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(54)

Load stabiliser

(57) Load stabiliser (1) for a forklift attachment (2) having laterally displaceable forks (3), said load stabiliser (1) comprising a shaft (5), a pressure plate (6) mounted on the shaft (5), and height adjustment means (7) adapted for adjusting the vertical position of the shaft (5) and pressure plate (6). The pressure plate (6) is adapted for providing a suitable vertically directed pressure onto a load (4) placed on said forks (3). Further, the pressure plate (6) is adapted for lateral displacement along the shaft (5) by means of a sliding element (12). The present invention also relates to a method for using such a load stabiliser (1).

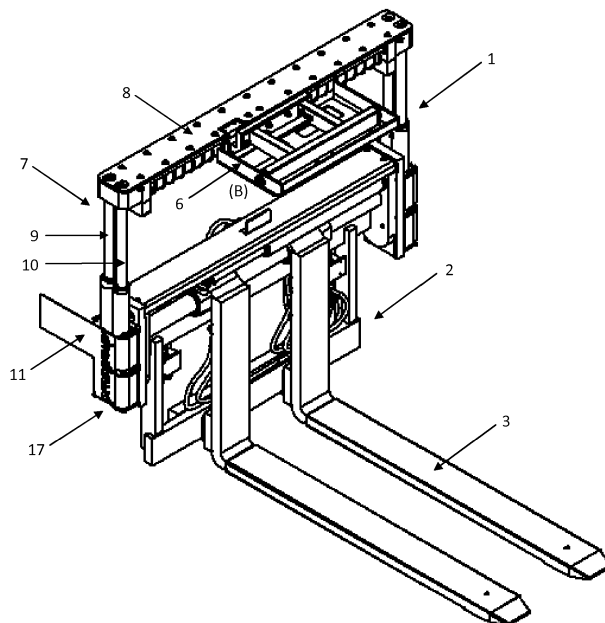


Fig. 1

Description

Field of the invention

[0001] The present invention relates to a load stabiliser for a forklift attachment having laterally displaceable forks. The load stabiliser comprises a shaft, a pressure plate mounted on the shaft, and height adjustment means adapted for adjusting the vertical position of the shaft and pressure plate. The pressure plate is adapted for providing a suitable vertically directed pressure onto a load placed on the forks.

Background of the invention

[0002] Forklifts are well-known in the art. The ordinary forklift is, at its front end, provided with a vertically adjustable forklift attachment used for lifting and transporting load. Some forklift attachments are provided with forks which can be displaced laterally, as well as vertically. Such lateral fork displacement facilitates adaption of the fork width to the dimensions of a load, or fine tuning of the unloading process without having to move the forklift itself. The possibility of lateral displacement of the forks results in a more flexible forklift which can carry loads having different widths in a more secure way since the fork width can be adapted to the width of a specific load. This does however not solve the problem of carrying a load having large dimensions and which needs to be carried by the forklift in a way such that the load has a large overhang beyond the extension of the forks.

[0003] DE10040249 A1 discloses a forklift wherein each fork is provided with a holding device used for securing a load carried by the forks. The holding devices are pressed against the load in order to secure it between fork and holding device. The vertical adjustment of the forklift attachment results in both fork and holding device being displaced simultaneously in a vertical direction, therefore maintaining the pressure on the load from the holding element. However, this solution requires the use of multiple holding elements which not only limit the visibility for the driver, but which also are quite inflexible as they are fitted to each individual fork. Since the holding elements are fitted to the individual forks, i.e. towards the sides of the load, the load cannot be stabilised at its centre. A centred stabilisation is desired in order to, e.g., avoid an uneven pressure distribution on the load.

Summary of the invention

[0004] It is an object of the present invention to mitigate the above problems, and to provide a stabiliser which is simple to attach to a forklift attachment, easy to manufacture and manage, which does not obscure the vision of the driver, and which facilitates a secure and even arrangement of a load. According to a first aspect of the present invention, these objects are achieved by a load stabiliser for a forklift attachment having laterally dis-

placeable forks, the load stabiliser comprising a shaft, a pressure plate mounted on the shaft, and height adjustment means adapted for adjusting the vertical position of the shaft and pressure plate, the pressure plate being adapted for providing a suitable vertically directed pressure onto a load placed on the forks, characterised by the pressure plate being adapted for lateral displacement along the shaft by means of a sliding element.

