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(54) **Working device with coupling means for operatively coupling it to a vehicle**

(57) A working device, with coupling means for operatively coupling it to a vehicle, which means form a quick coupling, comprises, on a rear side of a bucket (1), a supporting plate (8) supporting a first portion of the constructional elements forming the quick coupling,

whereas a respective end portion of the vehicle arms has a further supporting plate (14), which is driven by a cylinder-piston unit (21), and supports a further portion of the quick coupling forming constructional elements.

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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a working device including coupling means for operatively coupling the working device to a vehicle.

[0002] As it is known in agricultural or construction machines it is frequently necessary to replace the operating equipment being used by another tooling to perform works of other types.

[0003] Nowadays, for example, the replacement of a working tool by another working equipment having different technical characteristics, for example a bucket supported by the free end portions of the lifting arms of the vehicle, is performed by mechanical operations, in which the vehicle operator must exit the vehicle cab for performing manual clutching operations, to mount and connect, in particular, hydraulic fluid supply and return tubes, by performing a lot of different manual operations.

[0004] Thus, the need of performing the mentioned manual operations makes the working tool replacement operation very complex, and it must be performed by skilled vehicle operators. Moreover, the above mentioned operations must be generally performed on the field, for an operating required time, thereby causing the operating machine to be undesirably stopped for a comparatively long period.

SUMMARY OF THE INVENTION

[0005] Accordingly, the aim of the present invention is that of allowing a working device, such as a bucket, a mower or the like to be easily disassembled, respectively reassembled, on a front side of lifting and lowering arms of an operating vehicle, in a quick and safe manner, without using tools and without compelling the vehicle operator to leave the vehicle.

[0006] The above mentioned aim is achieved by a working device including coupling means for operatively coupling said device to a vehicle, said coupling means forming a quick coupling, wherein on a rear side of a bucket is provided a supporting plate supporting a first portion of the constructional elements forming said quick coupling and wherein a respective end portion of said vehicle arms includes a further supporting plate, which can be driven by a cylinder-piston assembly, supporting a further portion of said constructional elements forming said quick coupling.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The subject matter of the present invention will be disclosed in a more detailed manner hereinafter, with reference to the accompanying drawings, where:

Figure 1 is a perspective view showing a working bucket assembled to the front portion of two arms

projecting from an operating vehicle;

Figure 2 is a side view showing the bucket with the front end portion of the supporting arm of the vehicle at the start of the assembling operation;

Figure 3 is a detail view showing a detail for receiving a female clutch assembly of a quick coupling, integral with the bucket;

Figure 4 is a side view showing the male clutch assembly of a quick coupling;

Figure 5 is a front view showing the female clutch assembly and a male clutch assembly of the quick coupling, during the assembling operation thereof;

Figure 6 is a detail view showing a detail related to a clearance recovery device.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0008] As is shown in figure 1, an interexchangeable bucket 1 is mechanically coupled to a front portion 2 of a plurality of arms included in a lifting and lowering assembly of an operating vehicle used, for example, in agricultural or constructional operations.

[0009] In figure 1 is shown a loading bucket 1 but it should be apparent that other devices or apparatus could also be provided, to be hydraulically operated and which, accordingly, require a quick coupling for operatively coupling the bucket of tooling 1 to a hydraulic central unit, of a per se known type, of the operating vehicle.

[0010] Figure 2 shows, in a side view, the bucket 1 including, on a rear side thereof, a per se known mechanism 3, having, for example, a seat 4 and a further seat 5, for providing a mechanical connection to a top cross element 6 and a bottom tubular element 7 of the front portion of the operating vehicle arms. The movable tool comprises a supporting plate 8 projecting from the rear wall of the bucket 1.

[0011] Said supporting plate 8 supports the constructional elements forming a female portion of a quick coupling, generally indicated by the reference number 9, said constructional elements being disclosed hereinafter in a more detailed manner with reference to figure 3.

[0012] Figure 3 is a detail view showing the supporting plate 8 projecting from the bucket 1.

