(12) STANDARD PATENT (11) Application No. **AU 2006274249 B2**
(19) AUSTRALIAN PATENT OFFICE

(54) Title
Semi-trailer landing gear

(51) International Patent Classification(s)
B60S 9/02 (2006.01)

(21) Application No: **2006274249** (22) Date of Filing: **2006.07.20**

(87) WIPO No: **WO07/012425**

(30) Priority Data

(31) Number	(32) Date	(33) Country
10 2005 034 553.0	**2005.07.23**	**DE**

(43) Publication Date: **2007.02.01**
(44) Accepted Journal Date: **2011.12.01**

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(56) Related Art
EP 0380941
US 2001/020781

(12) NACH DEM VERTRAG ÜBER DIE INTERNATIONALE ZUSAMMENARBEIT AUF DEM GEBIET DES PATENTWESENS (PCT) VERÖFFENTLICHTE INTERNATIONALE ANMELDUNG

(19) Weltorganisation für geistiges Eigentum
Internationales Büro

(43) Internationales Veröffentlichungsdatum
1. Februar 2007 (01.02.2007)

PCT

(10) Internationale Veröffentlichungsnummer
WO 2007/012425 A3

(51) Internationale Patentklassifikation:
B60S 9/02 (2006.01)

(21) Internationales Aktenzeichen: PCT/EP2006/007144

(22) Internationales Anmeldedatum:
20. Juli 2006 (20.07.2006)

(25) Einreichungssprache: Deutsch

(26) Veröffentlichungssprache: Deutsch

(30) Angaben zur Priorität:
10 2005 034 553.0 23. Juli 2005 (23.07.2005) DE

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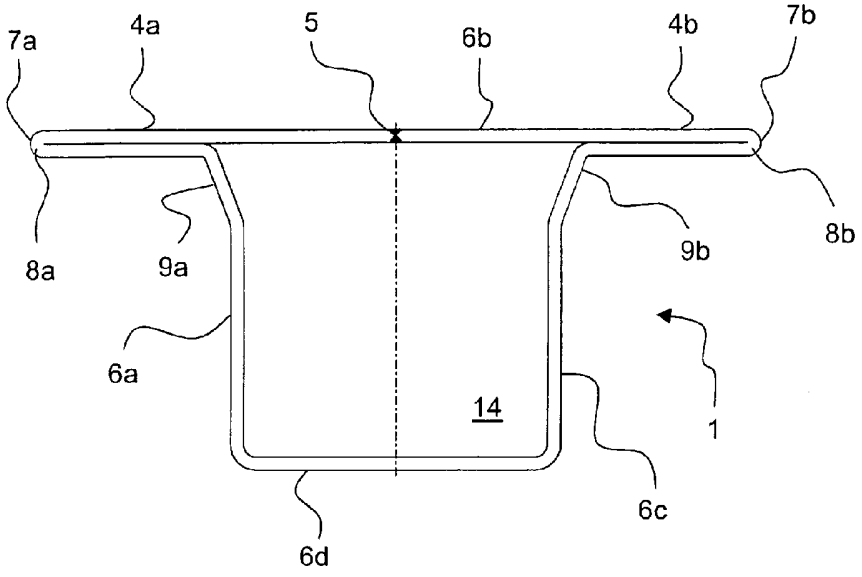
(84) Bestimmungsstaaten *(soweit nicht anders angegeben, für jede verfügbare regionale Schutzrechtsart)*: ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), eurasisches (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), europäisches (AT, BE, BG, CH, CY, CZ, DE, DK,

[Fortsetzung auf der nächsten Seite]

(54) Title: SEMI-TRAILER LANDING GEAR

(54) Bezeichnung: STÜTZWINDE



(57) Abstract: The invention relates to a semi-trailer landing gear, in particular to support trailers, comprising a support element (3) which comprises an outer sleeve (1) and an inner sleeve (2) and which can be displaced in a telescopic manner in relation to the height.The outer sleeve (1) comprises a securing flange (4) which can be applied to a vehicle. The aim of the invention is to develop a semi-trailer landing gear which is economical to produce and can also withstand high loads. Said aim is achieved by virtue of the fact that the outer sleeve (1) and the securing flange (4) are made of a single piece of flat steel by means of edge rolling.