[0005] Such a load stabiliser has a simple design, is easily attached to an existing forklift attachment, and operated by the existing forklift systems. The load stabiliser does not limit the visibility for the driver during use, and the flexibility provided by the laterally displaceable forks is maintained. The pressure from the pressure plate is also provided evenly at the centre of the load.

[0006] In one embodiment, the lateral displacement of the pressure plate is adapted to occur simultaneously with, and as a result of, a lateral displacement of the forks and the load. Hence, the pressure plate does not require a separate operating system but is simply displaced along with the load, while maintaining the pressure at the centre of the load.

[0007] The sliding element may comprise a sleeve, which at least partially surrounds the shaft, and at least one slide bearing. This is a simple configuration which does not require many mechanical parts.

[0008] In a further embodiment, the sliding element and the pressure plate are pivotally mounted on the shaft, for rotation between a horizontal pressure plate position and a vertical pressure plate position. The horizontal pressure plate position is used when carrying a load, and the vertical pressure plate position is used when there is no need for a load stabiliser, such that the pressure plate does not protrude forward and restrict the loading capacity of the forklift.

[0009] The load stabiliser may further comprise lateral return means adapted for returning a displaced pressure plate to a starting position on the shaft when the vertically directed pressure is no longer provided onto the load. This way, the load stabiliser is self-adjusting, avoiding a further work operation for the driver.

[0010] In one embodiment, the lateral return means comprise of two springs arranged around the shaft on opposite sides of the pressure plate and sliding element, providing a very simple, mechanical solution.

[0011] The pressure plate may be provided with means for inclining the pressure plate in relation to the sleeve, adapting the pressure plate to the shape of the load.

[0012] The means for inclining may comprise a joint extending across the plate in the direction of the shaft, which also is a simple, mechanical solution.

[0013] According to a second aspect of the present invention, these objects are achieved by a method for securing a load carried by a forklift attachment provided with laterally displaceable forks, by means of the load stabiliser as described above, comprising the steps of: placing a load onto the forks, adjusting the shaft and pressure plate in a vertical direction, by means of height ad-

justment means, to a position where the pressure plate provides a suitable vertically directed pressure onto the load, and displacing the forks, the load, and the pressure plate simultaneously in a lateral direction, while maintaining the vertically directed pressure on the load. The method has the same advantages as stated above.

[0014] In one embodiment, the method also comprises returning a displaced pressure plate to a starting position on the shaft when the pressure plate no longer provides vertically directed pressure onto the load, the starting position being at the centre of the shaft.

[0015] Generally, all terms used in the claims are to be interpreted according to their ordinary meaning in the technical field, unless explicitly defined otherwise herein. All references to "a/an/the [element, device, component, means, etc]" are to be interpreted openly as referring to at least one instance of said element, device, component, means, etc., unless explicitly stated otherwise. Further, by the term "comprising" it is meant "comprising but not limited to" throughout the application.

Brief description of the drawings

[0016] This and other aspects of the present invention will now be described in more detail, with reference to the appended drawings showing a currently preferred embodiment of the invention.

Figure 1 shows a perspective view of a load stabiliser according to an embodiment of the present invention, attached to a forklift attachment and having the pressure plate in a horizontal position.

Figure 2 shows the load stabiliser according to figure 1, having the pressure plate in a vertical position.

Figure 3 shows a side view of a load stabiliser according to an embodiment of the present invention, attached to a forklift attachment and carrying a load. Figure 4 shows a partial side view of a load stabiliser according to an embodiment of the present invention, before pressing onto a load.

Figure 5 shows a partial side view of a load stabiliser according to an embodiment of the present invention, having an inclined pressure plate pressing onto an inclined load.

Detailed description

[0017] Figure 1 shows a load stabiliser 1 attached to a forklift attachment 2. The forklift attachment 2 is, in turn, attached to a forklift or any other suitable transportation vehicle. The load stabiliser 1 can be attached to an existing forklift attachment 2, as will be discussed in more detail below. The load stabiliser 1 can however also be integrated with the forklift attachment 2.