[0013] Said supporting plate 8 supports the female type elements 11 of the quick coupling 1, two centering bushes 13 for centering respective pins and two floating support elements 12 coupling the plate 9 to the supporting plate 8.

[0014] As shown in figure 4, the arm 2 comprises, on a side thereof facing the plate 9, a further plate 14 including the male elements 15 of the quick coupling, which male elements can be coupled to the female elements 11; openings 13 for engaging therein locating pins 10 being moreover herein provided.

[0015] It is also possible to schematically see the clamping points or elements 25 to clamp respective sliding columns which, in figure 5, have been indicated by the reference number 16.

[0016] Figure 5 is a front view of the quick coupling before its connection operation.

[0017] It is clearly shown herein the plate 14 therefrom the centering pins 10 project as well as the male elements 15 of the quick coupling.

[0018] The assembly comprising the plate 14 is slidably supported by the supporting column 16.

[0019] Figure 1 also shows a leverage, generally indicated by the reference number 20 and which is actuated by a cylinder-piston unit 21 in turn controllably driven from the operating vehicle cab.

[0020] The leverage 20, as is better shown in figure 5, is actuated or driven by the cylinder-piston unit 21 and is operatively coupled to a bracket 22, integral with said supporting columns 16 operatively coupled to said plate 14.

[0021] Thus, by operating the piston 21, the plate 14, together with the male elements 15 and pins 10, may perform a translating movement (arrow f) toward the plate 9, thereby causing the components 10, 15 to be coupled to the female components 10, 13 (figure 3) thereby providing a fully assembled quick coupling.

[0022] Figure 6 shows the leverage 20 in an actuated position, that is in a condition thereof driven by the rod of the cylinder-piston unit 21.

[0023] The plate 14 together with the pins 10 and component elements 15 (figure 5) has been driven in the direction indicated by the arrow (f) in figure 6, and, accordingly, the female coupling assembly 9 has received the projecting elements of the male assembly 14, thereby the quick coupling will be assembled to properly operate.

[0024] Figure 6 shows a clearance recovery system, generally indicated by the reference number 30. This system comprises screws 31, washers 32, and being urged by inserting therein the centering pins 10 of the plate 14 in respective bushes 13 of the plate 9, thereby allowing a radial recovery of the mutual displacements of the two plates, to provide a perfect assembling.

[0025] After having mechanically connected the bucket 1, by assembling the cavities 4 and 5 with the tubular elements 6 and 7 of the front portion 2 of the vehicle arm, the cylinder-piston 21 unit is operated to cause the leverage to drive frontward the plate 14 and elements 15, 10 toward the plate 9, where is performed the coupling with the individual constructional elements 13, 11 forming the component elements of the female quick coupling.

[0026] It is herein particularly advantageous the fact that the movement or driving of the plate 14 is performed by the cylinder-piston unit 21 already used for providing a mechanical coupling of a chosen operating tool, for example the bucket 1 to the front portion 2 of the arms included in the lifting or rising and lowering assembly of an operating vehicle.

[0027] In particular, the movement of the plate 14 and related components 13, 15, 16 is achieved owing to the provision of the leverage generally indicated in figure 5 by the reference number 50.