[Fortsetzung auf der nächsten Seite]

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EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Erklärung gemäß Regel 4.17:
— *Erfindererklärung (Regel 4.17 Ziffer iv)*

Veröffentlicht:
— *mit internationalem Recherchenbericht*
— *vor Ablauf der für Änderungen der Ansprüche geltenden Frist; Veröffentlichung wird wiederholt, falls Änderungen eintreffen*

(88) Veröffentlichungsdatum des internationalen Recherchenberichts: 5. April 2007

Zur Erklärung der Zweibuchstaben-Codes und der anderen Abkürzungen wird auf die Erklärungen ("Guidance Notes on Codes and Abbreviations") am Anfang jeder regulären Ausgabe der PCT-Gazette verwiesen.

(57) Zusammenfassung: Es wird eine Stützwinde beschrieben, insbesondere zum Abstützen von Aufliegern, mit einem in seiner Höhe teleskopartig verfahrbaren, eine Aussenhülse (1) und eine Innenhülse (2) aufweisenden Abstützelement (3), wobei die Aussenhülse (1) einen Befestigungsflansch (4) zum Anbringen an ein Fahrzeug umfasst. Der Erfindung lag die Aufgabe zugrunde, eine Stützwinde zu entwickeln, die einerseits kostengünstig herzustellen ist und andererseits auch hohen Belastungen standhält. Die Aufgabe wird mit einer Stützwinde gelöst, bei der die Aussenhülse (1) und der Befestigungsflansch (4) einstückig mittels Rollbiegen aus einem Flachstahl gefertigt sind.

Semitrailer landing gear
Specification

The invention concerns a support jack, especially for propping up trailers, with a vertically telescopic support element having an outer sleeve and an inner sleeve, while the outer sleeve has a fastening flange for placement on a vehicle.

Such support jacks are used in particular to prop up the trailers of a tractor-trailer rig. These support jacks are made from rectangular tubes, placed one inside the other and able to move relative to each other, as is known to the applicant for example from EP 1 104 369 B1.

To reduce the weight and the manufacturing expenses, a lifting mechanism with shaft tube and support tube is proposed in EP 0 972 688 A2, being fastened to a vehicle chassis by a mounting mechanism. The mounting mechanism should be configured as a mounting plate, closing an open U-shaped profile element, so that a hollow shaft tube is produced. For this, the mounting plate is welded to the U-profile by longitudinal welds for its entire length. The major drawback of this lifting mechanism is the expensive fabrication, since the U-shaped profile element has to be welded to the mounting plate with very precise fit. Furthermore, there is the risk of a cross section of different clearance when there are welds situated on the inside, and this may cause hindrance in the extending and retracting of the support tube.

Another prior art is EP 0 380 941 A2. In the case of this support device, an outer sleeve is extruded as a single piece with its fastening plate for mounting the support device onto a vehicle. Since the rough casting is in block form, this method is confined to light metals, especially aluminium. But such support devices have not been successful on the market, since they are costly because of the high-value material and they have proven to be prone to breakdown in operational use, due to the low material strength.

Consequently, it would be desirable to develop support jacks which on the one hand are economical to fabricate and on the other hand also withstand high loads.

A reference herein to a patent document or other matter which is given as prior art is not to be taken as an admission or a suggestion that that document or matter was, known or that the information it contains was part of the common general knowledge as at the priority date of any of the claims.

According to the present invention, there is provided support jack, especially for propping up trailers, with a vertically telescopic support element having an outer sleeve and an inner sleeve, while the outer sleeve has a fastening flange for placement on a vehicle, wherein the outer sleeve and the fastening flange are fabricated as a single piece by means of edge rolling from a piece of flat steel.

