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(54) **Railway surveying assembly**

(57) A railway surveying assembly (4) is shown, comprising surveying and measuring means and a support (5) for said surveying and measuring means. The support is provided with mounting means for detachably attach-

ing it to the buffers (2) of a railway vehicle (1). Preferably, the railway surveying assembly is of a modular construction, with a central support frame and housings (6,7) attached thereto.

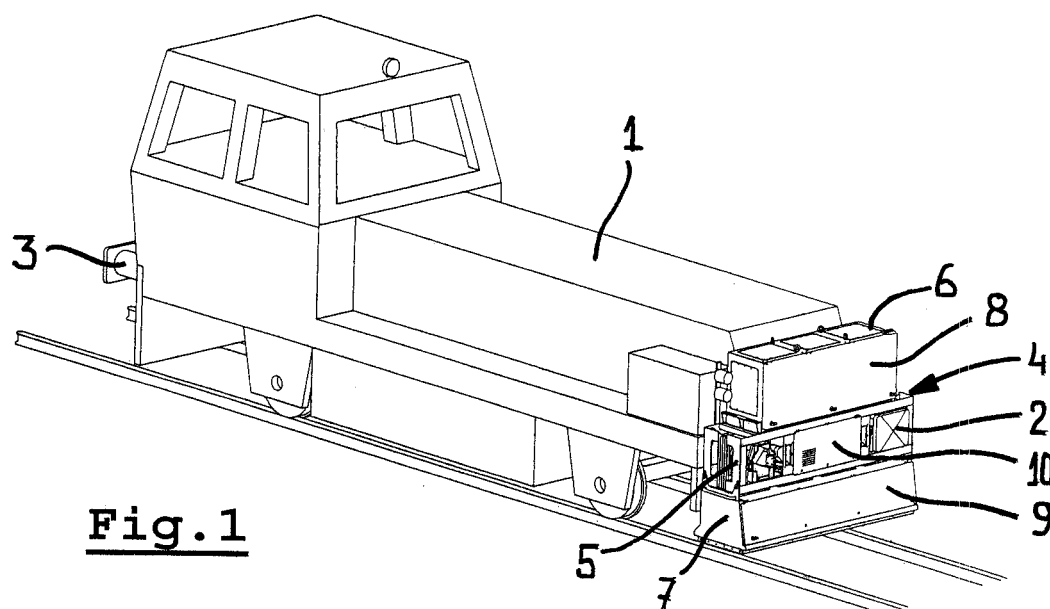


Fig.1

Description

[0001] The invention relates to a railway surveying assembly, comprising surveying and measuring means and a support for said surveying and measuring means.

[0002] For safeguarding the safety of a railway system a regular survey of its components, such as the survey of the integrity of points, compensation welds, attachments and rails, is an important factor. It is known, for an automated survey, to use a railway surveying assembly which is an integral part of a specially designed railway vehicle. It will be evident, that using such a specially designed railway vehicle renders the surveying process expensive. Furthermore the relocation of such a specially designed railway vehicle from one part of the railway system already surveyed towards another part still to be surveyed is complicated and time-consuming.

[0003] It is an object of the present invention to provide an improved railway surveying assembly of the type referred to above.

[0004] Thus, in accordance with the present invention, a railway surveying assembly, comprising surveying and measuring means and a support for said surveying and measuring means, is characterised in that the support is provided with mounting means for detachably attaching it to the buffers of a railway vehicle.

[0005] Such a railway surveying assembly basically may be attached to any railway vehicle which is provided with buffers. This means, that no specially designed (and thus expensive) railway vehicle is needed and that for surveying a specific part of the railway system a railway vehicle may be used which is already present at or near said part of the railway system, thus eliminating the need for relocating such a specially designed railway vehicle. Moreover, because the railway surveying assembly in accordance with the present invention is detachably attachable to the buffers of a railway vehicle, it can be replaced by another railway surveying assembly, of which the surveying and measuring means are best fit for performing the specific surveying task (for example inspecting the integrity of points, measuring the distance between the rails, etcetera). This makes the railway surveying assembly extremely versatile.

