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(54) Device and method for connecting a hoisting mechanism to a tool

(57) A device (8) as well as a method for connecting a hoisting mechanism (3) to a tool (5), wherein the hoisting mechanism and the tool are each provided with a plate (10,15), which plates can be positioned opposite each other. The first plate (10) is provided with a pin (11), which can be positioned in an opening (17) in the second plate (15). The plates can be interlocked.

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Description

[0001] The invention relates to a device for connecting a hoisting mechanism to a tool.

[0002] The invention also relates to a method for connecting a hoisting mechanism to a tool.

[0003] In the prior art various vehicles are known that are provided with a hoisting mechanism to which a tool such as a grab, a pallet hook, a brick clamp, a tree clamp and the like can be connected.

[0004] In this way it is possible to use the hoisting mechanism for operating various tools and/or to use said tools with different hoisting mechanisms.

[0005] With the devices that are known so far, a person must manually effect the connection between the hoisting mechanism and the tool. This is a time-consuming and laborious operation.

[0006] The object of the invention is to provide a device by means of which a hoisting mechanism can be connected to a tool in a simple manner.

[0007] This object is accomplished with the device according to the invention in that the hoisting mechanism and the tool are each provided with a plate, which plates can be positioned opposite each other and be interlocked, the first plate being provided with a pin that can be positioned in an opening in the second plate.

[0008] In this way a person operating the hoisting mechanism can position the hoisting mechanism and the plate that is attached thereto opposite the plate that is attached to the tool and subsequently cause the pin to slip into the opening. By subsequently interlocking the plates, a connection between the hoisting mechanism and the tool is effected.

[0009] The plate provided with the pin(s) may be attached either to the hoisting mechanism or to the tool, and the plate provided with the opening(s) is attached to the tool or to the lifting device, respectively.

[0010] One embodiment of the device according to the invention is characterized in that the pin comprises a widened end on a side remote from the first plate, whilst the opening in the second plate comprises a widened portion that registers with said widened end and a narrower portion that joins said widened portion, wherein the plates can be connected by inserting the pin into the widened portion and subsequently moving the plates relative to each other until the pin is positioned in the narrower portion of the opening, with the widened portion of the pin being positioned on a side of the second plate that faces away from the first plate.

[0011] Using such a pin and such an opening, it is possible to effect a connection between the plates as well as an interlocking engagement of the plates by moving the plates relative to each other. Said positioning of the plates relative to each other as well as said moving of the plates relative to each other can be done by the operator of the hoisting mechanism.

[0012] Preferably, the plates are locked in position relative to each other after the pin has been moved into the narrower portion of the opening, so that the pin cannot unintentionally move out of the opening.

[0013] Another embodiment of the device according to the invention is characterized in that the first plate is provided with at least three pins arranged in a circle, whilst the second plate is provided with three openings that register with said pins.

[0014] By using at least three pins and openings that mate therewith, an adequate power transmission between the hoisting mechanism and the tool is effected, and a firm abutment between the plates can be effected.

[0015] Yet another embodiment of the device according to the invention is characterized in that one of the plates is provided with a centring pin, which can be centred in a centring opening in the other plate.

[0016] The centring of the plates relative to each other can be effected in a simple manner by means of the centring pin.

[0017] The centring pin is preferably centrally positioned between the pins that are present on the first plate so as to make it easier to position the centring pin in the centring opening and subsequently position the other pins in the openings.

[0018] The centring pin is preferably longer than the other pins, so that the centring pin can be inserted into the centring opening first before the other pins are inserted into the openings.

[0019] Yet another embodiment of the device according to the invention is characterized in that the centring pin has a conical end.

[0020] The conical end facilitates the insertion of the centring pin into the centring opening.

