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(72) Inventor: **Erikkilä, Juha**
02430 Masala (FI)

(74) Representative: **Tanskanen, Jarmo Tapio et al**
Papula Oy
P.O. Box 981
00101 Helsinki (FI)

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(71) Applicant: **Erikkilä Nostotekniikka Oy**
02430 Masala (FI)

(54) **Crane carriage system**

(57) A crane carriage system, comprising a profiled beam (1) comprising a hollow interior space (3), horizontal internal bearing surfaces (4,5) and a downwards opening gap (6) between the bearing surfaces (4,5). The system further comprises a crane carriage (7), comprising a frame (8) which comprises an inner frame part (9) with at least one pair of wheels (10,11) movable on the bearing surfaces (4,5) in the interior space (3) of the profiled beam (1), and an outer frame part (12), which extends below the profiled beam (1) through the gap (6) and to which a load (13) to be lifted and/or moved can be connected. In addition, the system comprises an overload guard (14), which is fastened to the outer frame part (12) to prevent expansion of the gap (6) beyond a predetermined value so that the crane carriage is prevented from falling off the profiled beam supporting it.

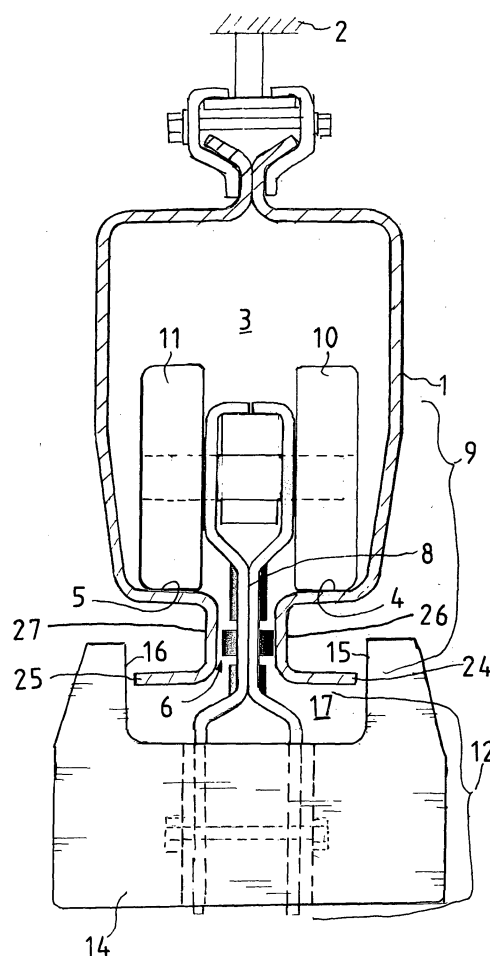


Fig 2

Description

FIELD OF THE INVENTION

[0001] The present invention relates to a crane carriage system as defined in the preamble of claim 1.

BACKGROUND OF THE INVENTION

[0002] A prior-art crane carriage system as illustrated in Fig. 1 is used e.g. in various micro-crane and portal robot systems.

[0003] The system comprises a profiled beam 1, which is suspended with respect to a structure 2 above it. The profiled beam 1 has a hollow interior space 3. Inside the profiled beam 1 are substantially horizontal bearing surfaces 4 and 5. Between the bearing surfaces 4 and 5 is a downwards-opening gap 6. The system further comprises a crane carriage 7. The crane carriage 7 comprises a frame 8. The frame 8 comprises an inner frame part 9 with at least one pair of wheels 10, 11 rotatably mounted on it, said wheels being substantially aligned with each other and movable on the bearing surfaces 4, 5 on opposite sides in the interior space 3 in the profiled beam 1. The frame 8 also comprises a lower frame part 12 extending below the profiled beam 1 through the gap 6, to which lower frame part a load 13 to be lifted and/or moved can be connected. The weight of the load 13 is transmitted by the frame 8 of the crane carriage 7 to the wheels 10, 11 and thus further to the bearing surfaces 4 and 5 of the profiled beam.

[0004] The problem is that, in an overload situation when the crane carriage 7 is subjected to an overload, the gap 6 of the profiled beam 1 tends to open and widen, so that there arises a risk of the crane carriage 7 falling down off the profiled beam 1 and causing a hazard.

OBJECT OF THE INVENTION

[0005] The object of the invention is to overcome the above-mentioned drawbacks.