[0018] In the description below, we will limit us to a forklift having a forklift attachment 2 with laterally displaceable forks 3. The forklift attachment 2 can also be referred to as a fork positioner with side shift. The forklift

attachment 2 is in itself a well-known product, provided with at least two forks 3 which extend in the forward driving direction of the fork lift and which are used for carrying load 4 such as e.g. a pallet. The forks 3 can be displaced laterally, i.e. in a horizontal direction which is transverse to the extension of the forks 3.

[0019] Figure 2 shows the load stabiliser 1 more in detail. The load stabiliser 1 comprises a shaft 5, a pressure plate 6 mounted on the shaft 5, and height adjustment means 7 adapted for adjusting the position of the shaft 5 and pressure plate 6 in a vertical direction. The shaft 5 and height adjustment means 7 are arranged essentially as a U turned upside-down, with the shaft 5 at the centre of the U and the height adjustment means 7 corresponding to the legs of the U. Preferably, the load stabiliser 1 also comprises an upper beam 8, arranged essentially in parallel with the shaft 5 and above the shaft 5, as seen in a vertical direction. The height adjustment means 7 and the shaft 5 are connected to the beam 8, which not only provides stability to the load stabiliser structure but also provides a place for securing additional components on the load stabiliser 1. The load stabiliser 1 preferably also comprise base parts 17, one such base part 17 being arranged at the opposite end of each height adjustment means 7, i.e. opposite to the ends which are connected to the beam 8.

[0020] Each height adjustment means 7 preferably comprise a hydraulic cylinder 9 and an air cylinder 10, or other kind of guide support, arranged in parallel with the hydraulic cylinder 9, and a hydraulic block 11. One end of each cylinder 9, 10 is mounted to the beam 8, while the opposite end of each cylinder 9, 10 is mounted to a base part 17 of the load stabiliser 1. The hydraulic block 11 is also mounted to the base part 17. The hydraulic cylinder 9 is connected to the hydraulic block 11, which is connected to the existing hydraulic system of the forklift. The height adjustment system 7, more exactly the two base parts 17, is mounted to opposing sides of the forklift attachment 2 by means of e.g. screw joints. In this way, the load stabiliser 1 can be mounted onto existing forklift attachments 2. The load stabiliser 1 can however be mounted onto an existing forklift attachment 2, permanently or detachably, by any suitable fastening means.

[0021] As mentioned above, the height adjustment means 7 are used for adjusting the position of the shaft 5 and pressure plate 6 in the vertical direction. When a load 4 is placed on the forks 3 of the forklift attachment 2, the height adjustment means 7 are activated for lowering the shaft 5 and pressure plate 6 until an upper, at least partially horizontal, surface of the load 4 is reached. The vertical movement of the shaft 5 and pressure plate 6 is stopped when the pressure plate 6 applies a suitable vertically directed pressure onto the load 4. The pressure may be a preset value, or a value which is adjusted in response to the kind of load or the shape of the load to be placed on the forks 3. E.g., a load 4 which causes a large overhang beyond the extension of the forks 3, as

shown in figure 3, has to be secured with a higher vertically directed pressure from the pressure plate 6, than a load 4 which has no such overhang. The pressure is adjusted by means of the above mentioned hydraulic block 11.

[0022] The shaft 5 is preferably cylindrical and extends horizontally between two height adjustment means 7. The pressure plate 6 has an essentially rectangular shape and is mounted on the shaft 5 by means of a sliding element 12 which is attached to the pressure plate 6 itself. The sliding element 12 comprises mainly of a cylindrically shaped sleeve, which at least partially surrounds the shaft, and a number of slide bearings arranged between sleeve and shaft. This configuration allows the pressure plate 6 to be displaced along the shaft 5, i.e. laterally in relation to the forks 3. It also allows the pressure plate 6 to be pivoted around the shaft 5, which will be described in more detail farther below.

[0023] The pressure plate 6 is located in a starting position, or resting position, at the centre of the shaft 5 when not in use. It remains in this starting position while the height adjustment means 7 lower the shaft 5 and pressure plate 6 to the surface of the load 4. When, and if, the forks 3 and the load 4 are displaced laterally, the pressure plate 6 is moved simultaneously with, and as a result of, the vertically directed pressure on the load 4 and the displacement of the load 4. The sleeve, and therefore the pressure plate 6, slides along the shaft 5 by means of the slide bearings.