[0021] The invention will now be explained in more detail with reference to the drawings, in which:

Figure 1 is a side elevation of a vehicle provided with a hoisting mechanism and a tool, which can be connected by means of a device according to the invention;

Figure 2 is a larger-scale detail of the truck that is shown in figure 1, showing the device according to the invention;

Figure 3 is a perspective view of the device according to the invention, in which the plates are not connected;

Figure 4 is a perspective, sectional view of the device that is shown in figure 3, in which the plates are connected;

Figure 5 is a view of the device that is shown in figure 4.

[0022] Like parts are indicated by the same numerals in the figures.

[0023] Figure 1 is a side view of a truck 1 comprising a load platform 2 and a hoisting mechanism 3 mounted on the load platform 2. The hoisting mechanism 3 comprises a number of arms 4, which can be moved and be pivoted relative to each other by means that are known

per se, for example hydraulic means, enabling one end of the hoisting mechanism 3 to move and pivot in X-, Y- and Z-direction. Present on the load platform 2 of the truck 1 is a tool in the form of a grab 5. The grab 5 comprises a number of pivotally interconnected arms 6.

[0024] The end of the hoisting mechanism 3 is provided with a first part 7 of a device 8 according to the invention, which can be connected to a second part 9 of the device 8 according to the invention, which is attached to the grab 5.

[0025] Figure 2 shows the device 8 in more detail. The first part 7 comprises a plate 10, which is provided with a centring pin 11 and three pins 12 symmetrically arranged around said centring pin 11. The plate 10 is furthermore provided with a locking mechanism 13 comprising a locking pin 14 that extends parallel to the pins 12 and the centring pin 11. The second part 9 comprises a plate 15, which is attached to the grab 5 by means of spacers 16. The plate 15 is provided with a number of openings 17, 18, 19, which register with the centring pin 11, the pins 12 and the locking pin 14, respectively.

[0026] As figure 3 clearly shows, the pins 12 comprise a widened portion 20 spaced from the plate 10 and a narrower portion 21 extending between the plate 10 and the widened portion 20. The widened portion 20 has a spherical end on a side remote from the plate 10. The centring pin 11 is longer than the pins 12 and has a conical end 22 on a side remote from the plate 10. The locking mechanism 13 is provided with a sleeve 23, in which the locking pin 14 is movably accommodated. The locking pin 14 can be moved out of or into the sleeve 23 by means of a lever 24 that is pivotally connected to the sleeve 23.

[0027] The openings 18 in the plate 15 have a widened portion 25, into which the widened portion 20 of the pins 12 can be positioned, and a narrower portion 26 that joins said widened portion 25. The narrower portion 26 is so dimensioned that the narrower portion 21 of the pin 12 can easily move therethrough.

[0028] To connect the hoisting mechanism 3 to the tool 5, the operator of the truck 1 moves the hoisting mechanism 3 by means of the controls present on the truck 1 until the first part 7 that is attached to the end of the hoisting mechanism is positioned opposite the second part 9. Then the first part 7 is moved downwards until the conical end 22 of the centring pin 11 is positioned in the centring opening 17. Because of the conical shape of the end 22, the centring pin 11 can be inserted into the opening 17 without difficulty. Subsequently, the plate 10 is rotated about the centring pin 11 relative to the plate 15 until the widened portions 20 of the pins 12 are positioned opposite the widened portions 25 of the openings 18 and are subsequently inserted into said widened portions 25 by moving the plate 10 in the direction of the plate 15. Once the plate 10 abuts against the plate 15, the widened portions 20 of the pins 12 have been moved through the widened portions 25 of the openings 18 in their entirety. Then the plate 10 is rotated with respect to the plate 15 by the operator of the hoisting mechanism 3, in such a manner that the narrower portions 21 of the pins 12 are moved into the narrower portions 26 of the openings 18. The plates 10, 15 are now interlocked. To prevent accidental pivoting of the plates 10, 15 relative to each other during use of the tool 5, which may lead to the pins 12 moving out of the openings 18, the locking pin 14 is inserted into the opening 19 by means of the lever 24 of the locking mechanism 13, so that the plates 10, 15 are locked against movement relative to each other in a simple manner. Undesirable pivoting of the lever 24 can be prevented in a simple manner by means of a locking pin 27.