In most cases, cold working is done. Only in special instances, with large cross sections or very small bending radius, is the material heated in order to reduce the forces needed for the shaping. The major benefit of edge-rolled as opposed to extruded sleeves lies in the almost free choice of the alloy for the platelike starting material. Conventional steel grades can also be used for this. Furthermore, it is not necessary to connect individual structural parts by a plurality of welded seams, which are difficult to fabricate. Thanks to the relatively short bending process of the material, very large numbers of pieces can be produced per unit of time.

In one particular embodiment, each sleeve has at most one welded seam. This type of material joint produces sleeves with a self-contained hollow body, which has a high bending strength. The welded seam can be located in a position very favourable to the fabrication, for example, on the side wall close

to the fastening flange.

It has been found to be especially advantageous when the connection weld is arranged in the axial direction of the outer sleeve. The welded seam can then run down the middle through one side wall of the sleeve or in the angle between two neighboring side walls.

Preferably, the fastening flange projects beyond the outer sleeve at either end. In any case, in this embodiment as well the fastening flange forms part of the sleeve as a single piece. The fastening flange has a given pattern of holes. For the mounting on a vehicle chassis, for example, screws are then inserted through the holes and bolted to the vehicle.

The fastening flange of the outer sleeve can be formed by a wall folded outward from the respective side wall by around 90 degrees, on whose end segment a 180 degree bend-around is preferably arranged. This results in a double wall thickness in the region of the fastening flange with especially good resistance to high surface pressures. The wall thickness resulting from the bend-around at the vehicle side should meet the complementary opposite wall segment in the middle between side walls of the outer sleeve and is advantageously butt-welded to it.

Advantageously, the sleeve in the region of the bend-around has a cavity seal. Due to the sharp bend-around, microcracks are formed on the outside and a cavity is formed on the inside, in which

moisture can penetrate and result in rust formation. Such corrosion effects are effectively prevented by a suitable cavity seal in the entire region of the fastening flange. This likewise substantially increases the lifetime of the support jack.

An especially high stability of the support jack is achieved when two opposite side walls of the outer sleeve have an angled wall section. Preferably, the side walls bordering on the fastening flange are each angled by 5 to 30 degrees. The angling starting at the fastening flange should not go beyond half the depth of the profile and it should widen in the direction of the fastening flange.

For a better understanding, the invention will now be explained more closely by means of 3 drawings. These show:

Fig. 1: a plan view of an outer sleeve with flat-rolled bend-around of a fastening flange;

Fig. 2: a view per Fig. 1 with moderately rolled bend-around of a fastening flange, and

Fig. 3: a plan view of an outer sleeve with inner sleeve arranged therein.

Figure 1 shows in a plan view an outer sleeve 1 according to the invention, whose side walls 6a, 6b, 6c, 6d surround a basically rectangular inner space 14. The side wall 6b has a connection weld 5 in its axis of symmetry, which joins together both halves of the side wall 6b. At the side wall 6b, the entire

support jack is placed via the outer sleeve 1 onto a vehicle, not shown. For this, fastening flanges 4a, 4b projecting laterally beyond the side walls 6a, 6c are formed on the side wall 6b on either side of the connection weld 5.

The side walls 6a, 6b, 6c, 6d are formed from an originally platelike starting material by bending and consequently pass into each other without seams. At each end segment 7a, 7b of the fastening flanges 4a, 4b one notices a bend-around 8a, 8b, where the material is bent by 180 degrees. In the embodiment shown in Fig. 1, this is a sharp bend-around, which has been rolled again after the bending process, so that the wall material in the region of the bend-around again lies against each other.

In the usual installation procedure, the side walls 6a, 6c are at right angles to the direction of travel 13 and the side walls 6b, 6d lie in this direction (see Fig. 3). To increase the stability, the opposite side walls 6a, 6c are provided with angled wall sections 9a, 9b, which are set outward by around 20 degrees in the direction of the side wall 6b. Thanks to this structural measure, it is possible to have thinner material for the outer sleeve 1 with the same stability. The side walls 6a, 6c are formed with the angled wall section because of the forces acting upon the trailer when coupling it in or against the direction of travel 16.

