



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
02.09.2009 Bulletin 2009/36

(51) Int Cl.:
E04F 21/22^(2006.01) B25B 5/06^(2006.01)

(21) Application number: **08101991.1**

(22) Date of filing: **26.02.2008**

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MT NL NO PL PT RO SE SI SK TR
Designated Extension States:
AL BA MK

(72) Inventor: **Nørskov, Niels Erik**
7870 Råslev (DK)

(74) Representative: **Holme Patent A/S**
Vesterbrogade 20
1620 Copenhagen V (DK)

(71) Applicant: **Nørskov, Niels Erik**
7870 Råslev (DK)

(54) **A jaw clamp for assembling a deck of deck boards**

(57) A jaw clamp serves for moving an unsecured board (11;17) transversely along an underlying deck support (8;17) to a predetermined position on the deck support and for straightening warped or bowed deck boards on the deck support. The jaw clamp comprises a first jaw (2) attached to a bar (3), a second jaw (4) attached to a slide (5) on the bar, a handle lever (6) which is mounted on a transverse pivot (32) on the slide and partly is extending into a cavity (23) formed in the slide, a spring loaded ring (25) which is placed in said cavity and is encompassing the bar, and a pressure foot (36) attached to the handle lever for jamming the ring tight to the bar

by exerting a pressure upon the ring when pivoting the handle lever. The handle lever is divided up into a first separate lever arm (30) extending into the slide and a second separate lever arm (31) extending outwards from the slide. Each of the two separate lever arms is pivotally mounted upon the pivot, whereby the two separate lever arms have a first and second coupling part (34;39), respectively arranged for coupling the two arms together in at least two mutual angle positions. The handle lever can advantageously be positioned in desired operative angle positions in a plane preferable perpendicular to the deck support.

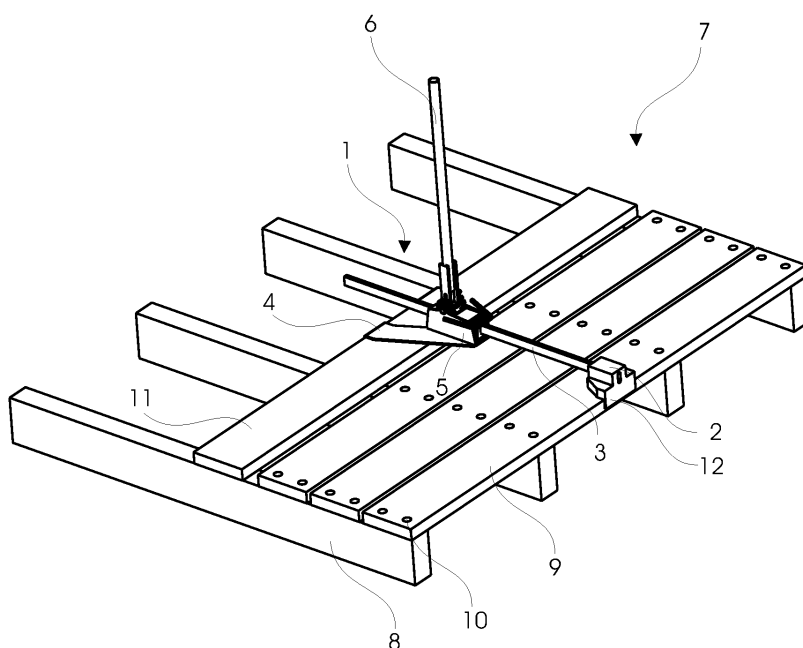


Fig. 1

Description

[0001] The invention relates to a jaw clamp for moving an unsecured board transversely on a underlying deck support to a predetermined position on the deck support and for straightening warped or bowed deck boards on the deck support.

[0002] The jaw clamp is comprising a first jaw attached to a bar, a second jaw attached to a slide on the bar, a handle lever which pivotally is mounted upon a transverse pivot on the slide and partly is extending into a cavity formed in the slide, a spring loaded ring which is placed in said cavity and is encompassing the bar, and a pressure foot on the handle for jamming the ring tight to the bar by exerting a pressure upon the ring when pivoting the handle lever.

[0003] Decks consisting of a number of boards are used as floors in for example buildings and terraces where the boards are attached to a number of underlying joists. The boards are for some applications abutting each other along their edges while there in other applications is a distance between the edges of the boards.

[0004] Positioning the boards correctly on the joists is normally a strenuous work since the deck is placed at a low level in relation to the operator, which therefore needs to stoop far down many times for assembling a deck of boards or alternatively to carry out the work down on knees.

[0005] Another problem consists in that warped or bowed boards are difficult or impossible to straighten out manually during assembling of the deck.

[0006] Many solutions to these serious problems of making deck boards have during the years been proposed.