[0006] In accordance with a preferred embodiment of such a railway surveying assembly, each mounting means comprises clamping means for clampingly surrounding the neck of the respective buffers. The neck of said buffers offers a large area of contact which may be used for realising a firm attachment of the railway surveying assembly to the railway vehicle. The enlarged head of the buffers remains free, such that the buffers, notwithstanding the surveying assembly attached thereto, still can perform their buffering task, if needed. This means that, generally, the position at which the railway surveying assembly is attached to the buffers of a railway vehicle, will be such that the normal operation of said buffers will not be hampered, that means that they still will be able to move relative to the railway vehicle when

hitting a foreign object.

[0007] When, in accordance with another preferred embodiment, the clamping means comprise an upward jaw fixedly connected to the support and a lower jaw which is movable between a release position in which the respective buffer can be moved between the two jaws or away from therebetween, and a locking position in which the respective buffer can be locked between the two jaws, mounting and dismounting the railway surveying assembly in accordance with the present invention can be carried out very quickly. With the lower jaw positioned in its release position, the railway surveying assembly can be manipulated in such a manner that the upper jaw is rested upon the neck of the respective buffer; thereafter the lower jaw is moved towards its locking position, as a result of which the neck of the respective buffer is firmly clamped between the upper jaw and lower jaw, thus fixing the position of the railway surveying assembly relative to the buffer, and thus relative to the railway vehicle. For removing the assembly the reverse order of steps can be carried out.

[0008] Preferably, in such an embodiment, the jaws are connected by quick-release couplings. Such quick-release coupling eliminate the need for specialised equipment, thus further simplifying the mounting and dismounting of the railway surveying assembly.

[0009] Under certain circumstances the operation of the railway surveying assembly in accordance with the present invention may be improved when damping means are provided between the railway vehicle and the support for absorbing vibrations of the railway vehicle. Such vibrations might otherwise interfere with a proper operation of the surveying and measuring means.

[0010] Preferably, such damping means are provided between the clamping means and the support, but it is possible too that such damping means are provided between the buffers and the clamping means. However, it is also possible, that such damping means are provided elsewhere, for example between the support and the surveying and measuring means. Also any combinations of these measures is possible.

[0011] In an embodiment of the railway surveying assembly which is characterised by its simplicity and effectivity, such damping means comprise rubber blocks.

[0012] In accordance with yet another preferred embodiment of the railway surveying assembly according to the present invention, the support comprises a frame which is provided with said mounting means, and at least one housing for receiving the surveying and measuring means, and wherein the frame and at least one housing are detachably connected one to the other.

[0013] As a result, a modular construction of the railway surveying assembly is obtained. It is possible, then, to reduce the weight of the separate modules (frame and housings) in such a manner, that they may be lifted and manipulated by two persons without violating respective regulations. Moreover, such a modular construction allows a replacement of only a single module without re-

placing the entire railway surveying assembly, for example when during the survey a different feature has to be determined relative to a previous survey.

[0014] In a specific embodiment of such a modular railway surveying assembly, at least two housings are provided, of which a first one is positioned below said frame and of which a second one is positioned above said frame, which housings each receive parts of said surveying and measuring means, such as for example surveying camera's, data storage and processing means, communication means, positioning means and power means.

[0015] Hereinafter the invention will be elucidated while referring to the drawing, in which an embodiment of a railway surveying assembly in accordance with the present invention is illustrated.

Figure 1 shows, schematically, a perspective view of a railway surveying assembly attached to a railway vehicle, in a closed position;

figure 2 shows a view corresponding to figure 1, however on a larger scale and with the railway surveying assembly in an open position;

figure 3 shows a frontal view of the combination of railway surveying assembly and railway vehicle according to figure 1, and

figure 4 shows in a side elevational view part of the combination of railway surveying assembly and railway vehicle in accordance with figure 2.

[0016] Figure 1 shows, schematically and in a perspective view, a railway vehicle 1. Generally, such a railway vehicle 1 is provided with two frontal buffers 2 and two rearward buffers 3. It is noted, that only one frontal buffer 2 (left frontal buffer) has been illustrated and that the other frontal buffer has been omitted for better illustrating the inventive concept.

[0017] A railway surveying assembly, which in its entirety is indicated by reference number 4, is detachably attached to the frontal buffers 2 of the railway vehicle 1. Such a railway surveying assembly, in the illustrated embodiment, basically comprises a central support frame 5 which comprises mounting means by which it is attached to the buffers 2 of the railway vehicle 1, an upper housing 6 and a lower housing 7. The upper and lower housings 6, 7 are meant to receive parts of the surveying and measuring means, such as for example (but not limited to) surveying cameras (which generally will be positioned in the lower housing 7), data storage and processing means, communication means, positioning means (such as for example GPS) and power means.