An alternative embodiment in respect of its end segments 7a, 7b is shown in Figure 2. This embodiment has a 180-degree bend-around, but one which has not been completely rolled flat, so that

a loop space 15a, 15b remains. This results in fewer microcracks on the outer side of the bend-around 8a, 8b, since the material in this region is not subject to such intense strain as in the embodiment per Fig. 1.

Figure 3 shows a plan view of a support element 3 comprising an outer sleeve 1 and an inner sleeve 2 inserted therein. For the fastening onto a vehicle (not shown), fastening bolts 13 are inserted into boreholes, also not visible in the plan view. The fastening bolts 13 project out beyond the plane surface of the side wall 6b with its fastening flanges 4a, 4b.

The inner sleeve 2 was likewise formed from a platelike starting material by edge rolling and joined into a closed hollow body by the connection weld 11. The connection weld 11 is likewise situated in the axis of symmetry and is arranged immediately next to the connection weld 5.

The inner sleeve 2 is formed as a rectangular tube with two pairs of opposite side walls 10a, 10b, 10c, 10d of equal length, the side walls 10a, 10c having angled wall sections 12a, 12b complementary to the side walls 6a, 6c. As a result of this, on the one hand, the maximum withstandable flexural torque is increased and on the other hand a good axial guidance is provided for the inner sleeve 2 relative to the outer sleeve 1.

List of reference symbols

1	outer sleeve
2	inner sleeve
3	support element
4a, 4b	fastening flange
5	connection weld, outer sleeve
6a-d	side wall, outer sleeve
7a, 7b	end segment, fastening flange
8a, 8b	bend-around
9a, 9b	angled wall section, outer sleeve
10a-d	side wall, inner sleeve
11	connection weld, inner sleeve
12a, 12b	angled wall section, inner sleeve
13	fastening bolt
14	inner space
15	loop space
16	direction of travel

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. Support jack, especially for propping up trailers, with a vertically telescopic support element having an outer sleeve and an inner sleeve, while the outer sleeve has a fastening flange for placement on a vehicle, wherein the outer sleeve and the fastening flange are fabricated as a single piece by means of edge rolling from a piece of flat steel.

2. Support jack according to claim 1, wherein the outer sleeve has at most one connection weld seam.

3. Support jack according to claim 2, wherein the connection weld runs in the axial direction of the outer sleeve.

4. Support jack according to any one of claims 1 to 3, wherein the fastening flange projects beyond the outer sleeve at either end.

5. Support jack according to any one of claims 1 to 4, wherein the fastening flange has a double wall thickness of one side wall.

6. Support jack according to any one of claims 1 to 5, wherein the fastening flange has an end segment with a 180 degree bend-around.

7. Support jack according to claim 6, wherein the outer sleeve in the region of the bend-around has a cavity seal.

8. Support jack according to any one of claims 1 to 7, wherein two opposite side walls of the outer sleeve have an angled wall section.