[0007] US Publication No. 7144004 thus proposes a jaw clamp for clamping the boards of a deck together. The jaws of the clamp are screwed together by manually rotation a crank positioned in the same level as the deck. The operator therefore needs to stoop far down for being able to operate this known jaw clamp or need to perform the assembling operations on knees.

[0008] From US Publication No. 5527014 is known a deck board pushing and clamping device for pushing an unsecured board into contact with a board secured to one or more joists. An unsecured board is moved along the joists while the device simultaneously is clamped to the joists by manually turning a handle of the device. The handle is placed at a relatively low level implying that the operator also in this case need to stoop far down for operating the device or to perform the assembling operations on knees. The construction of this device moreover is complicated and costly.

[0009] US Publication No. 5190266 discloses an articulating assembly for straightening and installing of deck boards. The assembly has a generally vertical first arm member pivotally mounted to a pivot on a generally horizontal second arm member with a first jaw at one end and bearings for the pivot at the other end. The first arm func-

tions as a handle equipped with a second jaw arranged for during operation engaging the edge of deck board to be straightened. The assembly can be operated by the operator in standing position. The construction of the assembly allows however only limited mutual movements of the two jaws implying that only little warped or bowed boards can be straightened sufficiently out and that a not secured board only can be moved a little and often not a sufficient distance against a secured board.

[0010] The above-mentioned disadvantages of the prior art jaw clamps for moving an unsecured board transversely on a underlying deck support to a predetermined position on the deck support and for straightening warped or bowed deck boards on the deck support are according to the present invention remedied by, in a first aspect of the invention providing a jaw clamp operated by means of a handle lever which can be positioned in desired operative angle positions in a plane preferable perpendicular to the deck support,

in a second aspect of the invention providing a jaw clamp which is arranged for being operated by one hand only of the operator,

in a third aspect of the invention providing a jaw clamp which is arranged for being operated by the operator being in a standing position,

in a fourth aspect of the invention providing a jaw clamp capable for moving an unsecured board a distance on a underlying deck support large enough for placing the board at a predetermined position on the deck support, and

in a fifth aspect of the invention providing a jaw clamp capable for straighten out even large warped or bowed boards.

[0011] The novel and unique features of the invention whereby these features are achieved consist in the fact that the handle lever is divided up into a first separate lever arm extending into the slide and a second separate lever arm extending outwards from the slide, that each of the two separate arms pivotally is mounted upon the pivot, and that the two separate arms have a first and second coupling part, respectively arranged for coupling the two arms together in more mutual angle positions.

[0012] The second lever arm is, in the operative position of the jaw clamp, more or less upright so that the operator in standing position will be able to operate the jaw clamp by turning the second lever arm about the common pivot of the two lever arms by using one hand only. The working position of the second lever arm easily can be adjusted to a position well suited for the actual operator since the two lever arms can be coupled together in more angular positions.

[0013] The first coupling part on the first lever arm can, in an advantageous embodiment of the invention, consist of a disc with a number of incisions while the second coupling part on the second lever arm can consist of a spring loaded pin fitting into each of the incisions in the disc whereby the pin displaceable is mounted to the separate lever arm so that the pin optionally can engage or

disengage the respective incision. By disengaging the pin from one incisions and engaging it with another one can a desired new working position of the second lever arm be obtained.

[0014] The invention will be explained in greater details below where further advantageous properties and example embodiments are described with reference to the drawings, in which

Fig. 1 is a perspective view of a jaw clamp according to the invention being in one mode of operation in process of moving an unsecured deck board against deck boards secured to underlying joists,

Fig. 2 is a perspective view of the jaw clamp shown in fig. 1 being in another mode of operation in process of moving an unsecured deck board against deck boards secured to underlying joists,

Fig. 3 is a lateral view shown in a larger scale of a fragment of the jaw clamp shown in fig. 1 and 2 with some parts removed,

Fig. 4 is a view taken along the line IV - IV in fig. 3, and

Fig. 5 is a perspective view of a fragment of the jaw clamp shown in fig. 1 and 2 showing a handle lever of the jaw clamp in three of more possible operation positions.

[0015] In fig. 1 is seen a jaw clamp according to the invention generally denoted with the numeral 1. The jaw clamp comprises a first jaw 2 releasable attached to an end part of a bar 3, a second jaw 4 fixed to a slide 5 on the bar and a handle lever 6 for manually activating the jaw clamp.

[0016] The jaw clamp 1 is in fig. 1 used for assembling a deck 7 supported by four joists 8 and a number of deck boards of which four boards 9 already are secured to the joists by means of fasteners 10 while one board 11 still is unsecured.

[0017] The first jaw 2 is engaging an edge of the first board 9 in the row of secured boards 9 while the second jaw 4 is engaging an edge of the unsecured board 11.