[0006] A specific object of the invention is to disclose a crane carriage system wherein the crane carriage is prevented from falling off the profiled beam supporting it when the system is subjected to an overload, so that work safety can be improved and workplace accidents prevented.

BRIEF DESCRIPTION OF THE INVENTION

[0007] The crane carriage system of the invention is characterized by what is disclosed in claim 1.

[0008] According to the invention, the system comprises an overload guard, which is fastened to the outer frame part to prevent expansion of the gap beyond a predetermined value so that the crane carriage is prevented from falling off the profiled beam supporting it.

[0009] The invention provides the advantage that, in an overload situation, the crane carriage can never fall off the profiled beam supporting it, which means that good work safety is achieved and workplace accidents of this nature are prevented. The overload guard of the invention can be added to all crane carriage systems, both to new systems and systems already in use by installing it as a retrofit.

[0010] In an embodiment of the system, the overload guard comprises two jaws forming a mouth between them which encloses the lower part of the profiled beam inside it with a clearance. In an overload situation, when the lower part of the profiled beam expands and the gap widens to a predetermined width, corresponding to the width of the mouth, the jaws come into contact and engagement with the profiled beam, thus limiting the expansion of the gap. When the jaws are locked by friction to the profiled beam, the crane carriage can no longer be moved. At the same time this is a sign telling the user that an overload has occurred.

[0011] In an embodiment of the system, the overload guard is a solid plate-like piece of continuous material with the jaws placed at a fixed distance from each other.

[0012] In an embodiment of the system, the overload guard comprises a first part with a first jaw and a second part with a second jaw. The second part has been fitted to be substantially irreversibly movable to a limited extent with respect to the first part in an overload situation.

[0013] In an embodiment of the system, the first part is fastened to the outer frame part of the crane carriage. The second part is fastened by a bolt-and-nut joint to the first part so that the second part can turn about the pivotal axis formed by the bolt-and-nut joint. The fixed first part comprises a pin placed at a distance from the pivotal axis, and the turnable second part comprises a curved elongated hole to receive the pin into it and to limit the movement between the first and the second parts.

[0014] In an embodiment of the system, the overload guard comprises an indicator which is arranged to indicate an overload having occurred. The indicator makes it possible for the maintainer of the system to establish afterwards that the system has been exposed to an overload.

[0015] In an embodiment of the system, the indicator comprises a breakable means, such as a string, seal or the like, which is easily broken in an overload situation.

[0016] In an embodiment of the system, the breakable means forms a bond between the first part and the second part.

LIST OF FIGURES

[0017] In the following, the invention will be described in detail with reference to embodiment examples and the attached drawing, wherein

Fig. 1 presents a diagrammatic cross-sectional

view of a prior-art crane carriage system,

Fig. 2 presents a diagrammatic cross-sectional view of a first embodiment of the crane carriage system of the invention,

Fig. 3 presents a side view of the crane carriage in the system according to Fig. 2,

Fig. 4 presents a diagrammatic cross-sectional view of a second embodiment of the crane carriage system of the invention, and

Fig. 5 presents a side view of the crane carriage in the system according to Fig. 4.

DETAILED DESCRIPTION OF THE INVENTION

[0018] Fig. 2 presents a crane carriage system which comprises an elongated profiled beam 1 suspended from a fixed structure 2 above it. The profiled beam 1 may be fastened to the fixed structure 2 either directly or indirectly. An example of indirect suspension is a portal crane application, wherein the profiled beam 1 may also be a movable portal beam secured at either end to crane carriages which again can be moved while supported and guided by two profiled beams extending perpendicularly relative to the portal beam and secured to a fixed structure.

[0019] The profiled beam 1 is a box-like beam having a hollow interior space 3 inside it. The substantially horizontal bearing surfaces 4, 5 of the profiled beam 1 support the wheels 10 and 11 of the crane carriage. Between the bearing surfaces 4, 5 is a gap 6 extending through the whole length of the profiled beam 1.