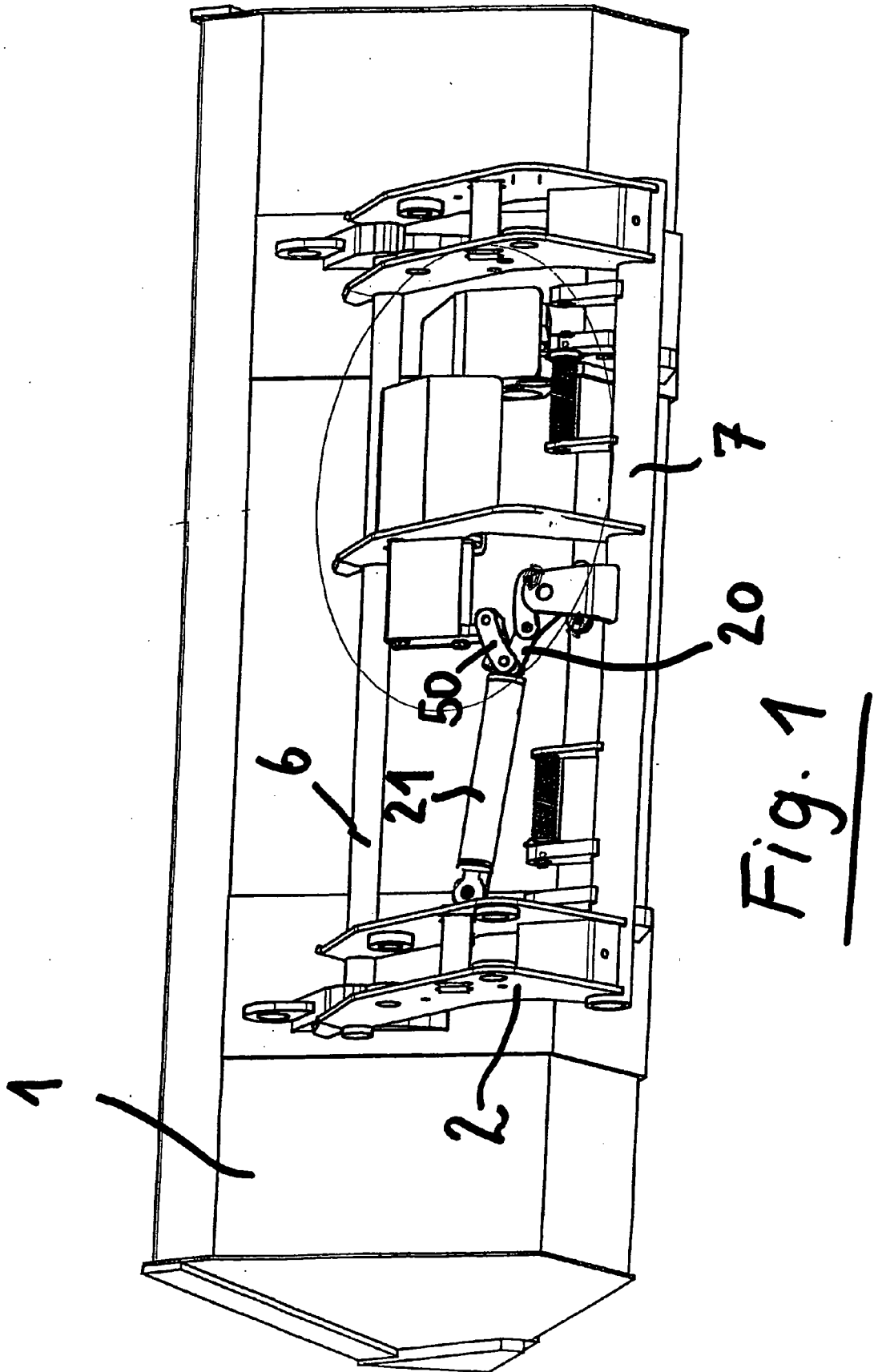
[0028] Advantageously, the translating movement or

sliding of the plate 14 and the components thereof is achieved without performing any rotary movements, owing to the provision of the supporting columns 16 sliding in corresponding bushings, schematically indicated by the reference number 26.

[0029] For disassembling the bucket 1, the components of the assembly 9 and those of the assembly 10 are disengaged, thereby allowing to easily disassemble the bucket 1 or other operating means.

Claims

1. A working device, with coupling means for operatively coupling said working device to an operating vehicle, which coupling means form a quick coupling, **characterized in that** on a rear side of said bucket (1) is provided a supporting plate (8) supporting a first portion of the constructional elements (13, 11) forming said quick coupling, and that a respective end portion of the operating vehicle arms (2) supports a further plate (14), which can be driven by a cylinder-piston unit (21), which supporting plate (14) supports a further portion of the constructional elements forming said quick coupling.
2. A working device, according to claim 1, **characterized in that** said plate (14) is driven by a driving piston (21) provided for mechanically locking the bucket (1) by a locking leverage (50) arranged between said cylinder-piston unit (21) and a support (22) of supporting columns (16).
3. A device according to claim 1, **characterized in that** said movable plate (14) is supported through bushings (13) by parallel supporting columns (16).