[0029] Once the plates 10, 15 are connected together, a hydraulic line of the hoisting mechanism may be connected to a hydraulic plant present on the grab 5, if desired, for operating the grab 5.

[0030] It is also possible, of course, to attach the first part 7 to the grab and to attach the second part 9 to the hoisting mechanism 3.

[0031] Furthermore it is possible to connect a pallet hook, a brick clamp, a tree clamp or another tool to the hoisting mechanism 3 instead of a grab 5.

[0032] It is also possible to provide a larger or smaller number of pins 12. Furthermore it is possible to have one of the pins 12 function as a centring pin, in which case said pin is preferably longer than the other pins 12.

[0033] It is also possible to lock the plates 10, 15 against movement relative to each other in a manner other than by means of the locking mechanism 13.

Claims

1. A device for connecting a hoisting mechanism to a tool, **characterized in that** the hoisting mechanism and the tool are each provided with a plate, which plates can be positioned opposite each other and be interlocked, the first plate being provided with a pin that can be positioned in an opening in the second plate.

2. A device according to claim 1, **characterized in that** the pin comprises a widened end on a side remote from the first plate, whilst the opening in the second plate comprises a widened portion that registers with said widened end and a narrower portion that joins said widened portion, wherein the plates can be connected by inserting the pin into the widened portion and subsequently moving the plates relative to each other until the pin is positioned in the narrower portion of the opening, with the widened portion of the pin being positioned on a side of the second plate that faces away from the first plate.

3. A device according to either one of the preceding claims, **characterized in that** the first plate is provided with at least three pins arranged in a circle, whilst the second plate is provided with three open-

ings that register with said pins.

4. A device according to any one of the preceding claims, **characterized in that** one of the plates is provided with a centring pin, which can be centred in a centring opening in the other plate.

5. A device according to claim 4, **characterized in that** the centring pin is centrally positioned between the pins on the first plate.

6. A device according to claim 4 or 5, **characterized in that** the centring pin is longer than the other pins.

7. A device according to any one of the preceding claims 4-6, **characterized in that** the centring pin has a conical end.

8. A device according to any one of the preceding claims, **characterized in that** the plates can be locked in position relative to each other.

9. A device according to claim 8, **characterized in that** the plates can be locked in position relative to each other by means of a locking pin positioned in a locking opening of a plate, which pin is attached to the other plate.

10. A method for connecting a lifting mechanism to a tool, **characterized in that** the hoisting mechanism and the tool are each provided with a plate, wherein at least said first plate is provided with a pin and said second plate is provided with an opening, which plates are positioned opposite each other, wherein the pin is inserted into the opening and the plates are subsequently locked in position relative to each other.

11. A method according to claim 10, **characterized in that** the pin comprises a widened end on a side remote from the first plate, whilst the opening in the second plate comprises a widened portion that registers with said widened end and a narrower portion that joins said widened portion, wherein the plates are connected together by inserting the pin into the widened portion and subsequently moving the plates relative to each other, so that the pin is positioned in the narrower portion of the opening, with the widened portion of the pin being positioned on a side of the second plate that faces away from the first plate.

12. A method according to claim 11, **characterized in that** the plates are locked in position relative to each other after the pin has been moved into the narrower portion of the opening.

