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DEVICE FOR SECURING PIPES HAVING VARIOUS DIAMETERS

The invention relates to a device for vertically holding pipes of differing diameter for elevator
10 systems for picking up, lifting and depositing a line of pipes or individual pipe segments onto oil platforms, consisting of a basic element for forming a cylinder liner with a swivel joint for an associated door element to complete the liner, wherein the swivel
15 joint has a closure which is spaced apart and has a pivotable catch with a closure pin, and the closing movement is controllable via an associated hydraulic adjusting cylinder.

20 Diverse embodiments of this type are known, wherein the opening and closing take place by adjusting cylinders via a hydraulic controlling means. There is the drawback in this case that the arrangements are configured only for one pipe size and the retrofitting
25 of the cylinder liner can be carried out in situ only with a large outlay. The standpoint that an opening movement of the door element will not be able to be carried out under load in the event of different pipe sizes is of great importance in practice.

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It is the object of the invention to provide a simple retrofittable arrangement for different pipe diameters, which arrangement permits adaptation in situ and ensures that the liner is secured for holding under
35 load.

This object is achieved according to the invention in that cylinder segments for forming the cylinder liner

in different size diameters are arranged interchangeably in the basic element and door element via rear guide profiles and associated profile rails in the basic element and door element, and the upper sides
5 of the individual cylinder segments are connected to corresponding receptacles via retaining rings which are assigned so as to be able to be pushed on horizontally, wherein, by reception of pipes in the cylinder liner and of an occurring load, a spring-loaded actuating arm
10 is adjustable in the height thereof via a cylinder segment, and locking of the hydraulic adjusting cylinder for the closing movement is controllable via an associated load sensor.

15 By this means, given the present conditions with relatively large diameters, retrofittings can be carried out by the individual cylinder segments in accordance with the pipe size used, and load-dependent locking is possible.

20 For good fixing of the cylinder segments, it is provided that the cylinder segments have additional retaining elements in the lower part for corresponding reception in the basic element and door element.

25 An advantageous embodiment consists in that three cylinder segments are arranged in the basic element and two cylinder segments of the cylinder liner are arranged in the door element.

30 For the automatic closure of the door element after insertion of pipes, it is provided that a cylinder segment in the basic element has a protruding trigger pin which, after reception of pipes, controls the
35 adjusting cylinder for the closing movement.

In a further refinement and in order to protect an inserted trigger pin, it is provided that the trigger

pin is connected via a spring to a hollow piston cylinder which, after activation of the adjusting cylinder, holds the trigger pin in a drawn-back position.

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An exemplary embodiment of the invention is illustrated schematically in the drawing, in which:

- 10 fig. 1 shows a top view of a cylinder liner formed in the basic element and door element with a cylinder segment pulled out;
- 15 fig. 2 shows a view of an open cylinder liner with the cylinder segments thereof and with a connection of the cylinder segments in the upper region via retaining rings which are pushed on;
- 20 fig. 3 shows a partial section through a basic element with an inserted cylinder segment;
- fig. 4 shows an unloaded cylinder liner with an assigned load sensor;
- 25 fig. 5 shows an illustration as per fig. 4 with a loaded cylinder liner and activated load sensor;
- 30 figs 6 and 7 show a cylinder liner in the unloaded and loaded state with a spring-loaded actuating arm for a load sensor;
- fig. 8 shows a top view of figs 6 and 7;
- 35 figs 9 and 10 show a valve activation of an adjusting cylinder for closing purposes in an open and closed position;

figs 11 show an assignment of a trigger pin in the
and 12 basic element for the valve activation for a
closing movement and as an external view with
5 the valve in a closed arrangement;

fig. 13 shows a section through a cylinder segment
with a trigger pin, and

10 fig. 14 shows an overall illustration of the device
in the closed position of the cylinder liner.

The device essentially consists of a basic element 1
with a door element 3 which is pivotable via a hinge
15 pin 2 and, in the closed state via a closure element 4
on the basic element 1, is controllable via an
adjusting cylinder 6 in order to form a cylinder liner
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20 The cylinder liner 5 is formed by individual cylinder
segments 7 which are fixed interchangeably on the basic
element 1 and door element 3. For this purpose, the
cylinder segments 7 are connected to rear guide
profiles 8 which can be pushed into associated profile
25 rails 9 and secured.

In the upper region, the cylinder segments 7 are
connected to a corresponding receptacle 21 for the
cylinder segments 9 via retaining rings 10 which can be
30 pushed on horizontally.

