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(54) A screeding device

(57) A device 1 for screeding a region of freshly laid concrete 25 comprises a beam 2, a leading blade 3, and a trailing blade 4. The beam 2 is hollow and defines an interior housing space 10 within the beam 2. Three air-operated vibrators 11 are provided located in the beam interior housing space 10, and spaced-apart along the beam 2. A plurality of corresponding access openings 13 to the beam interior 10 are provided in the trailing side of the beam 2 for gaining access to any of the vibrators 11 within the beam interior 10. The device 1 is used to screed a region of concrete 25 by vibrating the beam 2 as the beam 2 is moved over the region of concrete 25 with the blades 3, 4 in contact with the concrete 25. A winching arrangement may be used to draw the beam 2 over the region of concrete 25.

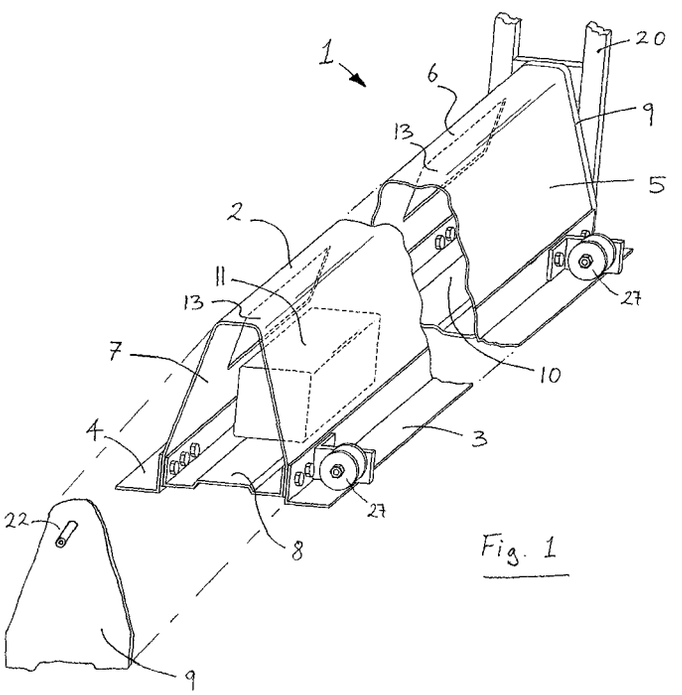

Fig. 1

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Description

Introduction

[0001] This invention relates to a device for screeding a region of material, in particular for screeding a region of freshly laid concrete.

[0002] Devices for screeding a relatively large region of concrete are known. For example, US 4,316,715 (Allen) discloses a triangular support frame structure having front and rear screed blades. Vibrators spaced at intervals along the blades impart vibratory motion to the blades as the device is translated over a region of concrete in a winching arrangement.

[0003] However, these devices suffer from a number of disadvantages, in particular concrete tends to stick to and infiltrate parts of the device during screeding of a region of concrete. If concrete is allowed to set on the device, the device becomes very heavy and difficult to move. Thorough cleaning of the concrete from all parts of these complex devices can be a time-consuming and tedious task. In addition, the concrete could damage the vibrating components of the device.

[0004] This invention is aimed at overcoming at least some of the problems associated with known screeding devices.

Statements of Invention

[0005] According to the invention there is provided a device for screeding a region of material, the device comprising:-

a beam having a leading material engaging member extending from a leading side of the beam, and a trailing material engaging member extending from a trailing side of the beam;

the beam being at least partially hollow to define an interior housing space within the beam; and

a plurality of vibrators located in the beam interior housing space, and spaced-apart along the beam for vibrating the beam as the beam is moved over a region of material to screed the material;

[0006] By locating the vibrators in the beam interior housing space, this ensures that concrete and/or other material thrown up during the vibrational screeding action hits the exterior of the beam only. The vibrators therefore will be prevented from becoming dirtied or clogged or damaged by concrete and/or other material during screeding. Cleaning of the screeding device after use is thus a relatively simple and quick task as only the beam exterior needs to be cleaned.

[0007] The plurality of vibrators spaced-apart along the beam ensure that the beam is adequately vibrated along its entire length. Thus the screeding device of the invention is suitable for screeding large regions of concrete with a width of, for example, 5m or greater.

[0008] In one embodiment of the invention the beam has at least one access opening to the beam interior housing space. Preferably the access opening is provided in the trailing side of the beam. Ideally the device comprises at least one closure for selective closure of the access opening.

[0009] The access opening to the beam interior housing space enables an operator to quickly and easily gain access to the vibrators, for example for maintenance, or repair, or replacement of a vibrator.

[0010] In one case the device comprises a removable cover for the beam. The cover may be of a plastics material.

[0011] In a preferred embodiment the device comprises means to draw the beam over a region of material in a winching arrangement.