[0018] Turning the handle lever 6 makes the slide 5 - by means of a mechanism being described later - to be displaced along the bar into a direction against the first jaw, since the bar during this operation is acting as a draw bar. The second jaw 4 attached to the slide therefore is drawing the unsecured board 11 to a predetermined position for being fastened here to the joists like the already secured boards 9.

[0019] The second jaw 4 is relatively broad for easily and securely being able to displace the unsecured board parallel to the secured boards.

[0020] The boards of the deck can be secured to the joists in positions where they, as seen in fig. 1, are separated with a space in between or, as seen in fig. 2, are

abutting each other.

[0021] The first jaw 2 has a hook 12 thin enough to fit into the space between each of two boards seen in fig. 1 so that the first jaw can engage an edge of each of the secured boards (not shown).

[0022] Fig. 2 shows the jaw clamp 1 shown in fig. 1 used for assembling another deck 13 supported by four joists 14 and a number of deck boards of which three boards 15 already are secured to the joists by means of fasteners 16 while one board 17 still is unsecured. The boards are, as can be seen, abutting each other in their secured positions.

[0023] The first jaw 2 has in this case been removed from the end part of the bar shown in fig. 1 for in fig. 2 releasable to be attached to the opposite end part of the bar. The first jaw is in this position leaning against a wall 18 while the second jaw 4 is engaging the unsecured board 17.

[0024] Turning the handle lever 6 makes the slide 5 to be displaced along the bar into a direction away from the first jaw, since the bar during this operation is acting as a thrust bar.

[0025] The second jaw 4 attached to the slide therefore is drawing the unsecured board 17 to a predetermined position for being fastened here to the joists 14 like the already secured boards 15.

[0026] The mode of operating the jaw clamp of the invention, shown in fig. 2 is especially useful when drawing an unsecured board placed close to a wall along the joists, e.g. the board closest to the wall.

[0027] The operator can easily operate the jaw clamp in a comfortable standing position and with one hand only since the handle lever is long and presents a large gearing. The jaw clamp is anyhow able to displace a board a relatively large distance along the joists by only repeating the turning of the handle lever a number of times. The large gearing also implies that the operator with minimal effort can straighten warped or bowed boards on the deck.

[0028] Some parts of the slide 5 have in fig. 3 and 4 been removed for being able to see the mechanism 19 for displacing the slide along the bar by turning the handle lever 6.

[0029] The slide 6 itself comprises a casing 20 and a first and second sliding bushing 21 and 22 which slidably are mounted on the bar 3. The two sliding bushings are preferably made of plastic or metal.

[0030] A first and second cavity 23 and 24 are formed in the casing 20. A first tilted plate formed ring 25, which is encompassing the bar 3, is placed in the first cavity 23 and a second tilted plate formed ring 26, which is encompassing the bar 3, is placed in the second cavity 24. A first compression spring 27 is acting between the first sliding bushing 21 and the first plate formed ring 25 and a second compression spring 28 is acting between the second sliding bushing 22 and the second plate formed ring 26.

[0031] The first plate formed ring 25 is, at the top seen

in the figures, abutting the second sliding bushing 22 while the second plate formed ring 26 is abutting a stop 29 on the casing.

[0032] The bar 3 and the two plate formed rings 25 and 26 are preferably made of hardened steel.

[0033] The handle lever 20 is divided up into a first separate lever arm 30 extending into the first cavity 23 in the casing 20 and a second separate lever arm 31 extending outwards from the slide 5. Both of the two separate lever arms are pivotally mounted upon a common pivot 32 arranged on the casing 20.

[0034] The first separate lever arm 30 consists of two pieces of plate 33, which each is formed with a semicircular coupling disc 34 with, in this case, seven incisions 35 and which mutual is connected with a rod 36 forming a pressure foot.

[0035] An end part of the second separate lever arm 31 is formed as two flat bars 37 having each a slit 38 for displaceable accommodating a traverse pin 39 which fits into each of the incisions 35 in the semicircular coupling discs 34 of the first separate lever arm 30. As best seen in fig. 4 is a compression spring 40 acting between the traverse pin 39 and a support 41 for the spring.

[0036] This construction makes it advantageously possible for the actual operator to set the handle lever 6 of the jaw clamp in a position in relating to the slide 5 in which said operator finds that he in the best possible way can carry out the assembling operation of a deck of boards. Another operator might set the handle lever in another position convenient for him.

[0037] Fig. 5 shows the jaw clamp of the invention with the handle lever 6 placed in three different positions in relating to slide 5. Seven different positions are in this case possible.