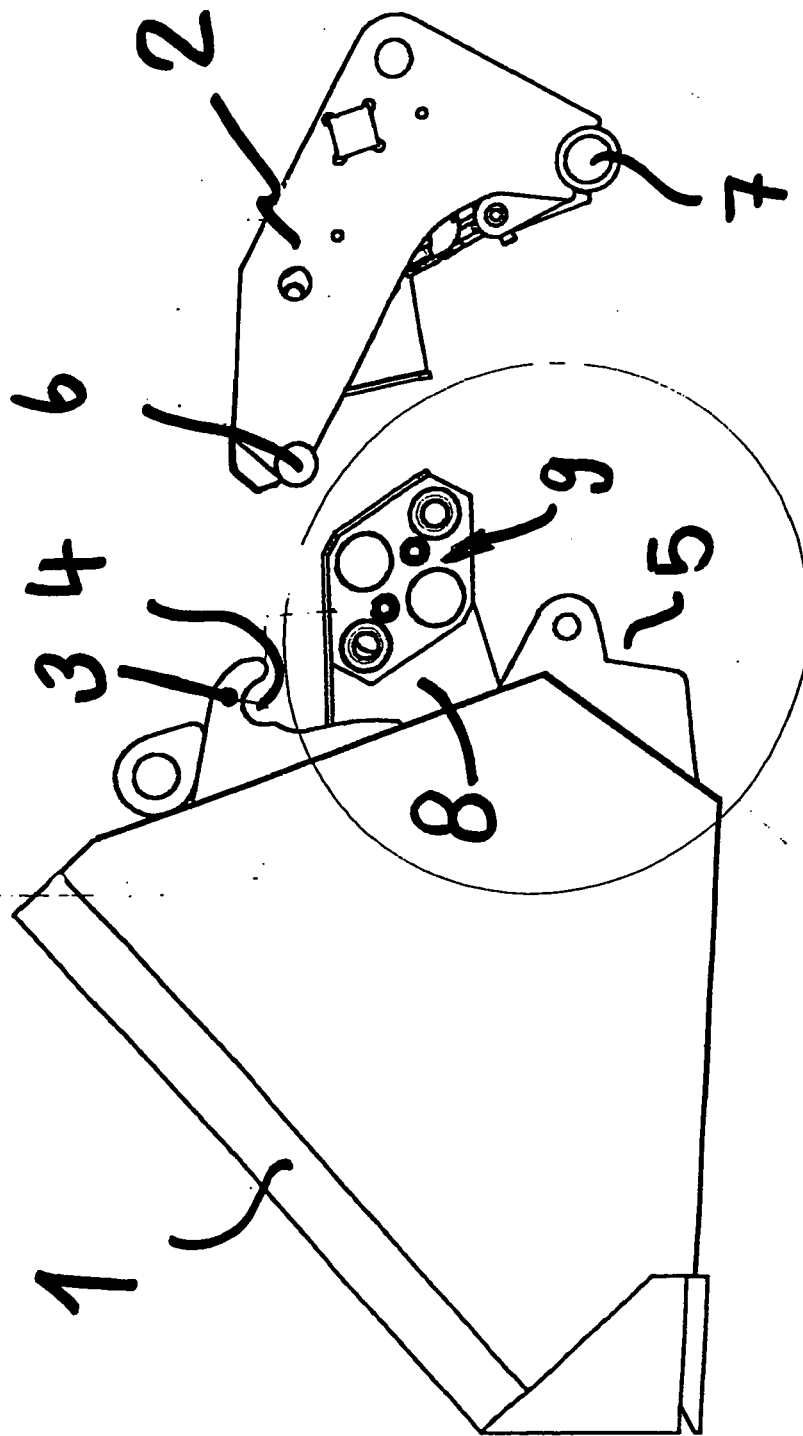