[0024] Before unloading the load 4 from the forks 3, the pressure plate 6 must be raised from the surface of the load 4. This is done in a corresponding way as when lowering the shaft 5 and pressure plate 6, but in the opposite direction. If the forks 3 and load 4, and hence the pressure plate 6, are displaced along the shaft 5 in relation to its starting position, the pressure plate 6 will automatically self-adjust back to the starting position, i.e. the centre of the shaft 5. This is achieved by lateral return means 13 mounted on the shaft 5. The lateral return means 13 preferably comprise of two springs, wherein one spring is mounted on each side of the sleeve of the sliding element 12, and hence on either side of the pressure plate 6.

[0025] When the load stabiliser 1 is not in use, the pressure plate 6 is preferably arranged in a vertical pressure plate position A such that it does not protrude forwards and is not in the way when carrying a load, see figure 2. The pressure plate 6 is locked in the vertical position by means of an opening in the beam 8, into which the wheels 15, discussed in more detail below, are introduced and thereafter locked using a foldable pin. During use, the pressure plate 6 is rotated upwards to an essentially horizontal pressure plate position B. In order to stop the pressure plate 6 from rotating farther upwards beyond the horizontal position B, the beam 8 may be provided with a stop 14. The stop 14 preferably extends in parallel with the shaft 5 such that a pair of wheels 15, arranged on the outer surface of the sleeve, will be in contact with and

interact with the stop 14, when the pressure plate 6 is in the horizontal pressure plate position B. The combination of stop 14 and wheels 15 not only stops the rotation of the sleeve, but also facilitates a smooth lateral displacement of the sleeve and pressure plate 6. Hence, the use of a sliding element 12, which is pivotable around the shaft 5, allows the pressure plate 6 to rotate between a horizontal pressure plate position B (90°) and a vertical pressure plate position A (0°).

[0026] As shown in figures 4 and 5, the pressure plate 6 may be provided with means 16 for inclining the pressure plate 6 by X° in relation to the horizontal plane, such as a joint which extends along the plate 6 in the direction of the shaft 5, i.e. laterally in relation to the forks 3, which allows the pressure plate 6 to be tilted forward/downwards towards the tips of the forks 3, as shown in figure 5, such that the front end of the pressure plate is at a lower vertical level than the rear end of the pressure plate. The front end relates to the side of the pressure plate which is arranged closest to the tips of the forks, and the rear end relates to the side of the pressure plate which is closest to the shaft 5 of the load stabiliser 1. If the load 4 has an uneven upper surface or a large overhang causing the load to tilt forward by X° , a pressure plate 6 which is inclined by X° provides extra flexibility which helps in securing the load 4. The joint interacts with at least one spring such that the pressure plate 6 is self-adjusted back to a position where the front end of the pressure plate is at a higher vertical level than the rear end of the pressure plate, i.e. it is somewhat inclined in the opposite direction, when it no longer is in contact with the upper surface of the load 4.

[0027] The underside of pressure plate 6, i.e. the surface which will be in direct contact with the load 4, is preferably provided with a rubber sheet having high friction, in order to provide a firm engagement with the upper surface of the load 4.

[0028] The load stabiliser 1 is used for securing a load 4 carried by a forklift attachment 2 provided with laterally displaceable forks 3, by the following steps. A load 4 is placed on the forks 3. The forks 3 are either located in a standard position or have been adjusted laterally in advance, in order to adapt the fork width to the dimensions of the load 4. The shaft 5 and pressure plate 6 are thereafter adjusted in a vertical direction, i.e. downwards, by means of the height adjustment means 7, to a position where the pressure plate 6 provides a suitable vertically directed pressure onto the load 4, hence securing the load 4 between the forks 3 and the pressure plate 6. Once the forklift has moved the load 4 to the desired unloading location, the forks 3, the load 4, and the pressure plate 6 can be moved in a lateral direction in order to fine tune the unloading process without having to move the forklift itself. Once the load 4 is placed in the desired lateral position, it is ready to be unloaded. At this point, the shaft 5 and the pressure plate 6 are moved in an opposite vertical direction, i.e. upwards, by means of the height adjustment means 7, to a position where the pressure

plate 6 no longer provides pressure onto the load 4. Thereafter the load 4 is removed from the forks 3. When the pressure plate 6 no longer provides pressure onto the load 4 it will be returned to a starting position on the shaft 5, if it was previously displaced in a lateral direction. The starting position is at the centre of the shaft 5.