[0038] An operator can easily set the handle lever 6 in desired position in relating to the slide 5 by manually displacing the traverse pin 39 upwards seen in the figures in the slit 38 against the elastic force of the compression spring 40 so that the traverse pin 39 is disengaging the respective incision 35 in the semicircular coupling discs 34 of the first separate lever arm 30, then turning the handle lever and letting the elastic force of the compression spring 40 forcing the traverse pin 39 into engagement with a suitable other incision 35.

[0039] The first and second separate lever arms 30 and 31 together forms a rigid handle lever 6 when the traverse pin 39 is in engagement with one of the incision 35 in the semicircular coupling discs 34 of the first separate lever arm 30.

[0040] The pressure foot 36 will by turning the rigid handle lever 6 with a force swing about the pivot 32 whereby the pressure foot 36 will act upon the first plate formed ring 25 with a pressure which will tilt the first plate formed ring 25 further and thereby jam it tight to the bar.

[0041] There now is established a rigid connection between the first plate formed ring 25 and the bar 3 which therefore will be moved in relation to the slide when further turning the handle lever.

[0042] The second plate formed ring 26 cannot participate in the relatively movement of the bar 6 since it is kept in position in relation to the slide 5 by the second compression spring 28 and the stop 29 on the casing 20. The bar 6 therefore will be pulled through the second plate formed ring 26.

[0043] The second compression spring 28 and the stop 29 will however jam the second plate formed ring 28 tight to the bar 6 when stopping to turn the handle lever with a force or to turn it into the opposite direction thereby securing the position of the bar 6 in relating to the slide 5.

[0044] The secured position can easily be released by means of a press onto a pedal 42 attached to the top of the second plate formed ring 26. The press can comfortably be exercised by depressing the pedal with a foot.

Claims

1. A jaw clamp for moving an unsecured board (11;17) transversely along an underlying deck support (8; 14) to a predetermined position on the deck support and for straightening warped or bowed deck boards on the deck support, comprising

- a first jaw (2) attached to a bar (3),
- a second jaw (4) attached to a slide (5) on the bar,
- a handle lever (6) which is mounted on a transverse pivot (32) on the slide and partly is extending into a cavity (23) formed in the slide,
- a spring loaded ring (25) which is placed in said cavity and is encompassing the bar, and
- a pressure foot (36) on the handle lever for jamming the ring tight to the bar by exerting a pressure upon the ring when turning the handle lever,

characterized in,

- **that** the handle lever is divided up into a first separate lever arm (30) extending into the slide and a second separate lever arm (31) extending outwards from the slide,
- **that** each of the two separate lever arms pivotally is mounted upon the pivot, and
- **that** the two separate lever arms have a first and second coupling part (34;39), respectively arranged for coupling the two arms together in at least two mutual angle positions.

2. A jaw clamp according to claim 1, **characterized in that** the first coupling part (34) on the first separate lever arm consist of at least one semicircular coupling disc (34) with at least two incisions (35) while the second coupling part (39) on the second separate lever arm consist of a coupling pin (39) which can fit into each of the at least two incisions in the at least one semicircular coupling disc and displaceable is mounted to the second separate lever arm.

3. A jaw clamp according to claim 1 or 2, **characterized in that** the first separate lever arm (34) consists of two pieces of plate (33) formed each with the semi-circular coupling disc (34) and mutual connected with a rod forming the pressure foot (36). 5

4. A jaw clamp according to claim 1, 2 or 3 **characterized in that** at least an end part of the second separate lever arm (31) is formed as a fork with two prongs (37) having each a slit (38) for accommodating the coupling pin (39), whereby said slits are arranged in such way that the coupling pin is allowed to move in the slits between a coupling position where the pin is engaging one of the incisions (35) in each of the coupling discs (34) of the first separate lever arm (30) and an unengaged position where the two separate lever arms are allowed freely to swing in relation to each other. 10
15

5. A jaw clamp according to any of the claims 1 - 4, **characterized in that** the coupling pin (39) is loaded with the spring force of a spring (40) mounted on the second separate lever arm (31). 20

6. A jaw clamp according to any of the claims 1 - 5, **characterized in that** a second ring (26) loaded by a second spring (28) is encompassing the bar (3) and that the spring load of the second spring (28) is jamming said ring tight to the bar when the handle lever (6) is kept stationary in relation to the slide (5). 25
30

7. A jaw clamp according to claims 6, **characterized in that** a pedal (42) is attached to the second spring loaded ring (26) for by being pressed upon by means of e.g. the foot of the operator disengaging the second spring loaded ring (26) from being jammed tight to the bar (3). 35

8. A jaw clamp according to any of the claims 1 - 7, **characterized in that** the first and second spring loaded ring (25;26) each is formed as a disc with a trough opening, which when tilted about an axis in a start position not jammed tight to the bar (3) has a dimension crosswise the tilting axis corresponding to the dimension of the bar crosswise the tilting axis. 40
45