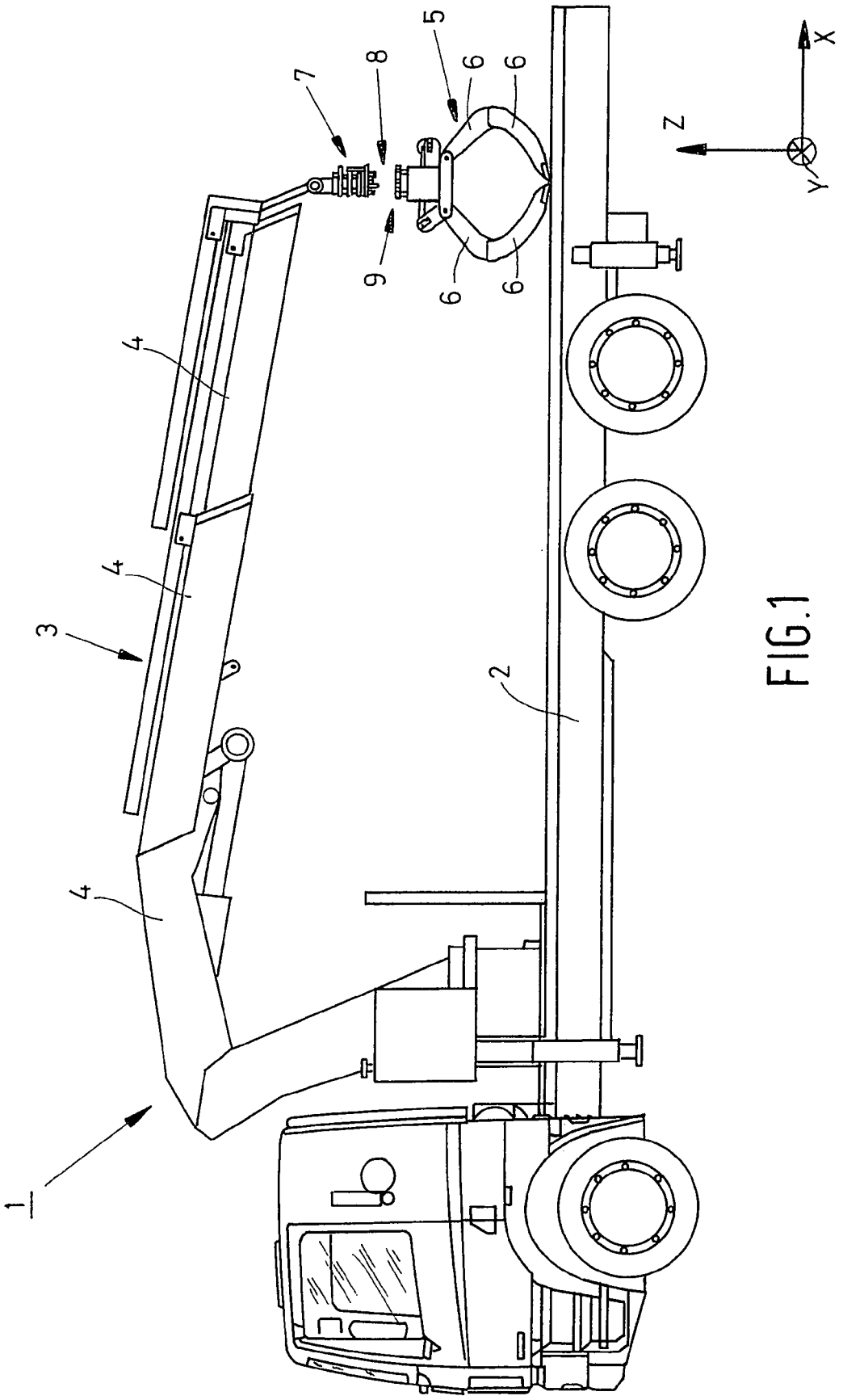

FIG.1