[0029] The person skilled in the art realizes that the present invention by no means is limited to the preferred embodiments described above. On the contrary, many modifications and variations are possible within the scope of the appended claims.

Claims

1. Load stabiliser (1) for a forklift attachment (2) having laterally displaceable forks (3), said load stabiliser (1) comprising a shaft (5), a pressure plate (6) mounted on the shaft (5), and height adjustment means (7) adapted for adjusting the vertical position of the shaft (5) and pressure plate (6), the pressure plate (6) being adapted for providing a suitable vertically directed pressure onto a load (4) placed on said forks (3), **characterised** by the pressure plate (6) being adapted for lateral displacement along the shaft (5) by means of a sliding element (12).
2. Load stabiliser (1) according to claim 1, wherein said lateral displacement of the pressure plate (6) is adapted to occur simultaneously with, and as a result of, a lateral displacement of the forks (3) and the load (4).
3. Load stabiliser (1) according to claim 1 or 2, wherein the sliding element (12) comprises a sleeve, which at least partially surrounds the shaft (5), and at least one slide bearing.
4. Load stabiliser (1) according to any of the previous claims, wherein the sliding element (12) and the pressure plate (6) are pivotally mounted on the shaft (5), for rotation between a horizontal pressure plate position (B) and a vertical pressure plate position (A).
5. Load stabiliser (1) according to any of the previous claims, further comprising lateral return means (13) adapted for returning a displaced pressure plate (6) to a starting position on the shaft (5) when the vertically directed pressure is no longer provided onto the load (4).
6. Load stabiliser (1) according to claim 5, wherein said lateral return means (13) comprise of two springs arranged around the shaft (5) on opposite sides of the pressure plate (6) and sliding element (12).
7. Load stabiliser (1) according to any of the previous

claims, wherein said pressure plate (6) is provided with means (16) for inclining the pressure plate (6) in relation to the sleeve (12).

8. Load stabiliser (1) according to claim 7, wherein said means (16) for inclining comprises a joint extending across the plate (6) in the direction of the shaft (5).
9. Method for securing a load (4) carried by a forklift attachment (2) provided with laterally displaceable forks (3), by means of the load stabiliser (1) according to claims 1-8, comprising the steps of:
 - placing a load (4) onto the forks (3),
 - adjusting the shaft (5) and pressure plate (6) in a vertical direction, by means of height adjustment means (7), to a position where the pressure plate (6) provides a suitable vertically directed pressure onto the load (4), and
 - displacing the forks (3), the load (4), and the pressure plate (6) simultaneously in a lateral direction, while maintaining the vertically directed pressure on the load (4).
10. Method according to claim 9, wherein a displaced pressure plate (6) is returned to a starting position on the shaft (5) when the pressure plate (6) no longer provides vertically directed pressure onto the load (4), the starting position being at the centre of the shaft (5).