9. A jaw clamp according to any of the claims 1 - 8, **characterized in that** at least the second jaw (4) has a substantially larger width crosswise the bar than the slide (5). 50

10. An application of the jaw clamp according to claims 1 - 9 for moving a deck board into position on a deck and/or straightening out a warped or bowed deck board. 55

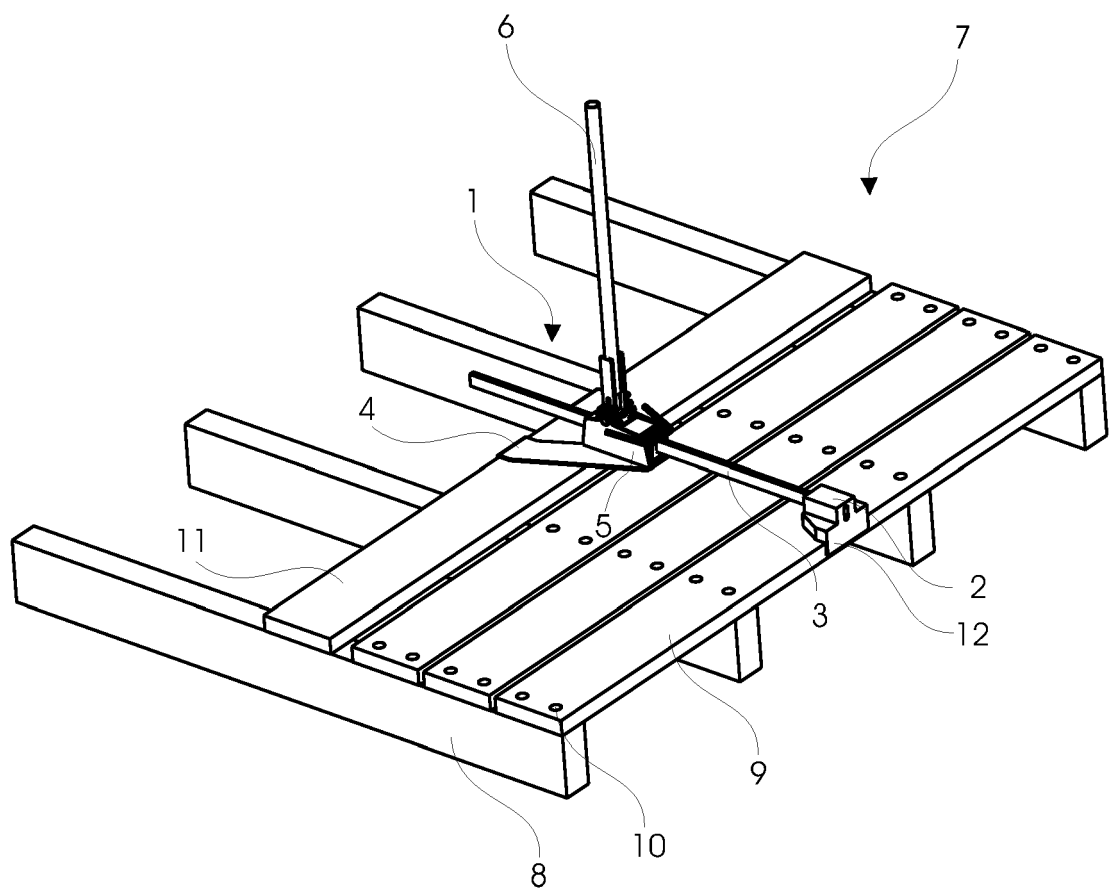


Fig. 1

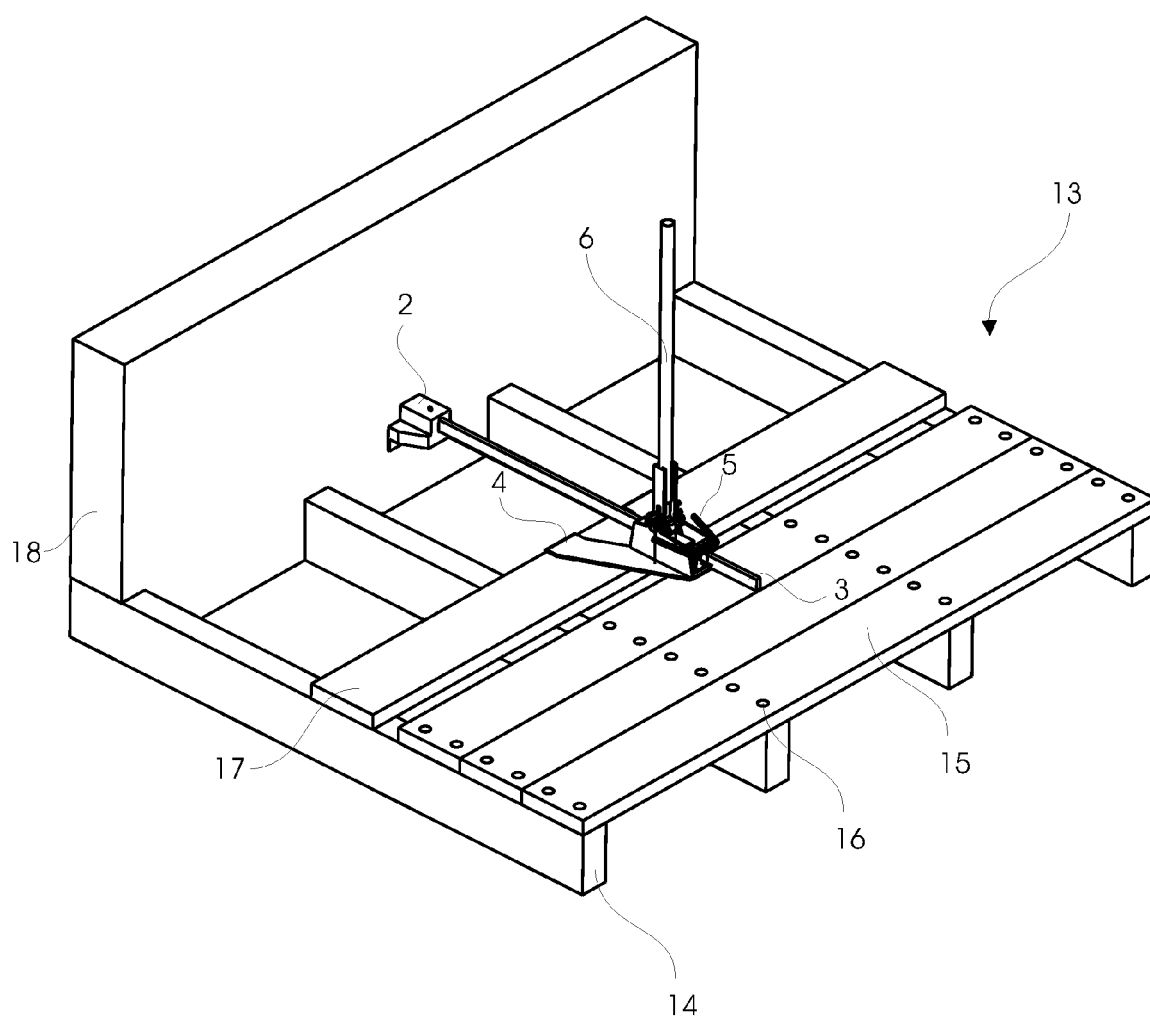


Fig. 2

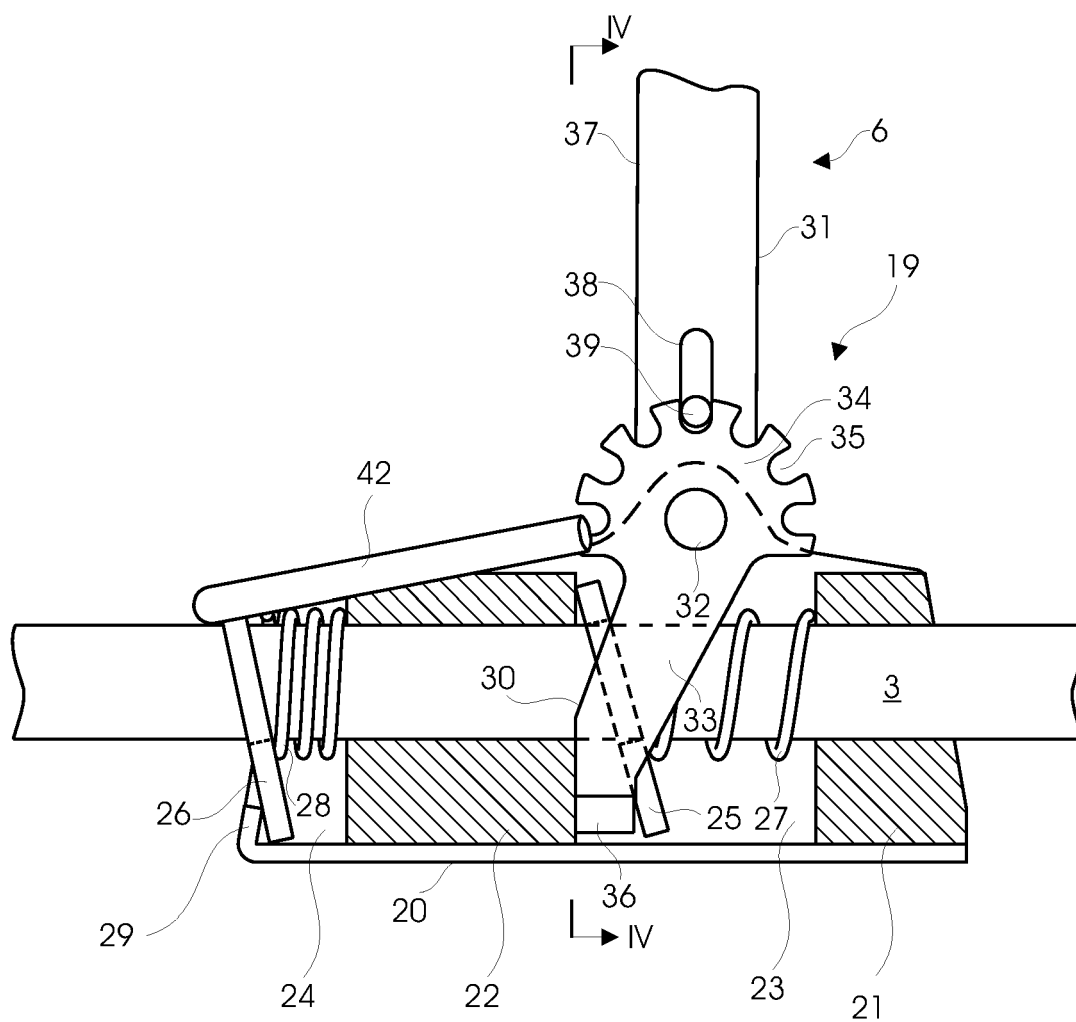
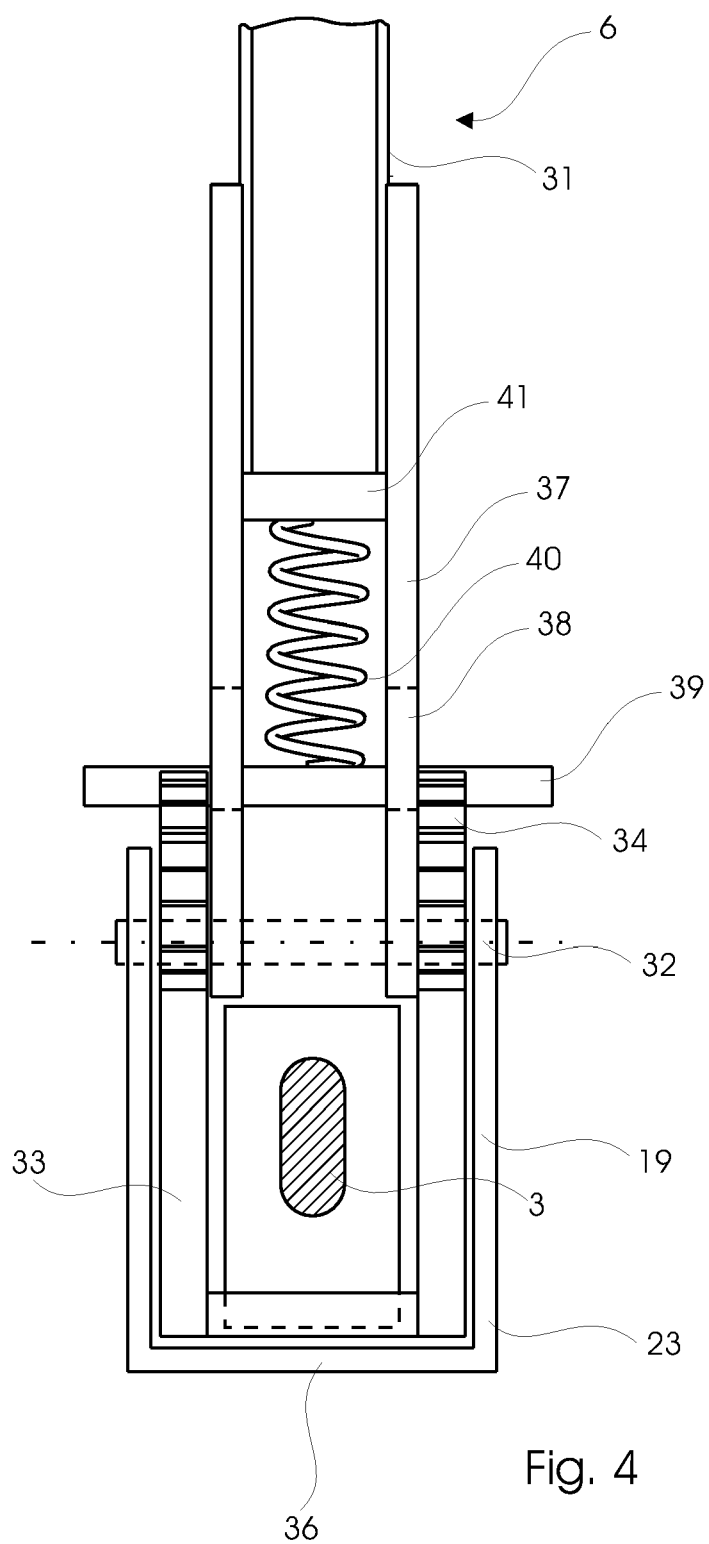