[0020] The profiled beam 1 supports the crane carriage 7, which comprises a frame 8, which comprises an inner frame part 9 with two pairs of wheels 10, 11 rotatably secured to it one after the other, the wheels in each of the two wheel pairs being mounted substantially in alignment with each other on the same axis on opposite sides of the inner frame part in the interior space 3 of the profiled beam 1. The wheels 10, 11 roll along the bearing surfaces 4, 5 and are supported by these. That part of the frame 8 which extends below the profiled beam 1 through the gap 6 is called here the outer frame part 12. To this outer frame part 12 it is possible to attach e.g. a hoist (not shown) which can be used to lift a load so as to allow it to be then moved by means of the crane carriage along the path defined by the profiled beam. Secured to the outer frame part 12 is an overload guard 14, which in an overload situation prevents expansion of the gap 6 beyond a predetermined value, thus preventing the crane carriage from falling off the profiled beam 1 supporting it.

[0021] In the embodiment presented in Fig. 2, the overload guard 14 is a single solid plate-like piece of continuous material with two jaws 15, 16 made in them at a fixed distance from each other and forming between them a mouth 17 which encloses the lower part of the profiled beam 1 inside it with a clearance. In an overload situation, as the lower part of the profiled beam 1 ex-

pands and the gap 6 is enlarged to a predetermined width, which corresponds to the width of the mouth 17, the jaws 15, 16 come into contact and engagement with the flanges 24, 25 in the lower part of the profiled beam 1, thus limiting the expansion of the gap 6. When the flanges 24 and 25 meet the jaws 15 and 16, the crane carriage will stop in place and can not be moved before the overload has been removed. The invention is not restricted to the shape of the profiled beam 1 illustrated in the figures. In another embodiment the profiled beam may have no horizontal flanges 24, 25 but still has flanges 26, 27 extending downwards on either side of the gap 6. In that case, the width of the mouth 17, i.e. the distance between the jaws 15, 16, is so fitted that in an overload situation the jaws 15, 16 will engage the outer sides of the flanges 26, 27.

[0022] Fig. 3 shows that the overload guard 14 is fastened preferably by a bolt-and-nut joint to one end of the outer part 12 of the frame 8 of the crane carriage 7.

[0023] The embodiment presented in Fig. 4 and 5 differs from the system of Fig. 2 and 3 only in respect of the structure of the overload guard 14. The overload guard 14 consists of two separate parts, a first part 18 and a second part 19. The first part 18 has a first jaw 15. The second part 19 has second jaw 16. The second part 19 has been fitted to be substantially irreversibly movable to a limited extent with respect to the first part 18 in an overload situation, in other words, the jaws 15 and 16 move a little away from each other. The first part 18 is fastened to the outer frame part 12 of the crane carriage 7. The second part 19 is connected to the first part 18 by a bolt-and-nut joint 20 so that the second part 19 can turn about the rotational axis 1 formed by the bolt-and-nut joint. The first part 18, which is fixed with respect to the frame, comprises a pin 21 located at a distance from the rotational axis 1, and the second part 19 comprises a curved elongated hole 22 to receive the pin 21 into it and to limit the movement between the first and the second parts. As the first and the second parts can move through a limited distance with respect to each other, they will be in somewhat different positions after an overload situation than before the overload. Thus, the serviceman can discover from the different position of the parts that the system has been overloaded. This two-part structure also allows the overload guard 14 to be provided with an indicator 23 that will indicate the occurrence of an overload. The indicator may preferably of a breakable type and form between the first part 18 and the second part 19 a bond that will easily break in an overload situation. The indicator 23 may be e.g. a string, a seal or the like.

[0024] The invention is not limited to the embodiment examples described above; instead, many variations are possible within the scope of the inventive concept defined in the claims.

Claims

1. A crane carriage system, comprising

- a profiled beam (1) supported by a fixed structure (2), said profiled beam comprising a hollow interior space (3), substantially horizontal internal bearing surfaces (4, 5) and a downwards opening gap (6) between the bearing surfaces (4, 5), and
- a crane carriage (7), comprising a frame (8) which comprises
 - an inner frame part (9) with at least one pair of wheels (10, 11) rotatably secured to it, said wheels being movable substantially in alignment with each other on the bearing surfaces (4, 5) on opposite sides of the inner frame part in the interior space (3) of the profiled beam (1), and
 - an outer frame part (12), which extends below the profiled beam (1) through the gap (6) and to which outer frame part (12) a load (13) to be lifted and/or moved can be connected, **characterized in that** the system comprises an overload guard (14), which is fastened to the outer frame part (12) to prevent expansion of the gap (6) beyond a predetermined value so that the crane carriage is prevented from falling off the profiled beam supporting it.