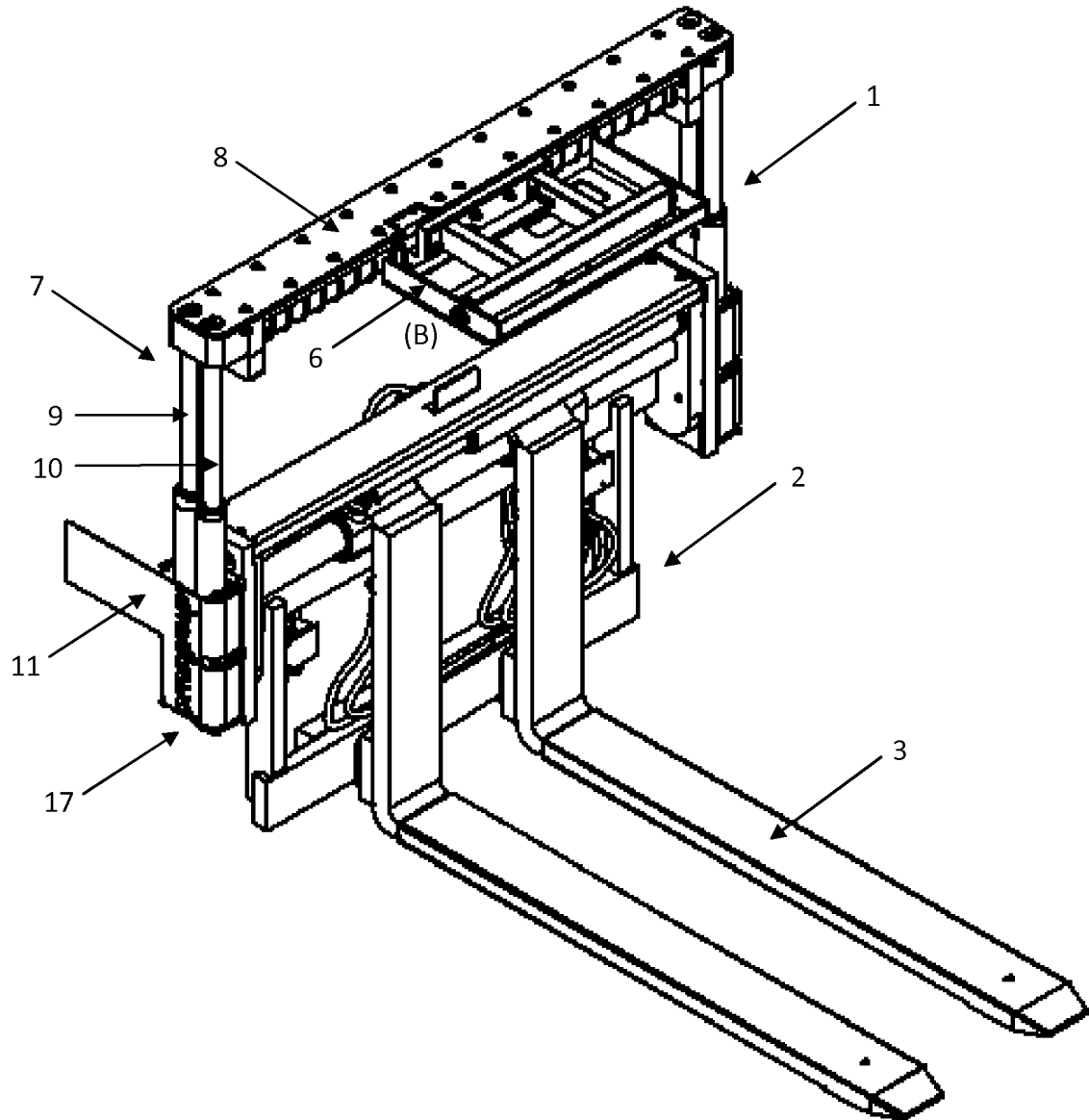


Fig. 1

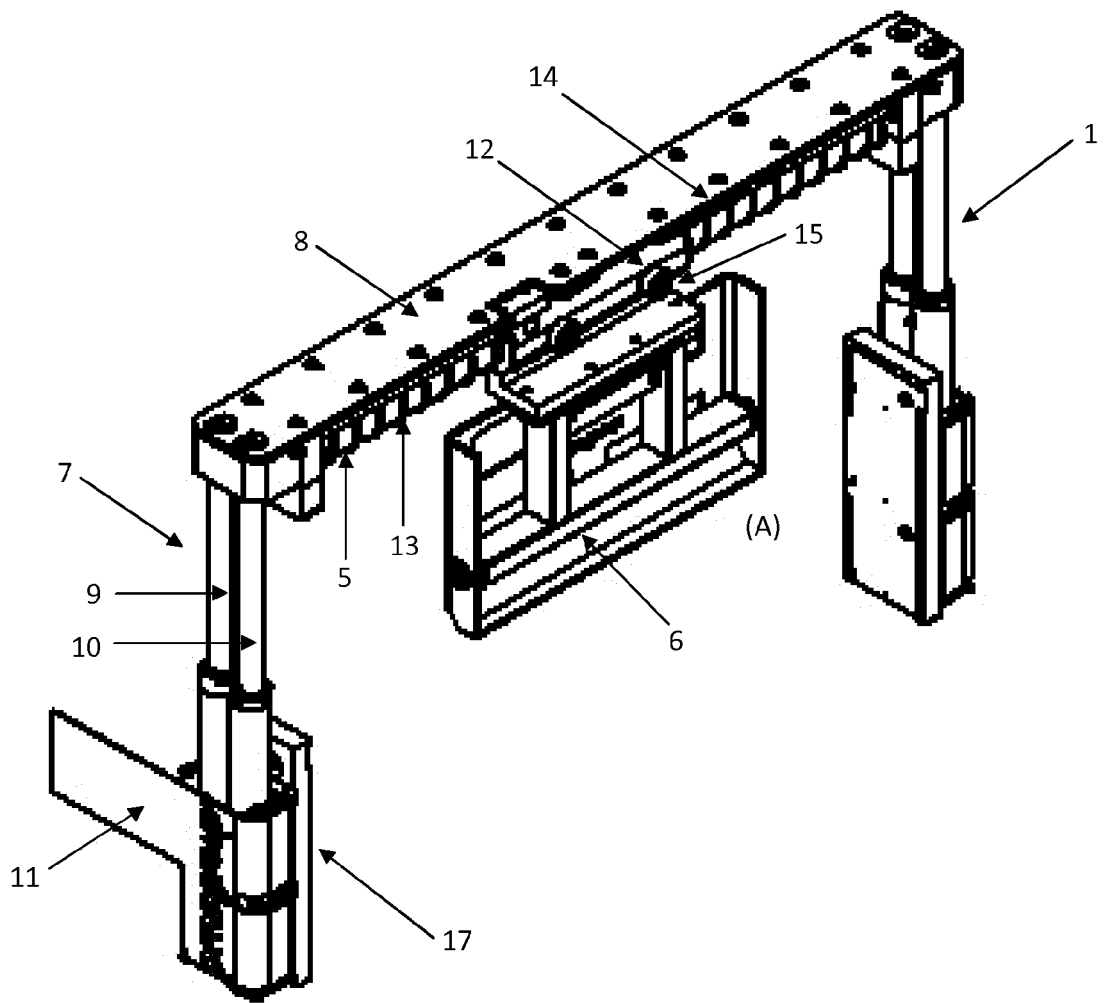


Fig. 2

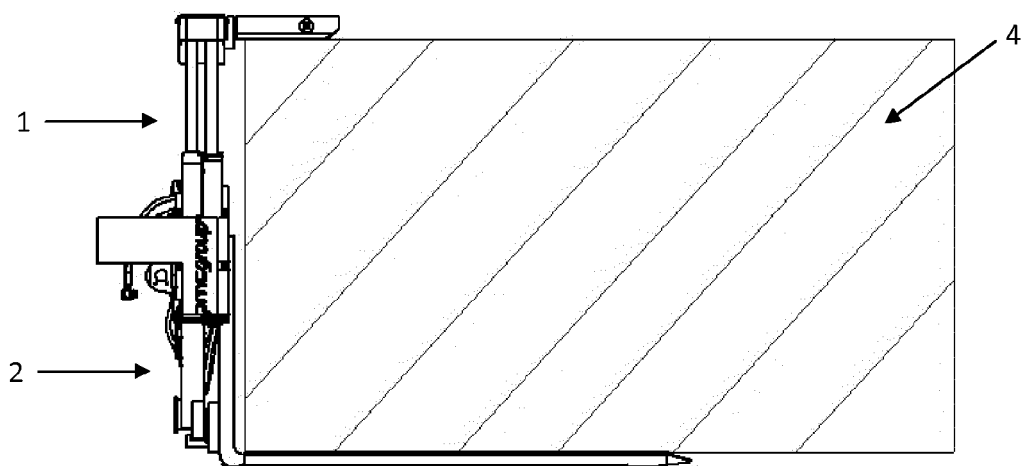


Fig. 3

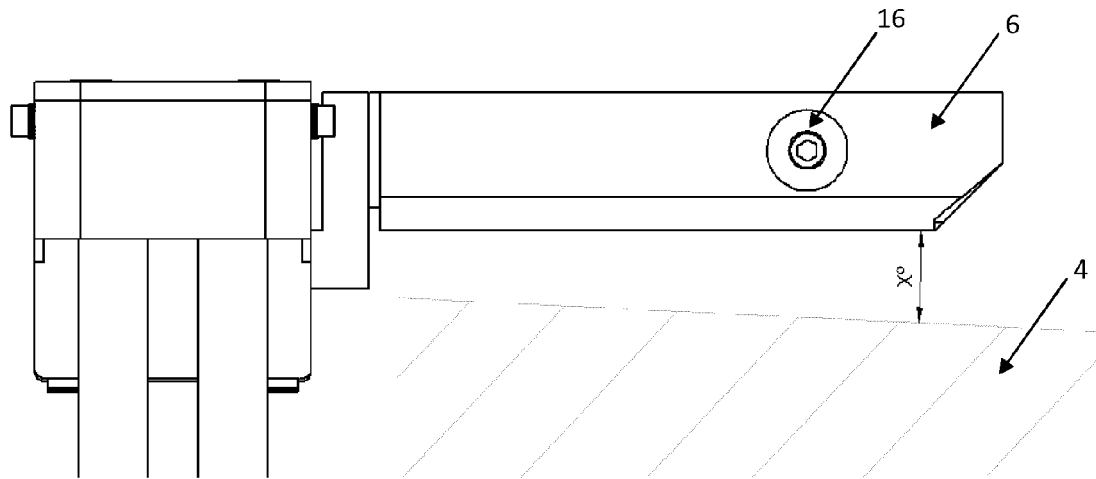


Fig. 4

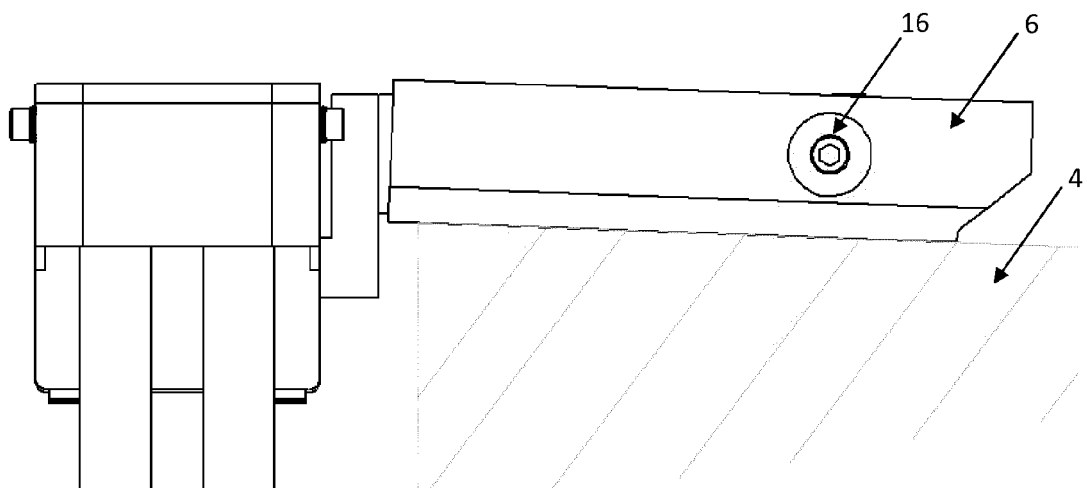


Fig. 5



EUROPEAN SEARCH REPORT

Application Number
EP 14 16 1603

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	JP 349 007 813 Y (UNKNOWN) 23 February 1974 (1974-02-23) * figures 1,2 *	1,5,9,10	INV. B66F9/14 B66F9/18
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A	EP 0 086 665 A1 (RODMAN S DEV COMPANY LIMITED [GB]) 24 August 1983 (1983-08-24) * abstract; figures 3,4 *	1,9	
			TECHNICAL FIELDS SEARCHED (IPC)
			B66F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		17 September 2014	Verheul, Omiros
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 14 16 1603

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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17-09-2014

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REFERENCES CITED IN THE DESCRIPTION

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