Fig. 3



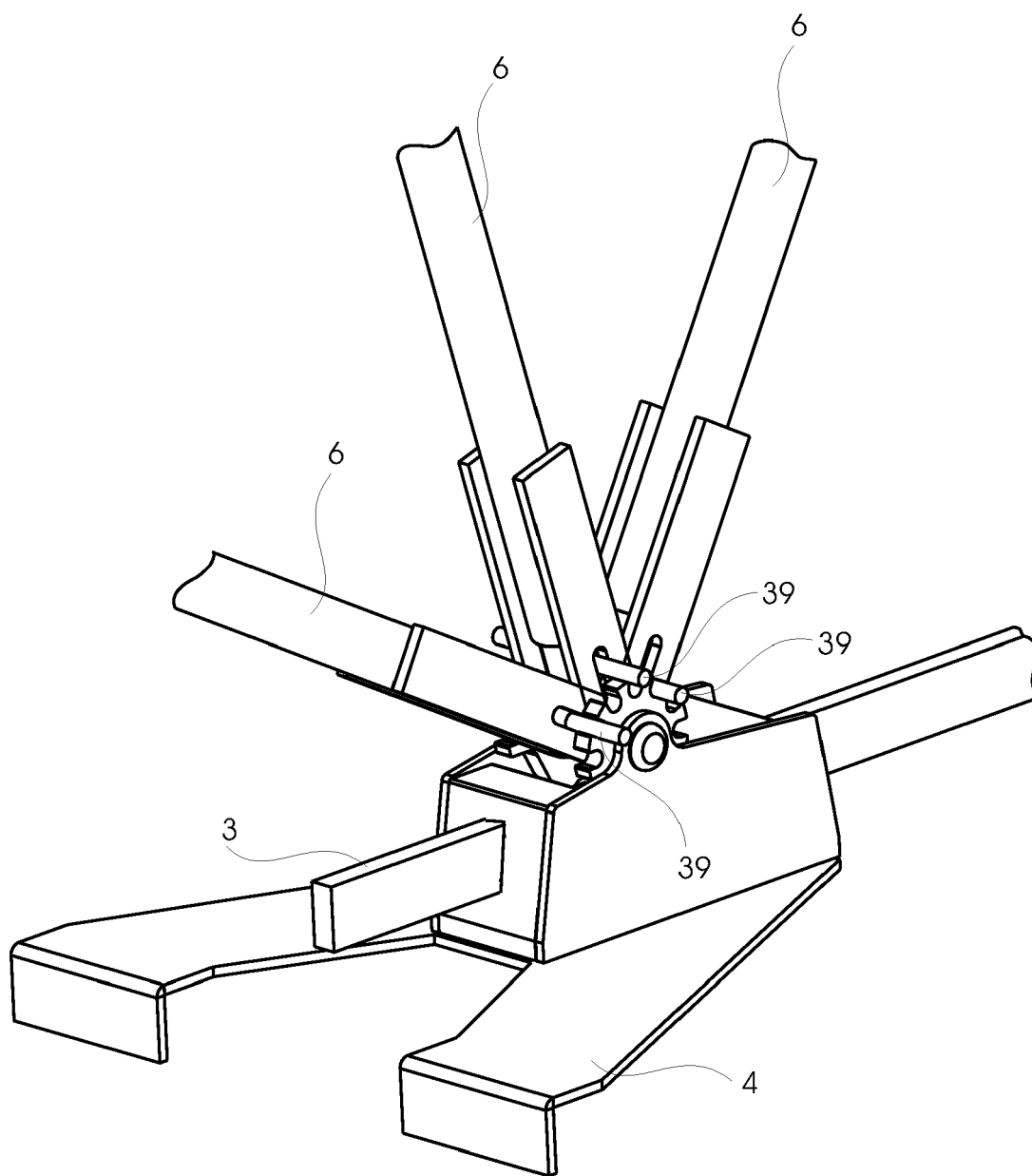


Fig. 5



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
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Place of search		Date of completion of the search	Examiner
The Hague		29 July 2008	Carmichael, Guy
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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