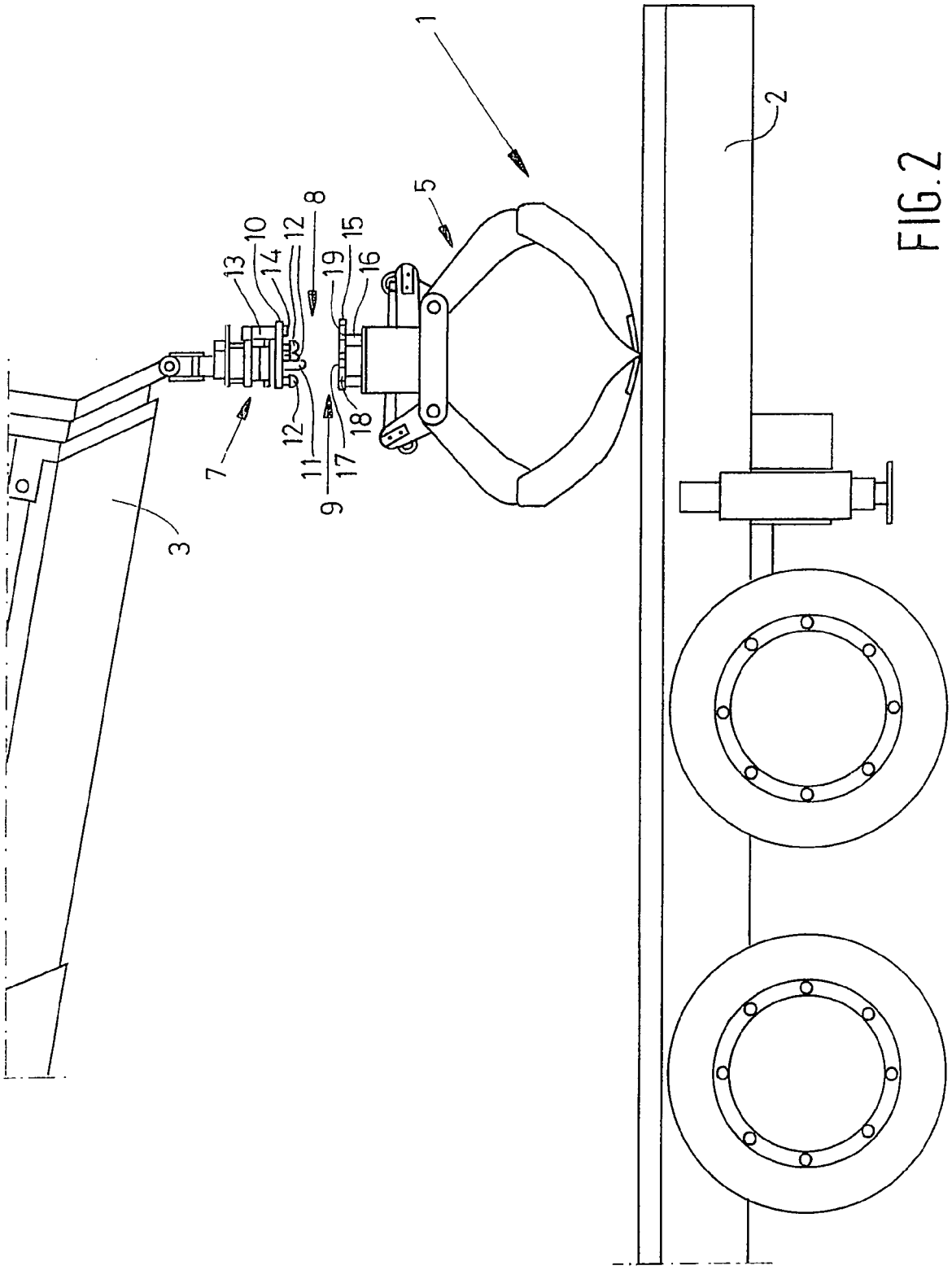

FIG.2

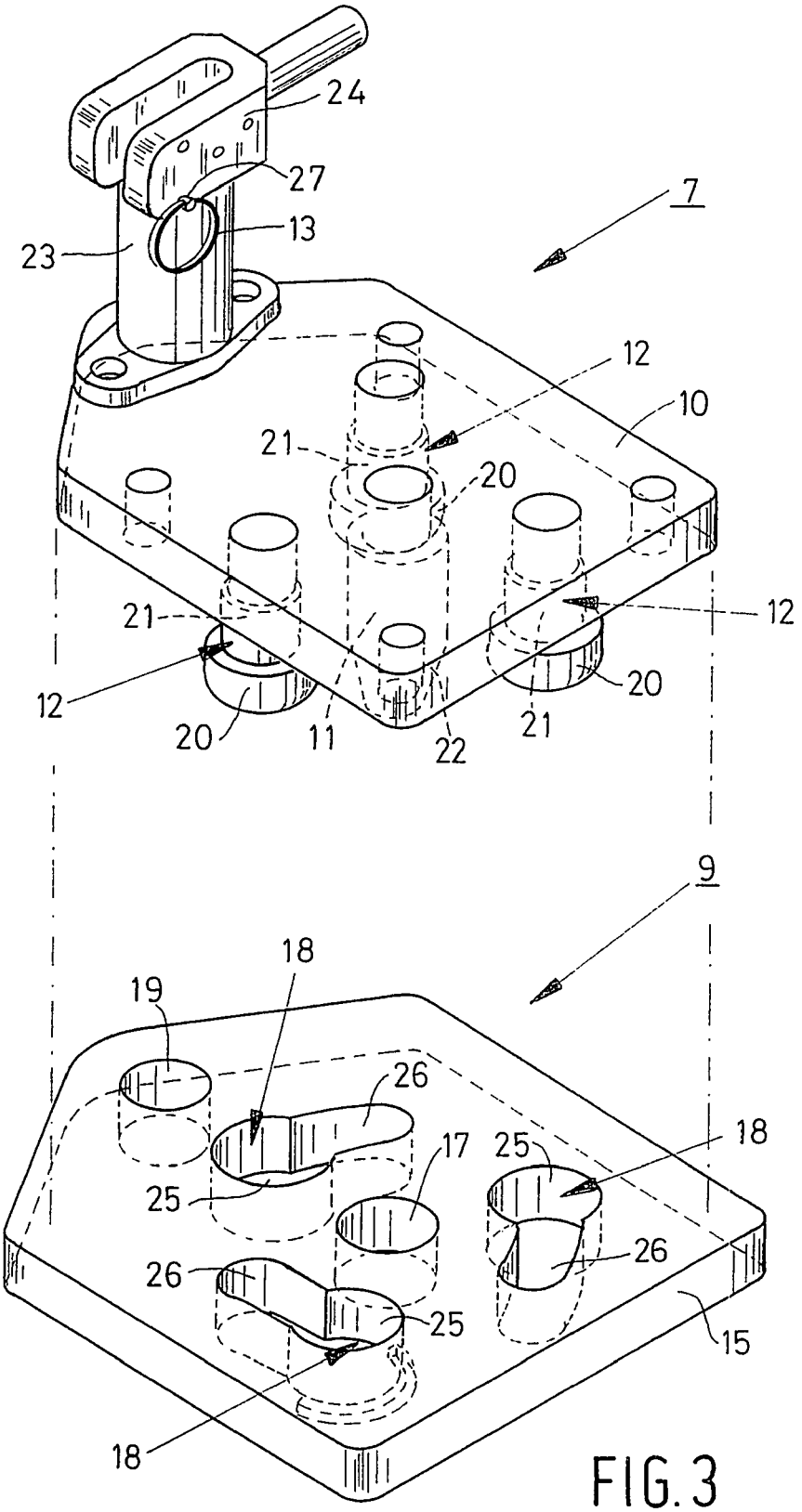
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FIG.3