9. A support jack according to any one of the embodiments substantially as herein described and illustrated.

Fig. 1

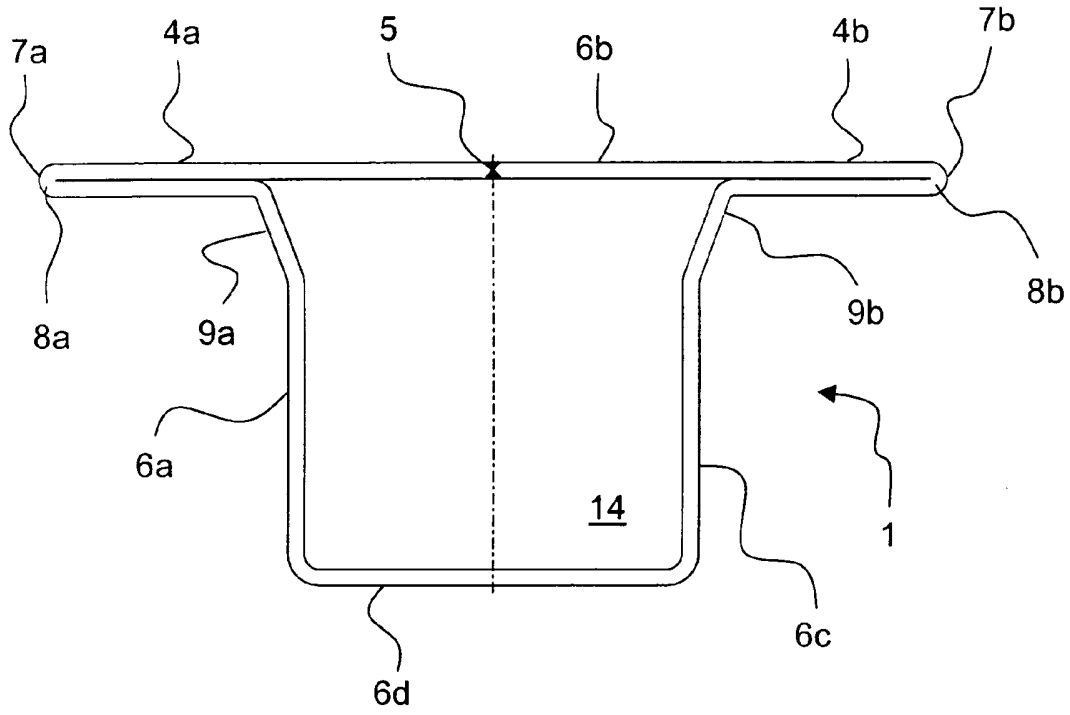

7a
4a
5
6b
4b
7b
8a
9a
9b
8b
6a
14
1
6c
6d

Fig. 2