[0012] The beam preferably comprises means to facilitate releasable jointing of the beam to an adjacent beam. The jointing means may comprise at least one male member protruding from one beam for engagement with at least one co-operating female member of another beam.

[0013] By jointing the beam to an adjacent beam, the width of the region of material that can be screeded in a single pass is increased.

[0014] In another case the beam comprises means to align the beam relative to an adjacent beam upon jointing. Preferably the alignment means comprises at least one male member protruding from one beam for mating with at least one co-operating female member of another beam.

[0015] The alignment means is particularly advantageous when moving two or more jointed beams over a long region of material being screeded. By correctly aligning the adjacent beams, this helps to prevent skewing of the path of the beams over the region of material.

[0016] In another preferred embodiment the material engaging member extends beyond an end of the beam to form a screeding bridge between the beam and an adjacent beam.

[0017] The screeding bridge arrangement helps to ensure that no region of material remains unscreeded between adjacent beams.

[0018] The material engaging member may extend from a base side of the beam to support the base side above the material during screeding.

[0019] In one case the beam may have a substantially trapezoidal shape in transverse cross-section. Preferably the leading side and the trailing side of the beam diverge outwardly towards a base side of the beam.

[0020] The leading material engaging member may be configured to divert material, which has accumulated on the member, forward, in the direction of travel of the beam, in a generally rotational movement. Ideally the leading material engaging member is shaped to scoop accumulated material forward in a generally rotational

movement.

[0021] The beam may be of stainless steel.

Brief Description of the Drawings

[0022] The invention will be more clearly understood from the following description of some embodiments thereof, given by way of example only, with reference to the accompanying drawings, in which:-

Fig. 1 is a partially exploded, perspective view of a device according to the invention for screeding a region of material;

Fig. 2 is partially cross-sectional, end view of the screeding device of Fig. 1;

Fig. 3 is a partially cut-away, perspective view of part of the screeding device of Fig. 1;

Fig. 4 is an enlarged, perspective view of a vibrator of the screeding device of Fig. 3;

Fig. 5 is a plan view of the screeding device of Fig. 1 in use, screeding a region of material;

Fig. 6 is a side view of the screeding device of Fig. 1;

Fig. 7 is an enlarged, side view of the screeding device of Fig. 6 jointed to another screeding device similar to the screeding device of Fig. 6; and

Fig. 8 is a partially cut-away, perspective view of another screeding device according to the invention.

Detailed Description

[0023] Referring to the drawings and initially to Figs. 1 to 7 thereof, there is illustrated a device 1 according to the invention for screeding a region of material. The device 1 comprises a beam 2 having a leading material engaging member and a trailing material engaging member, and a plurality of vibrators 11. The device 1 may be used to screed a region of material, such as a region of freshly laid concrete 25, by vibrating the beam 2 as the beam 2 is moved over the region of concrete 25 with the material engaging members in contact with the concrete 25.

[0024] As illustrated in Figs. 1 and 2, the beam 2 comprises an "inverted-U" shaped upper plate 7, a base plate 8, and two "A" shaped end plates 9. The plates 7, 8, 9 of the beam 2 are fixed together by means of rivets, and when assembled the beam 2 is hollow and defines an interior housing space 10 within the beam 2. As illustrated in Fig. 2, the assembled beam 2 has a substantially trapezoidal shape in transverse cross-section.

[0025] The leading and trailing material engaging members are provided in this case by a leading blade 3 and a trailing blade 4 respectively. As illustrated in Fig. 2, the leading blade 3 extends forwardly from a leading side 5 of the upper plate 7, and the trailing blade 4 extends rearwardly from a trailing side 6 of the upper plate 7. Both of the blades 3, 4 extend downwardly from the base plate 8. Rivets are used to fix both the blades 3, 4 to the upper plate 7 and the base plate 8 (Fig. 2).

[0026] In this case, three air-operated vibrators 11 are provided located in the beam interior housing space 10, and spaced-apart along the beam 2 with a distance of approximately 0.4m between each vibrator 11, as illustrated in Figs. 5 and 6. A plurality of corresponding access openings 13 to the beam interior 10 are provided in the trailing side 6 of the upper plate 7. The openings 13 enable an operator of the screeding device 1 to gain access to any vibrator 11 within the beam interior 10, for example for repair or maintenance or replacement of a vibrator 11, without having to dismantle the beam 2.

[0027] The vibrators 11 are held in place on the base plate 8 by means of two cross bars 12, as illustrated in Figs. 3 and 4. The cross bars 12, which are in contact with the vibrator 11, assist in distributing the vibrational forces to the upper plate 7 and the blades 3, 4.

[0028] The screeding device 1 further comprises means to draw the beam 2 over the region of concrete 25 in a winching arrangement. In this case, the winching means is provided by two connecting lines 15, with hooks 17 at ends 18 of the lines 15.