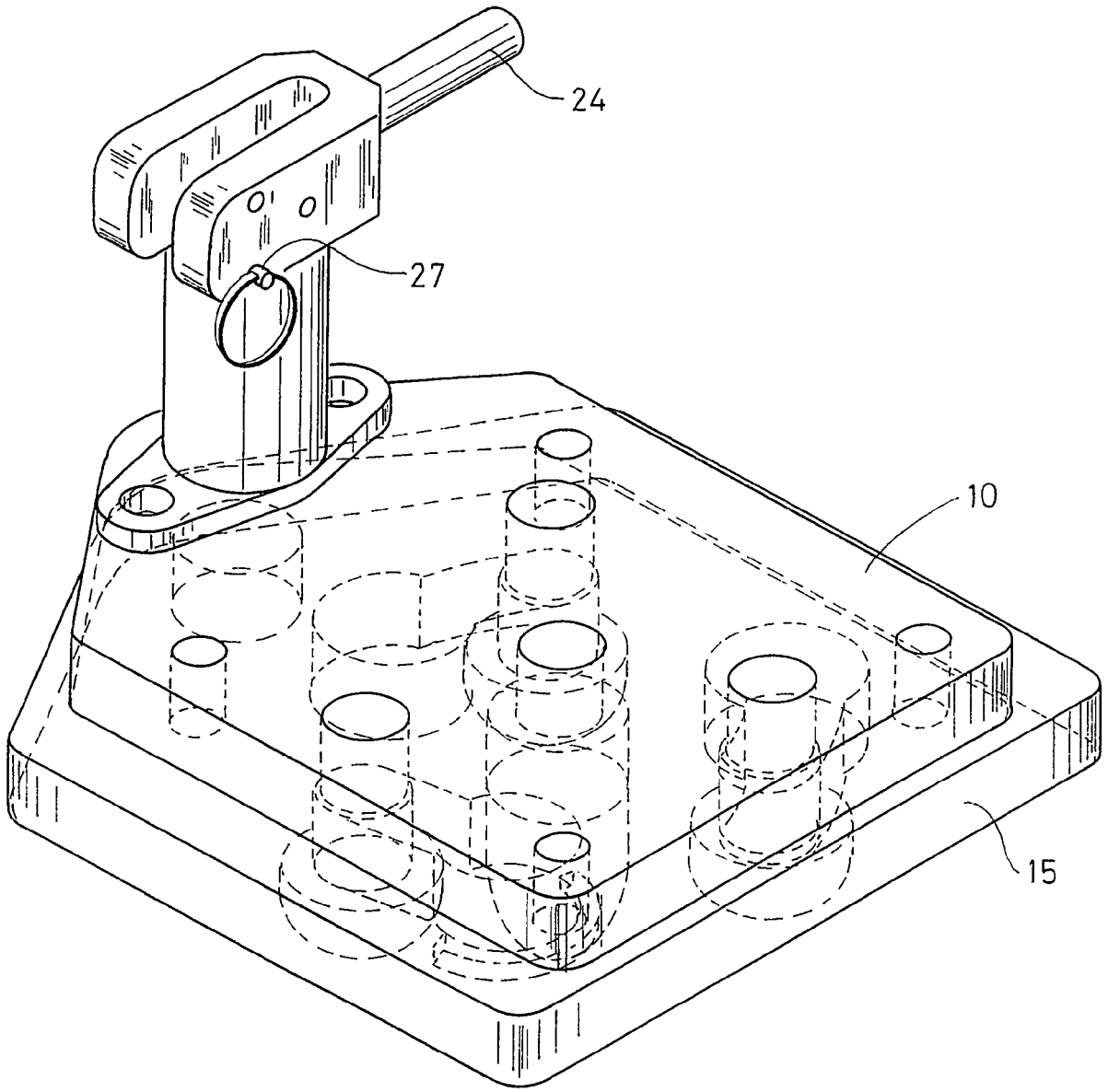

FIG. 4

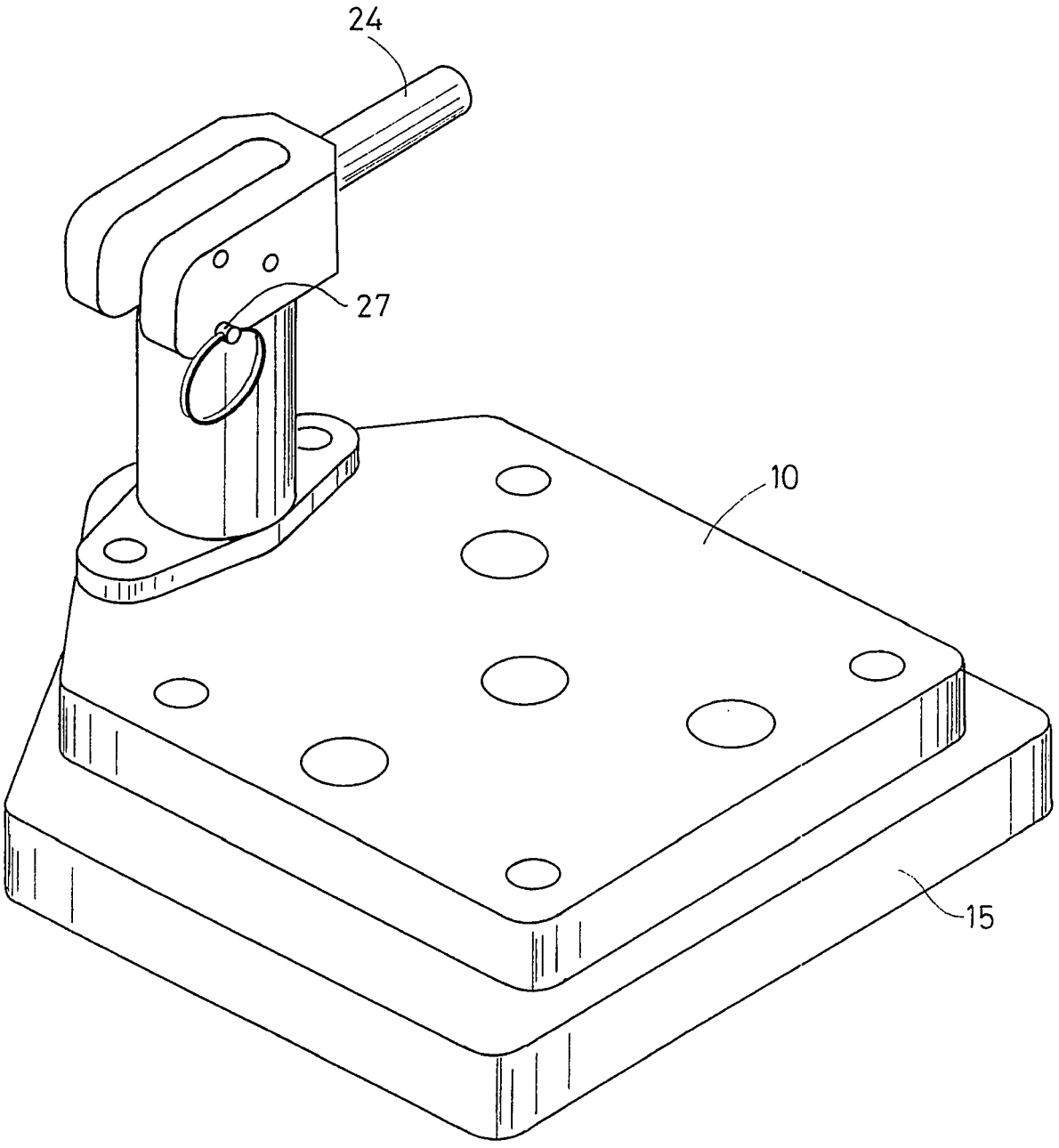

FIG. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 05 07 7762

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	US 5 141 386 A (BARWISE ET AL) 25 August 1992 (1992-08-25) * column 8, line 14 - column 10, line 10 * * figures 10-15 *	1-12	B66C3/00 E02F3/36
A	US 5 607 251 A (RAFN ET AL) 4 March 1997 (1997-03-04) * abstract * * figures *	1,3-7	
A	DE 297 10 009 U1 (BUEHLER, GEORG SEBASTIAN, 86922 ERESING, DE) 15 January 1998 (1998-01-15) * the whole document *	1	

TECHNICAL FIELDS SEARCHED (IPC)

B66C
E02F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	3 March 2006	Sheppard, B

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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03-03-2006

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US 5141386 A	25-08-1992	NONE	
US 5607251 A	04-03-1997	NONE	
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82