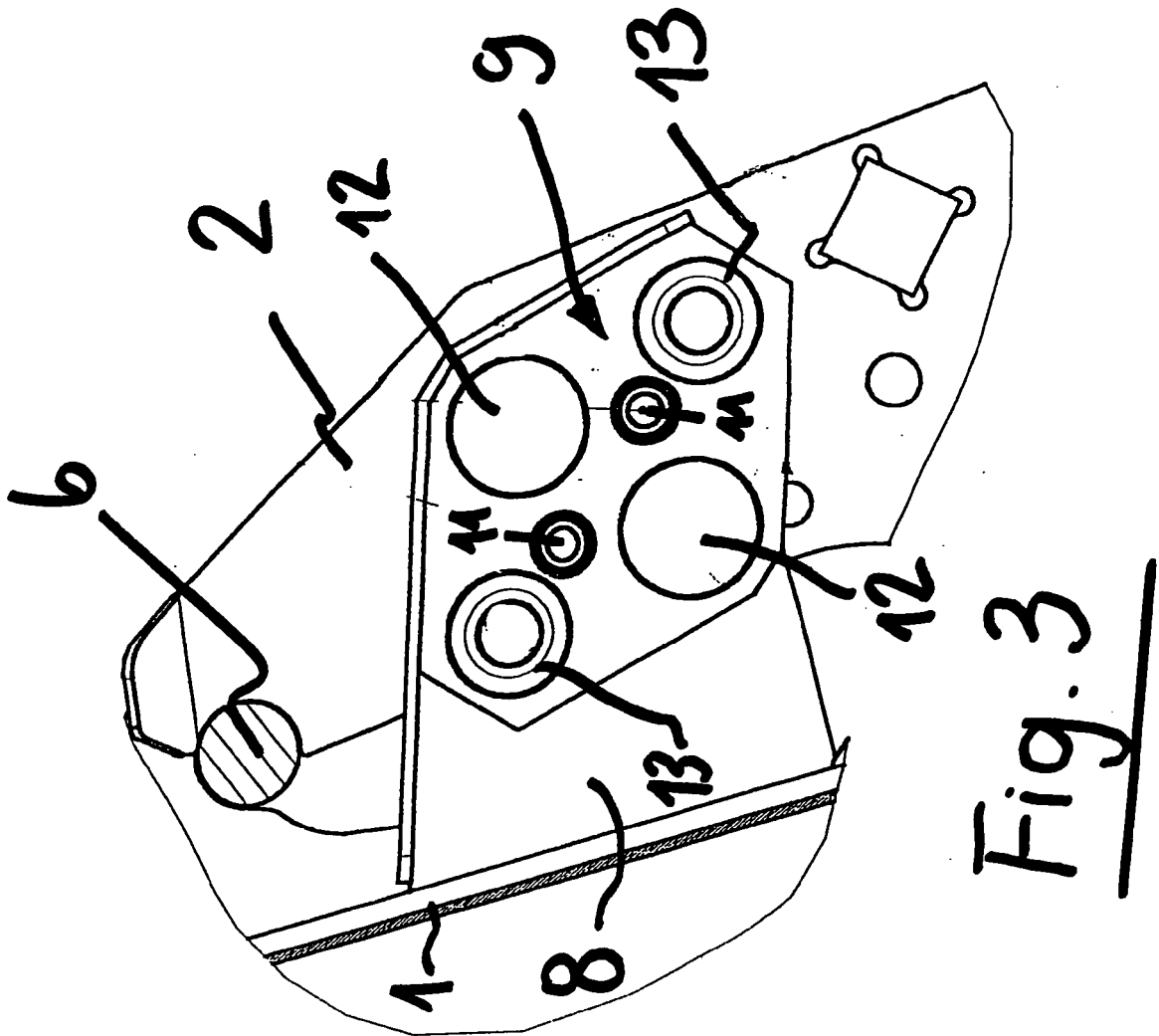