2. A crane carriage system according to claim 1, **characterized in that** the overload guard (14) comprises two jaws (15, 16) forming a mouth (17) between them which encloses the lower part of the profiled beam (1) inside it with a clearance so that in an overload situation, when the lower part of the profiled beam (1) expands and the gap widens to a predetermined width, corresponding to the width of the mouth (17), the jaws (15, 16) come into contact and engagement with the profiled beam (1), thus limiting the expansion of the gap.

3. A crane carriage system according to claim 1 or 2, **characterized in that** the overload guard (14) is a single solid plate-like piece of continuous material in which the jaws (15, 16) are at a fixed distance from each other.

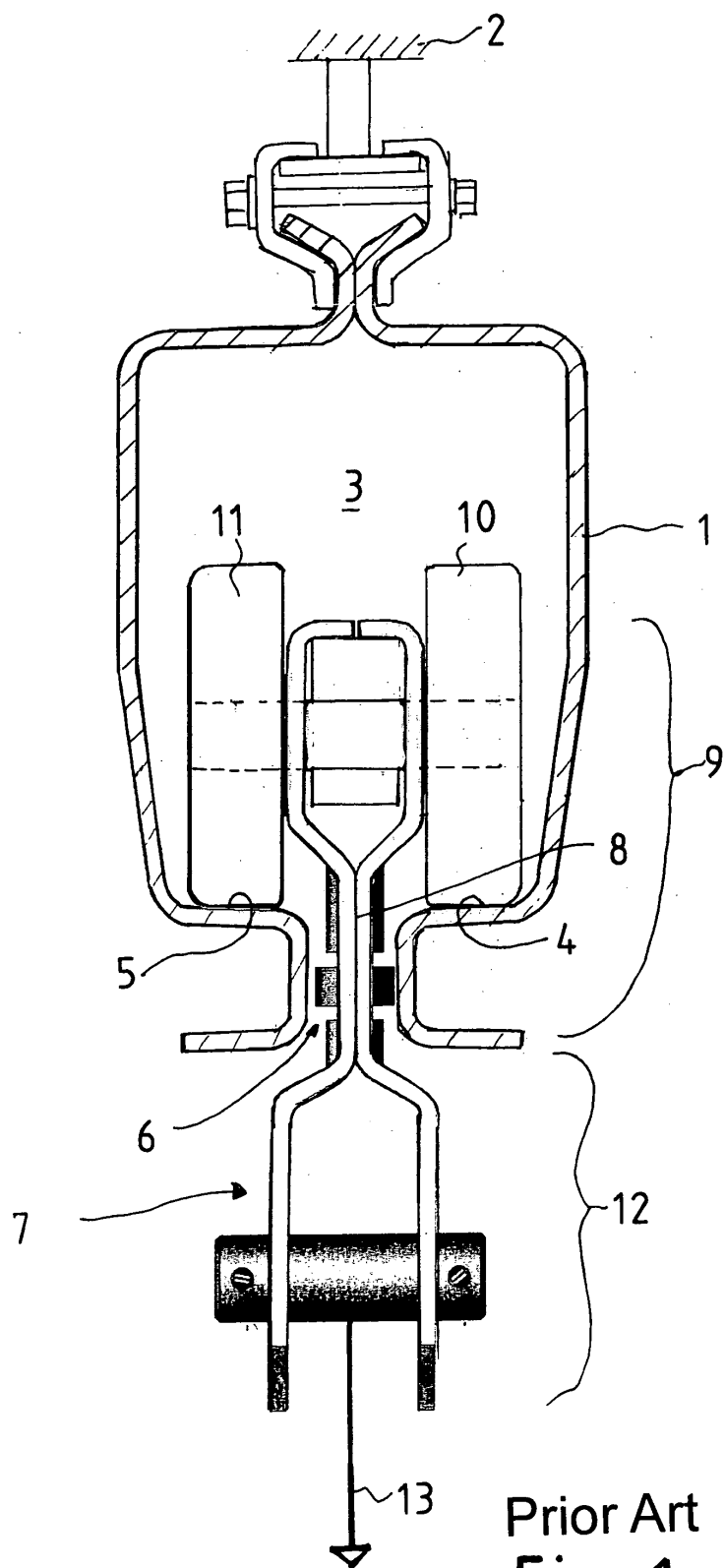
4. A crane carriage system according to claim 1 or 2, **characterized in that** the overload guard (14) comprises a first part (18) with a first jaw (15) and a second part (19) with a second jaw (16), which second part (19) has been fitted to be substantially irreversibly movable to a limited extent with respect to the first part in an overload situation.

