) is designed as a modular, quickly installable and disassemblable unit which is mounted in the openings of the spreader (15) using fastening elements (8, 10) in such a way that it can easily be
10 released and is protected against twisting by providing the twistlock on one side with an anti-twist protection such that the twistlock receptacle (7) fixes the twistlock unit with the surface of a separated segment of a circle to a counterpiece on the spreader (15),
- 15 2. Twistlock according to claim 1,
characterized in that
the modular unit has in its lower area a twistlock guide (3) in the groove of which the key of two T-nuts (8) projects.
- 20 3. Twistlock according to claim 1 and 2,
characterized in that
the T-nuts (8) have holes with which they are secured from below to the spreader (15) by way of bolts.
- 25 4. Twistlock according to one of claims 1 to 3,
characterized in that
the modular unit possesses a twistlock receptacle (7) which has in its lower part a smaller outer diameter than in its upper part.
- 30 5. Twistlock according to one of claims 1 to 4,
characterized in that
the lever (9) of the twistlock unit is connected with a positioning element by way of pin.
- 35 6. Twistlock according to one of claims 1 to 5,
characterized in that
a protective sleeve is arranged around the twistlock receptacle (7).

7. Twistlock according to one of claims 1 to 6,
characterized in that
the stop washer (2) is designed in its lower area as a spherical joint
such that the twistlock pin (16) is pivotable by approx. 0.5 °.

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8. Twistlock according to one of claims 1 to 7,
characterized in that
on the twistlock there is a quick coupling (14) for the connection of the
sensor technology.

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