Fig. 2



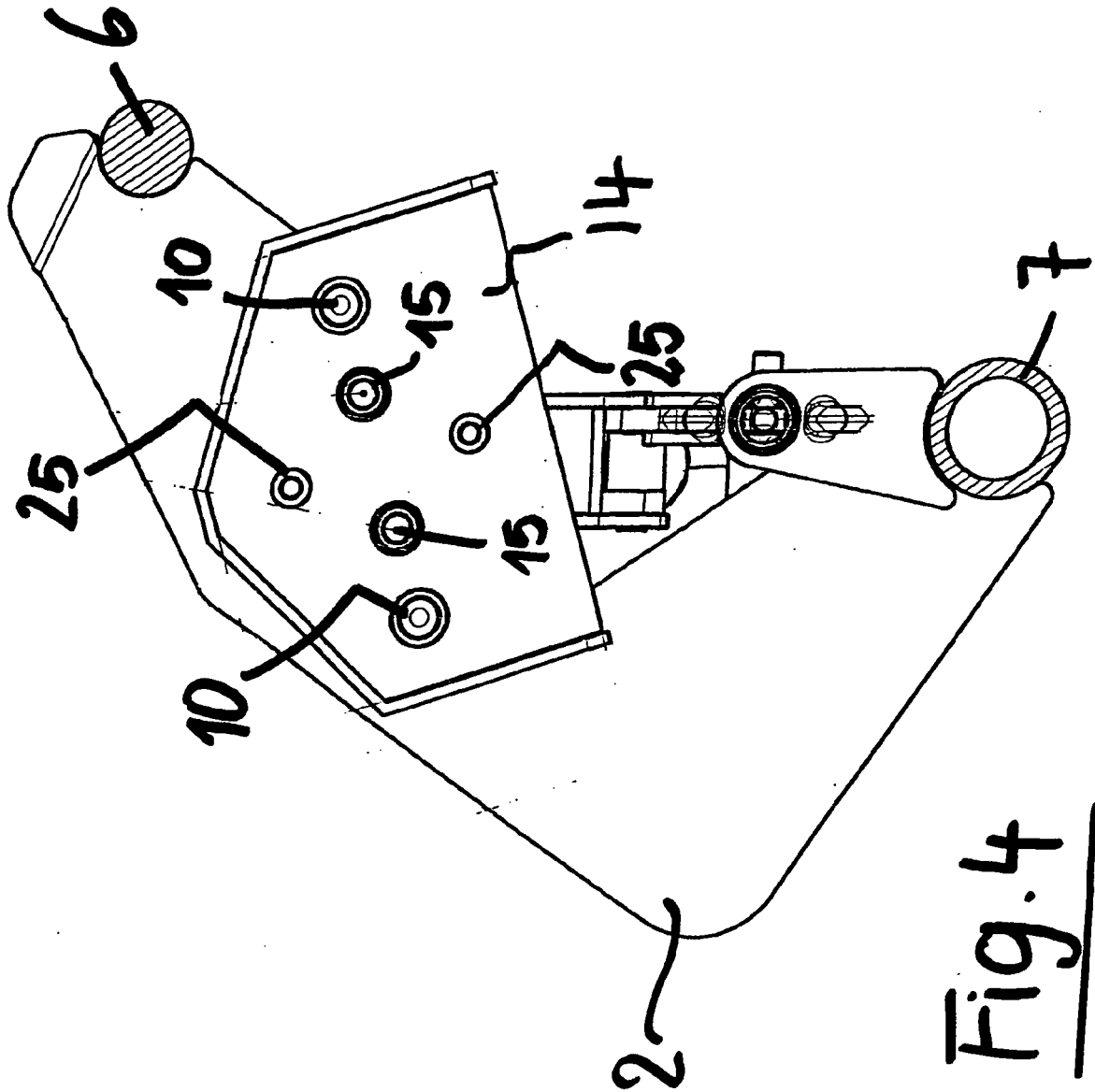