5. A crane carriage system according to claim 4, **characterized in that** the first part (18) is fastened to the outer frame part (12) of the crane carriage (7); that the second part (19) is fastened by a bolt-and-nut joint (20) to the first part (18) so that the second part (19) can turn about the pivotal axis (1) formed by the bolt-and-nut joint; that the fixed first part (18) comprises a pin (21) placed at a distance from the pivotal axis (1), and the turnable second part (19) comprises a curved elongated hole (22) to receive the pin (21) into it and to limit the movement between the first and the second parts.

6. A crane carriage system according to any one of claims 1 - 5, **characterized in that** the overload guard (14) comprises an indicator (23) which has been arranged to indicate an overload having occurred.

7. A crane carriage system according to claim 6, **characterized in that** the indicator (23) comprises a breakable means, such as a string, seal or the like, which is easily broken in an overload situation.

8. A crane carriage system according to claim 7, **characterized in that** the breakable means (23) forms a bond between the first part (18) and the second part (19).



Prior Art
Fig 1

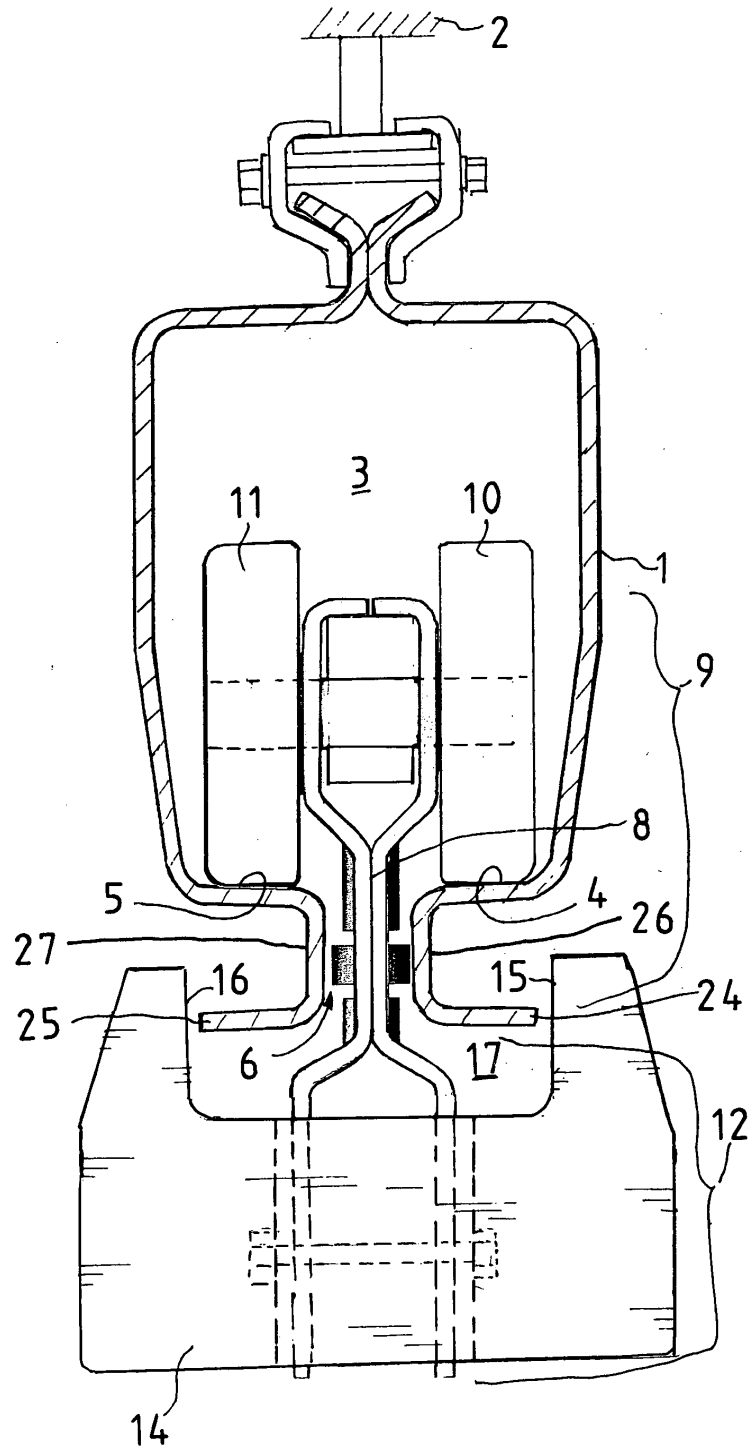


Fig 2

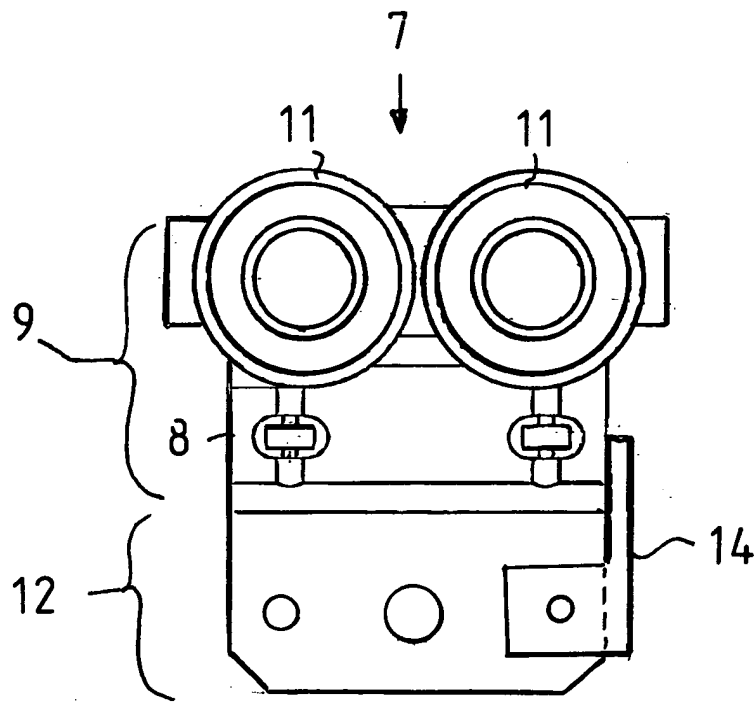


Fig 3

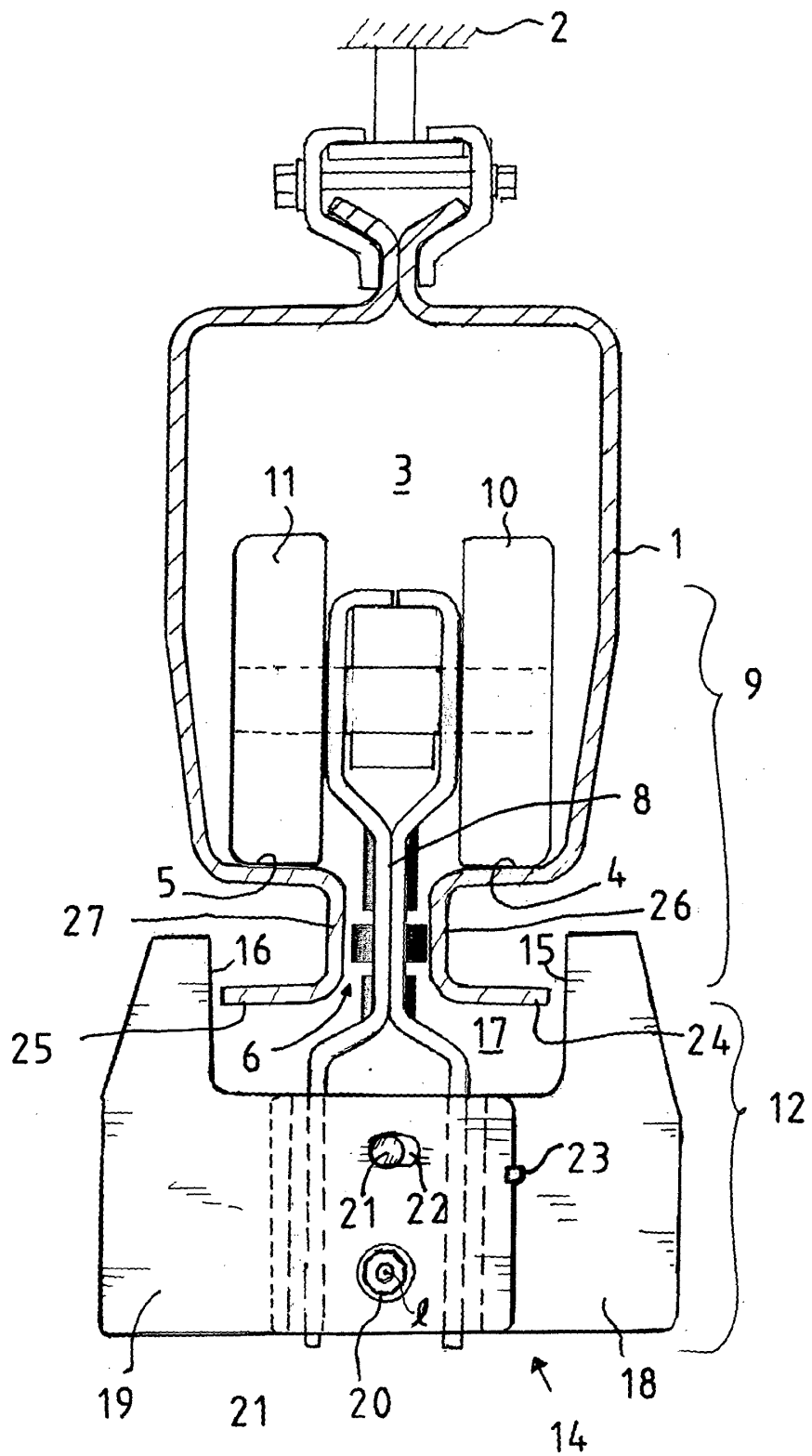


Fig 4

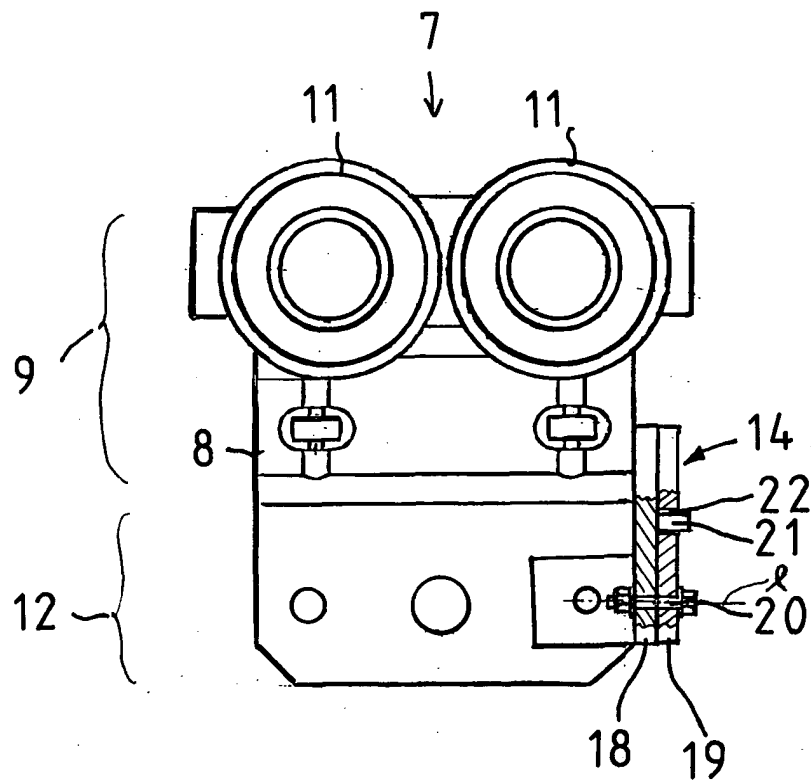


Fig 5



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EUROPEAN SEARCH REPORT

Application Number
EP 05 39 6011

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	DE 19 56 894 U (ABUS-FOERDERTECHNIK K.G) 9 March 1967 (1967-03-09) * the whole document * -----	1-3,6	B66C11/06
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			B66C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 4 July 2005	Examiner Sheppard, B
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 05 39 6011

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04-07-2005

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 1956894	U	09-03-1967	NONE

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