[0018] Each housing 6 and 7 is provided with hingeable cover means 8, 9, as illustrated best in figure 2 in which said cover means 8 and 9 are moved towards a position in which the housings 6 and 7 are open for an easy access to the components housed therein. Likewise, the central support frame 5 is provided with a central cover 10 which also can hinge between an open position (figure 2) and a closed position (figure 1) for allowing access to any

components housed therein.

[0019] Next, reference is made to figure 3 which illustrates the railway vehicle 1 and the railway surveying assembly 4 in a frontal view and on a larger scale. The covers 8, 9 and 10 are illustrated in their closed positions. At the right handed side of the train 1, that means left in figure 3, mounting means are illustrated which are used for clampingly surrounding the neck of the respective buffer (this neck has been illustrated schematically by a dotted line 2'). Such mounting means comprise an upper jaw 11 fixedly connected to the support frame 5, and a lower jaw 12 which, by means of quick-release couplings 13, is releasably connected to the upper jaw 11. By releasing the quick-release couplings 13 the lower jaw 12 may be (re)moved and the upper jaw 11 can be lifted (together with the railway surveying assembly) such as to remove the entire railway surveying assembly 4 from the buffer 2.

[0020] Not illustrated are damping means which may be provided for absorbing vibrations of the railway vehicle. For example, such damping means could comprise rubber blocks positioned between the buffers 2 and the jaws 11 and 12 of the clamping means.

[0021] The connection between the support frame 5 and upper and lower housings 6 and 7 may be detachable, such that for removing the railway surveying assembly 4 from the railway vehicle 1, firstly the housings 6 and 7 are removed, whereafter the support frame 5 is lifted from the buffers 2. In a reverse order a railway surveying assembly may be mounted to a railway vehicle by firstly positioning the support frame on the buffers 2, followed by attaching the housings 6 and 7 to the support frame 5.

[0022] Finally reference is made to figure 4, which shows a side elevational view of the frontal part of the railway vehicle 1 with railway surveying assembly 4 attached thereto. The railway surveying assembly 4 is illustrated in its completely open position, that means in a position in which the covers 8, 9 and 10 are in an open position. In the view according to figure 4 one clearly can see the upper and lower clamping jaws 11 and 12 which are part of the support frame 5.

[0023] When the railway vehicle 1 moves along a railway track 13 the railway surveying assembly can survey said railway track 13, for example by means of appropriate camera means positioned in the lower housing 7. However, also any other appropriate surveying and measuring means could be provided.

[0024] Further it is noted, that, although in the previous description an embodiment has been described in which the railway surveying assembly 4 has been attached to the front buffers 2 of a railway vehicle 1, such a railway surveying assembly 4 also could be attached to the rear buffers 3.

[0025] The invention is not limited to the embodiments described before, which may be varied widely within the scope of the invention as defined by the appending claims.

Claims

1. Railway surveying assembly, comprising surveying and measuring means and a support for said surveying and measuring means, **characterised in that** the support is provided with mounting means for detachably attaching it to the buffers of a railway vehicle. 5
2. Railway surveying assembly according to claim 1, wherein each mounting means comprises clamping means for clampingly surrounding the neck of the respective buffers. 10
3. Railway surveying assembly according to claim 2, wherein the clamping means comprise an upper jaw fixedly connected to the support and a lower jaw which is movable between a release position in which the respective buffer can be moved between the two jaws or away from there between, and a locking position in which the respective buffer can be locked between the two jaws. 15 20
4. Railway surveying assembly according to claim 3, wherein the jaws are connected by quick-release couplings. 25
5. Railway surveying assembly according to any of the previous claims, wherein damping means are provided between the railway vehicle and the support for absorbing vibrations of the railway vehicle. 30
6. Railway surveying assembly according to claim 5 and claim 2, wherein the damping means are provided between the clamping means and the support. 35
7. Railway surveying assembly according to claim 5 and claim 2, wherein the damping means are provided between the buffers and the clamping means. 40
8. Railway surveying assembly according to claim 6 or 7, wherein the damping means comprise rubber blocks.
9. Railway surveying assembly according to any of the previous claims, wherein the support comprises a frame which is provided with said mounting means, and at least one housing for receiving the surveying and measuring means, and wherein the frame and at least one housing are detachably connected one to the other. 45 50
10. Railway surveying assembly according to claim 9, wherein at least two housing are provided, of which a first one is positioned below said frame and of which a second one is positioned above said frame, which housings each receive parts of said surveying and measuring means, such as for example survey-

ing cameras, data storage and processing means, communication means, positioning means and power means.