Fig. 4

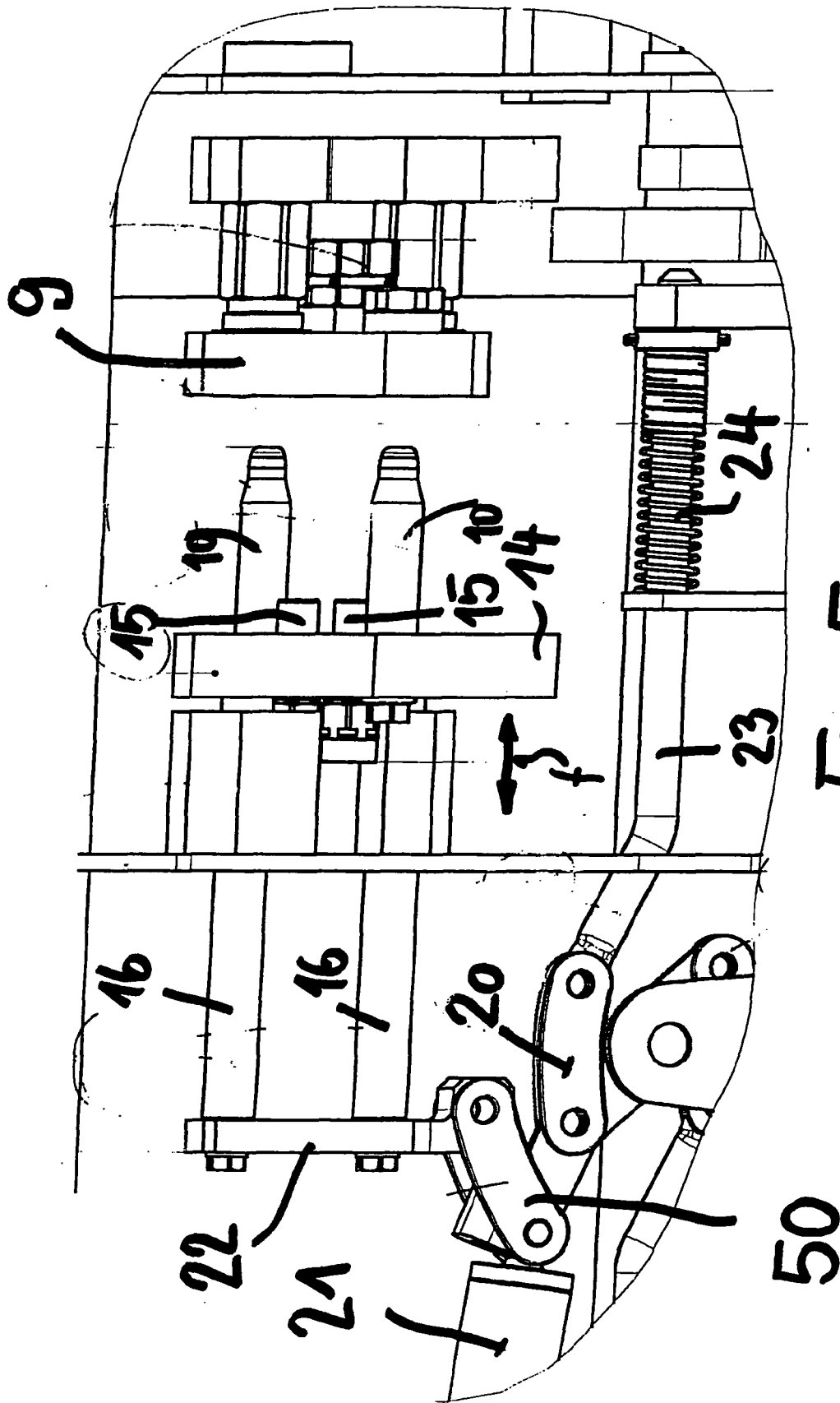