In this embodiment, a cylinder segment 7 is connected
to a spring-loaded actuating arm 11 and, when a pipe is
inserted and therefore a load occurs, acts on a load
35 sensor 12 which, upon closure of the device, blocks the
adjusting cylinder 6. The load sensor 12 is an internal
interlock in the hydraulic controlling means of the
adjusting cylinder 6, connecting an opening of the

cylinder liner 5 and release of a load. An operator therefore receives a signal as soon as the load sensor 12 has been actuated and therefore the elevator is under load.

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The hydraulic adjusting cylinder 6 permits opening and closing of the door element 3. The door element 3 can be opened by 90° in order to be able to receive pipes. In the closed position, the door element 3 rests on the
10 basic element 1. As soon as the door element 3 is closed, a hydraulic closure cylinder 22 is automatically actuated by a hydraulic controlling means with a valve 23. The closure cylinder 22 is connected to a closure 13 with a locking pin 14 and therefore
15 enables closing. The door element 3 is kept in the closed position by said closure 13 with the locking pin 14 and is connected to the basic element 1. An additional locking prevents inadvertent opening of the closure should the hydraulics fail or a line break.

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In this embodiment, three cylinder segments 7 are arranged in the basic element 1 and two cylinder segments 7 are arranged on the door element 3. In this case, the cylinder segments 7 are connected on the
25 lower side in a form-fitting manner via additional retaining elements 15 and corresponding receptacles 16 for additional guidance and securing. The formation of individual cylinder segments 7 in order to form the cylinder liner 5 makes it possible to reduce the
30 weight, and the times for a change to a different pipe diameter are reduced.

To automatically close the door element 3 after reception of a pipe in the open cylinder liner 5, a
35 trigger pin 17 is arranged in the central cylinder segment 7 of the basic element 1. A hydraulic hollow piston cylinder 18 which is connected to the trigger pin 17 by a basic body is located level with the

trigger pin 17. Upon reception of a pipe, the pipe strikes against the trigger pin 17. The trigger pin 17 impacts against a cylinder rod 19 of the hollow piston cylinder 18, presses said cylinder rod through the
5 hollow piston cylinder 18 counter to a spring 24 and actuates a trigger valve 20 which activates the hollow piston cylinder 18. The hollow piston cylinder 18 moves the cylinder rod 19 and therefore moves the trigger pin 17 away from the inserted pipe. The movement back of
10 the hollow piston cylinder 18 avoids wear to the trigger pin 17 which would otherwise bear continuously against the pipe. In addition, upon actuation of the trigger valve 20 by the hydraulic controlling means, the door element 3 is automatically closed and locked.

Patent Claims

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1. A device for vertically holding pipes of differing diameter for elevator systems for picking up, lifting and depositing a line of pipes or individual pipe segments onto oil platforms, consisting of a basic
10 element for forming a cylinder liner with a swivel joint for an associated door element to complete the liner, wherein the swivel joint has a closure which is spaced apart and has a pivotable catch with a closure pin, and the closing movement is controllable via an
15 associated hydraulic adjusting cylinder, characterized in that cylinder segments (7) for forming the cylinder liner (5) in different size diameters are arranged interchangeably in the basic element (1) and door element (3) via rear guide profiles (8) and associated
20 profile rails (9) in the basic element (1) and door element (3), and the upper sides of the individual cylinder segments (7) are connected to corresponding receptacles (21) via retaining rings (10) which are assigned so as to be able to be pushed on horizontally,
25 wherein, by reception of pipes in the cylinder liner (5) and of an occurring load, a spring-loaded actuating arm (11) is adjustable in the height thereof via a cylinder segment (7), and locking of the hydraulic adjusting cylinder (6) for the closing movement is
30 controllable via an associated load sensor (12).

2. The device as claimed in claim 1, characterized in that the cylinder segments (7) have additional retaining elements (15) in the lower part for
35 corresponding reception in the basic element (1) and door element (3).

3. The device as claimed in claim 1 or 2, characterized in that three cylinder segments (7) are arranged in the basic element (1) and two cylinder segments (7) of the cylinder liner (5) are arranged in
5 the door element (3).

4. The device as claimed in one of claims 1 to 3, characterized in that a cylinder segment (7) in the basic element has a protruding trigger pin (17) which,
10 after reception of pipes, controls the adjusting cylinder (6) for the closing movement.

5. The device as claimed in claim 4, characterized in that the trigger pin (17) is connected via a spring
15 (24) to a hollow piston cylinder (18) which, after activation of the adjusting cylinder (6), holds the trigger pin (17) in a drawn-back position.