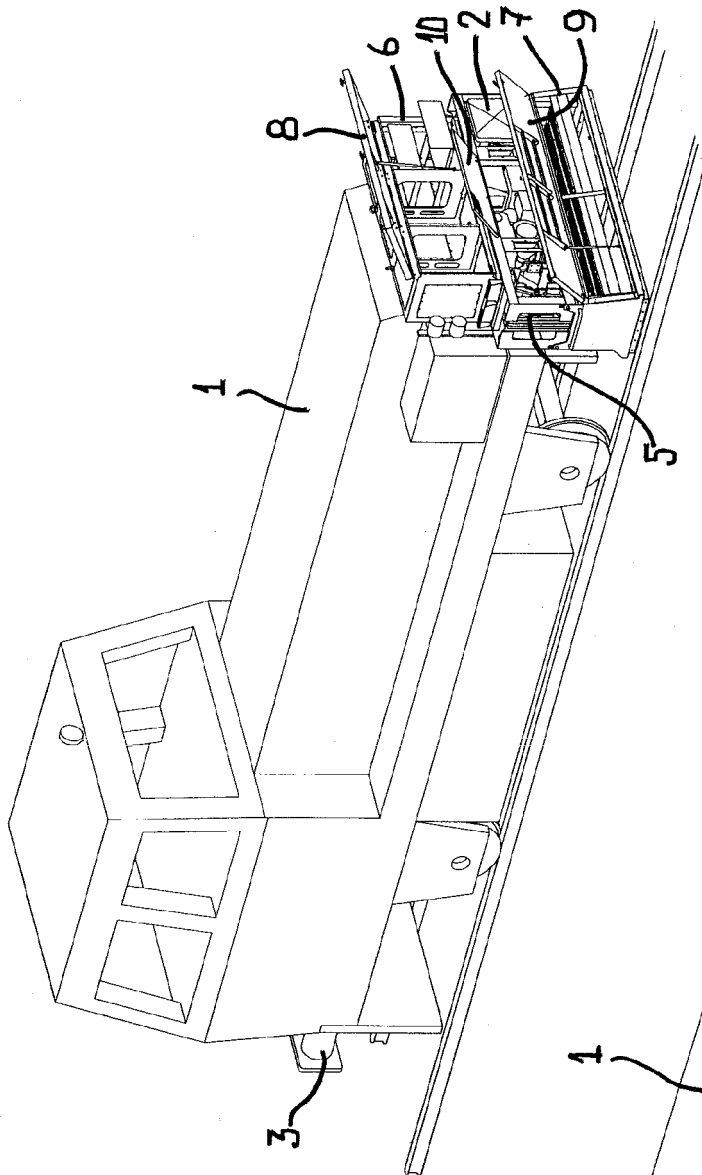


Fig. 1

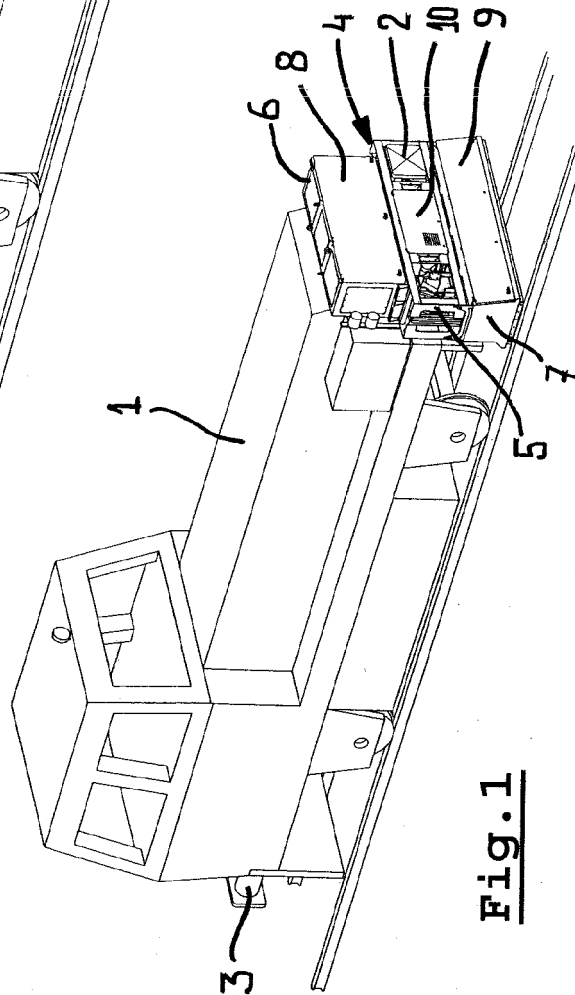


Fig. 2

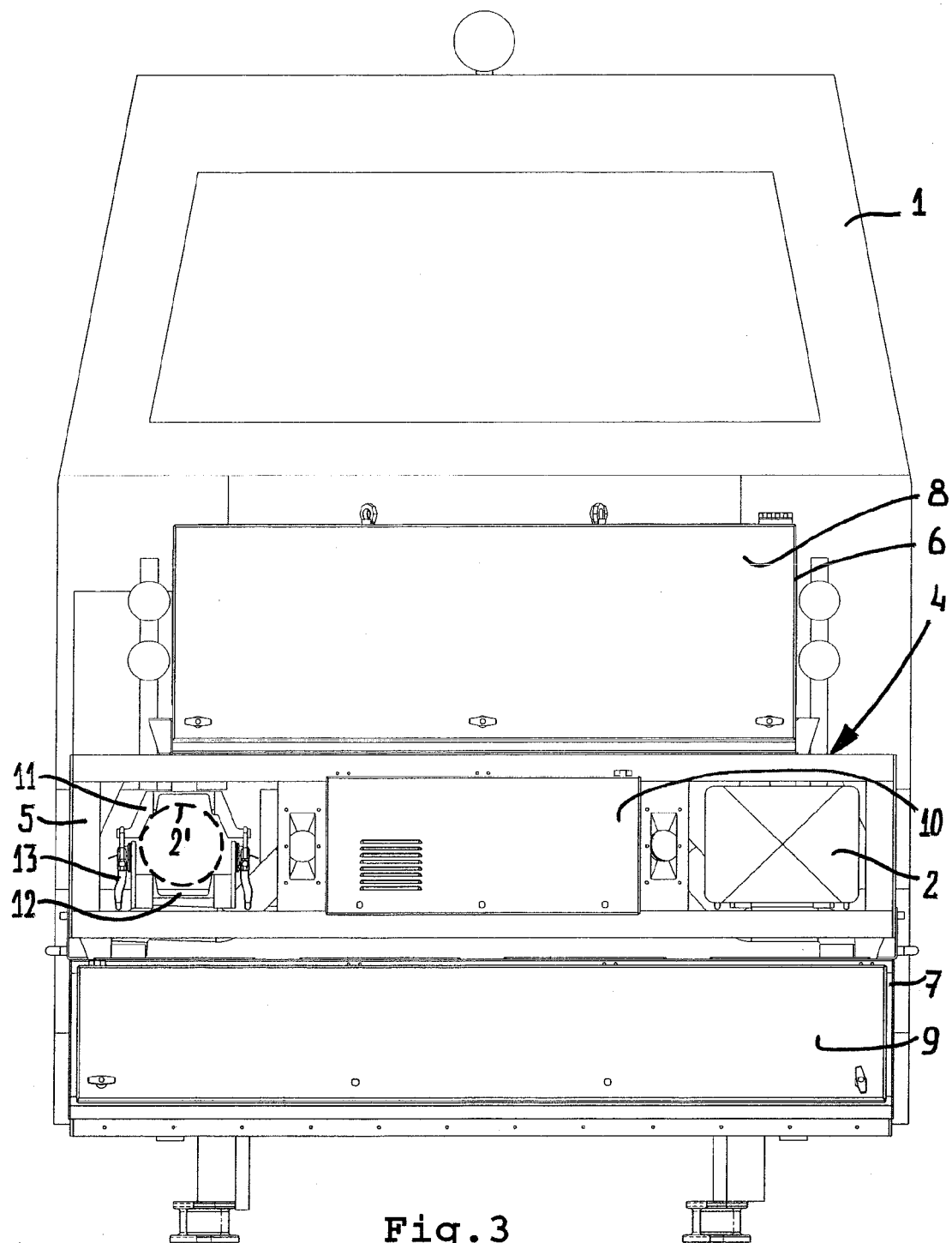


Fig. 3

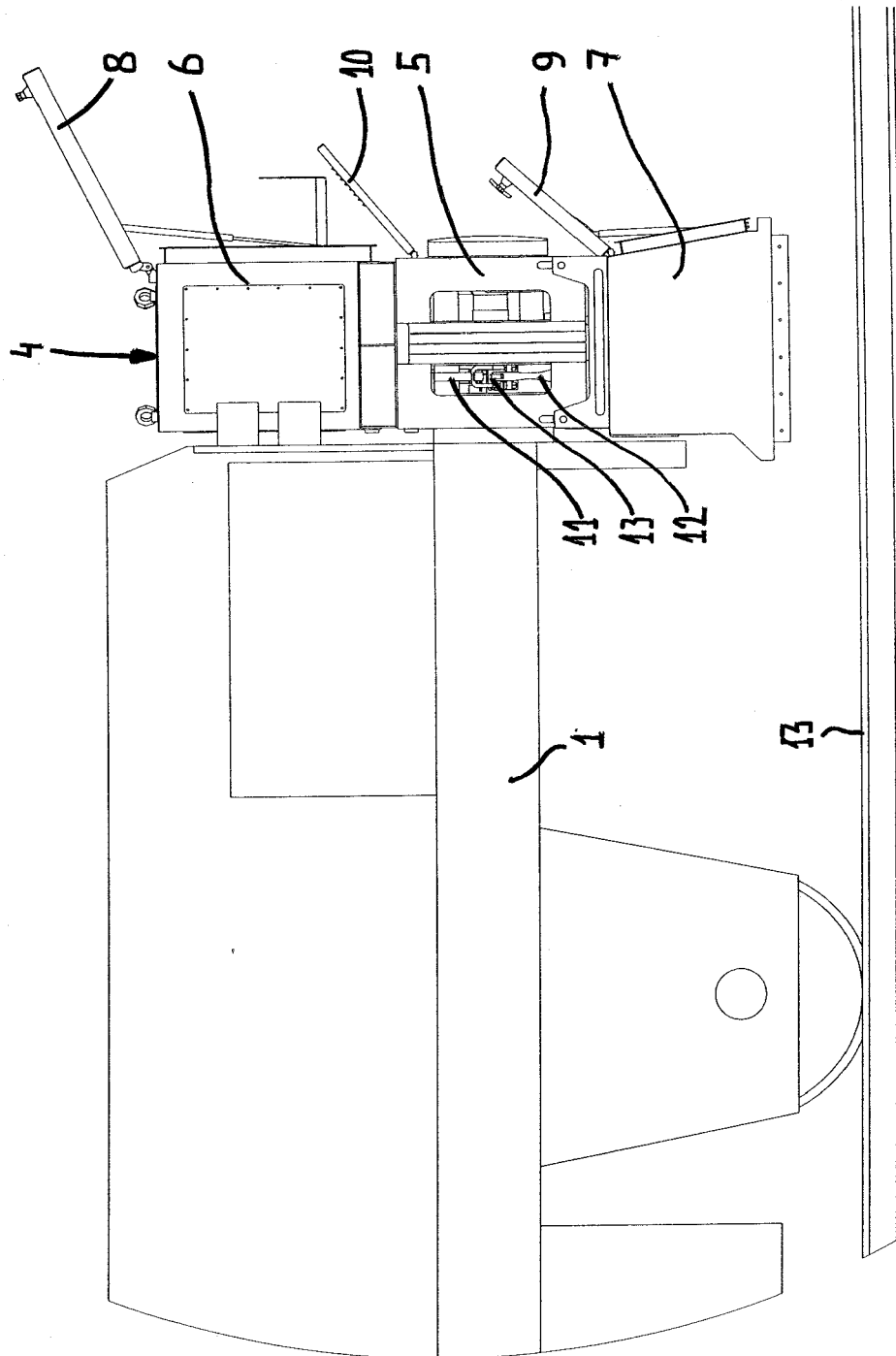


Fig. 4



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 06 12 2320

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			B61K B61D B61G E01B G01B B61C
Place of search		Date of completion of the search	Examiner
The Hague		19 March 2007	Chlosta, Peter
CATEGORY OF CITED DOCUMENTS		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	
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			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 06 12 2320

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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