Fig. 5

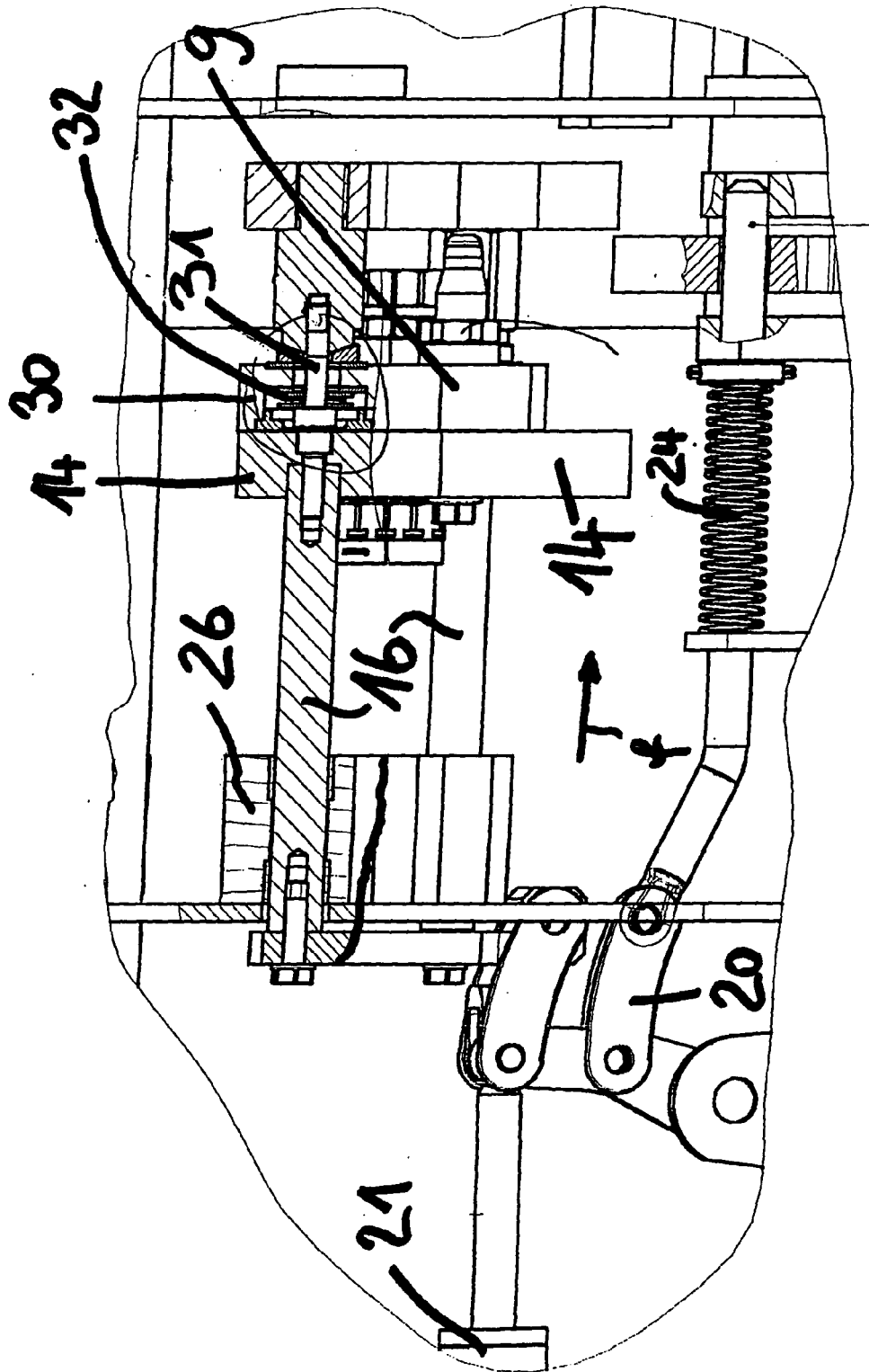


Fig. 6