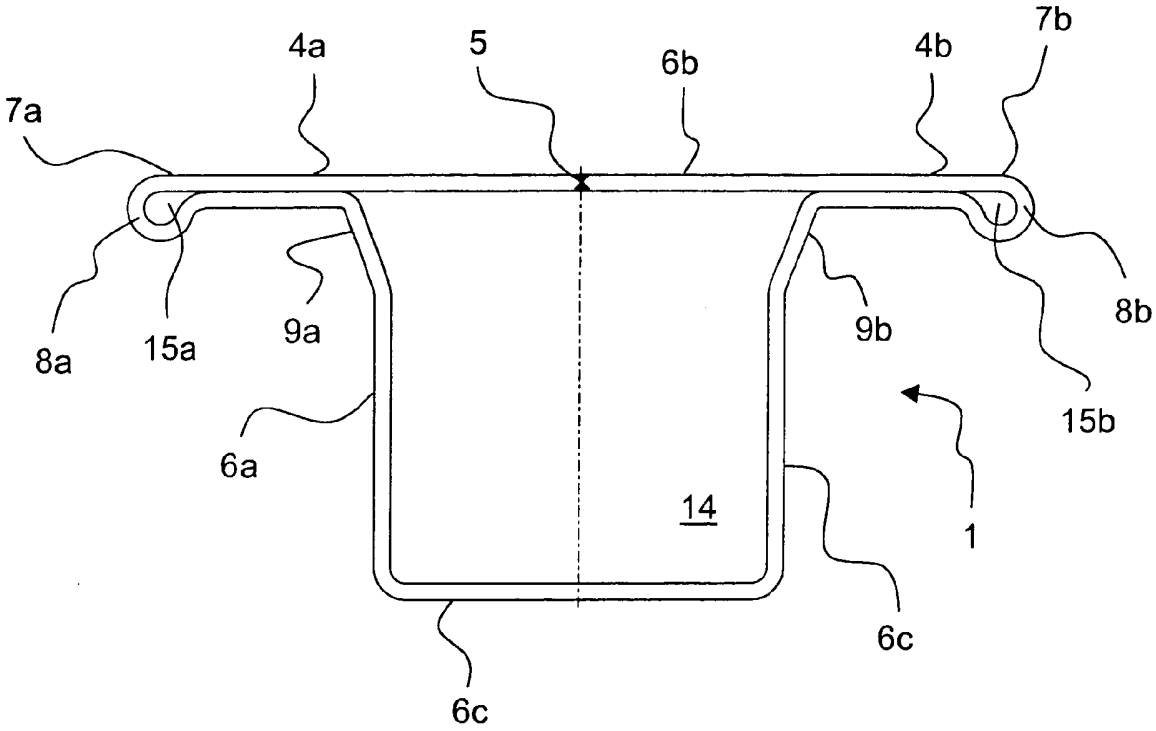
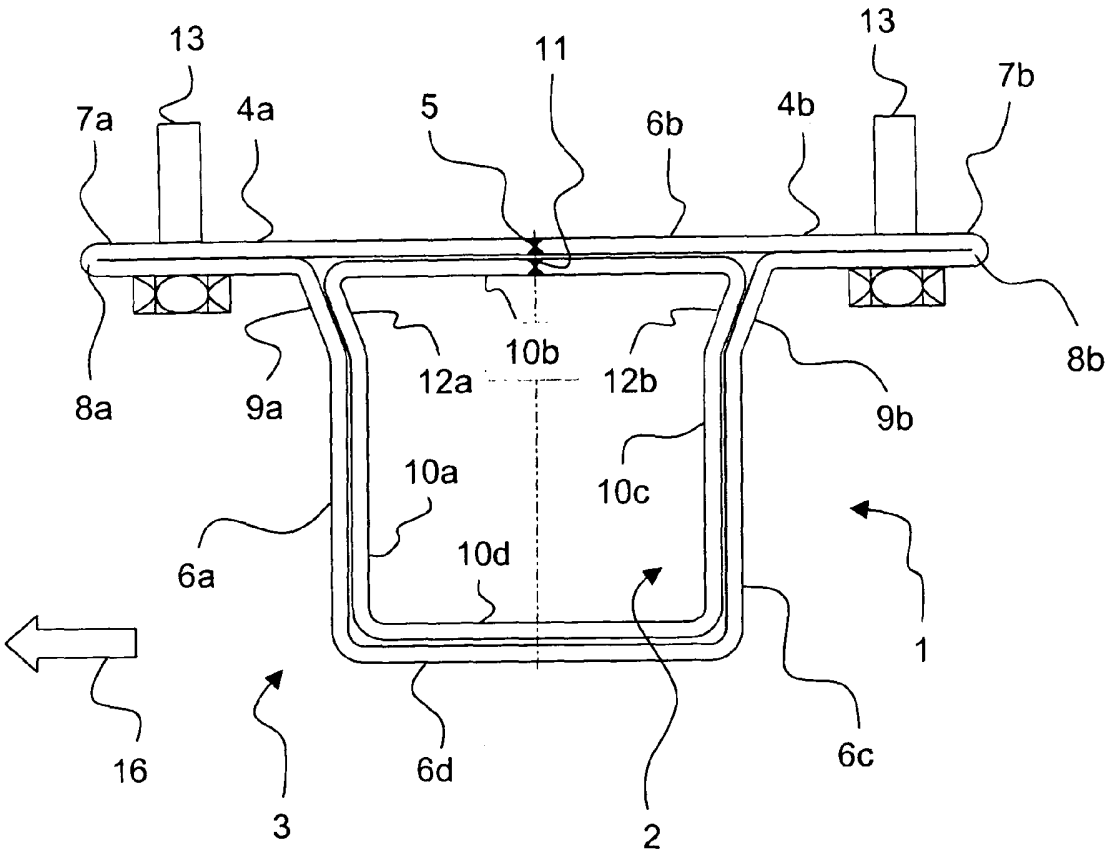

7a
4a
5
6b
4b
7b
8a
15a
9a
9b
8b
15b
6a
14
1
6c
6c

Fig. 3


13
11
13
7b
7a
4a
5
6b
4b
8b
8a
9a
12a
10b
12b
9b
10a
10c
6a
10d
1
16
3
6d
2
6c