[0029] Each connecting line 15 is normally wound around a reel 16, however the line 15 may be unwound from the reel 16 and rewound around the reel 16 by rotating a handle 19. As illustrated in Fig. 2, braces 20 support the handles 19 and the reels 16 at a suitable height above the concrete 25. Each brace 20 may be fixed to the end plate 9 by any suitable means, such as bolting or welding.

[0030] As illustrated in Figs. 6 and 7, the beam 2 comprises means to facilitate releasable jointing of the beam 2 to a beam 2^1 of another similar screeding device 1^1 (Fig. 7). The jointing means is provided, in this case, by a male member, such as a threaded screw 21, protruding from the end plate 9^1 of one beam 2^1 for engagement with a co-operating female member, such as a threaded tube 22, on the end plate 9 of the other beam 2.

[0031] The leading blades 3, 3^1 and the trailing blades 4, 4^1 extend beyond the ends of the beams 2, 2^1, typically by approximately 75mm, to form a screeding bridge between adjacent beams 2, 2^1 when jointed together (Fig. 7).

[0032] A lock nut 23 is also provided for releasably locking the two beams 2, 2^1 together in the position illustrated in Fig. 7 in which the blades 3, 3^1, 4, 4^1 of adjacent beams 2, 2^1 abut one another end-to-end.

[0033] Preferably the screw 21, the tube 22 and the nut 23 are all right hand threaded.

[0034] This simple threaded, nut and bolt jointing arrangement enables two or more screeding devices 1, 1^1 to be quickly and easily jointed together end-to-end to

extend the width of the region of concrete that can be screeded using the screeding device of the invention.

[0035] Splice plates may be used in addition for a more secure jointing arrangement.

[0036] The beam 2 is constructed of stainless steel, which enables the beam 2 to be spray-cleaned and drip-dried without rusting, while also providing for a sufficiently rigid beam 2.

[0037] In use, the screeding device 1 is located resting upon the region of freshly laid concrete 25 to be screeded, with the blades 3, 4 in contact with the concrete 25, and the base plate 8 supported slightly above the concrete 25 (Fig. 2).

[0038] In this case, the beam 2 extends over the entire width of the concrete 25 from one side 30 of the concrete framework to the other side 31 of the concrete framework (Fig. 5).

[0039] The handles 19 are rotated to unwind the connecting lines 15 from the reels 16. The unwound connecting lines 15 are then lead around pulleys 27, and the hooks 17 are engaged with an external support, such as the end of the concrete framework 32 (Figs. 2 and 5).

[0040] By rotating the handles 19 in the opposite direction, the connecting lines 15 are rewound around the reels 16. This winching action draws the beam 2 over the concrete 25 towards the hooked ends 18 of the connecting lines 15, as illustrated in Fig. 5.

[0041] As the beam 2 moves over the concrete 25, the vibrators 11 cause the blades 3, 4, which are in contact with the concrete, to vibrate. In this manner, the blades 3, 4 screed the concrete 2 into a smooth, levelled layer as the beam 2 moves over the concrete 25.

[0042] After use, the hooks 17 are disengaged from the framework 32, and the connecting lines 15 are rewound around the reels 16.

[0043] In the case when it is desired to screed a wider region of concrete, two or more screeding devices 1 can be jointed together end-to-end using the jointing means, as described above with reference to Figs. 6 and 7. In this manner any width of concrete can be screeded in a single pass using the screeding device 1, or an assembly of two or more of the screeding devices of the invention.

[0044] It will be appreciated that the screeding device 1 may comprise closures to enable selective closure of the access openings 13. The closures provide further protection against concrete or other unwanted material entering the beam interior housing space 10. Also the access openings 13 could be provided in the leading side 5 of the upper plate 7.

[0045] A removable cover may be provided for the beam, for example a heavy plastics tarpaulin. The cover acts as an external sheath to prevent concrete attaching to the beam 2. To remove concrete from the cover, the cover may be removed and washed as required.

[0046] It will also be appreciated that any type of vibrator may be used with the screeding device 1 according to the invention.

[0047] A scoop 60 may be provided on the leading blade 3 of the beam 2, as illustrated in Fig. 8. The scoop 60 is shaped to divert concrete, which has accumulated on the blade 3, forward, in the direction of travel of the beam 2, in a generally rotational movement. In this way, the scoop 60 helps to minimise clogging or excess accumulation of concrete on the leading blade 3.

[0048] The invention is not limited to the embodiments hereinbefore described, with reference to the accompanying drawings, which may be varied in construction and detail.

Claims

1. A device for screeding a region of material, the device comprising:-

a beam having a leading material engaging member extending from a leading side of the beam, and a trailing material engaging member extending from a trailing side of the beam;

the beam being at least partially hollow to define an interior housing space within the beam; and

a plurality of vibrators located in the beam interior housing space, and spaced-apart along the beam for vibrating the beam as the beam is moved over a region of material to screed the material;

2. A device as claimed in claim 1 wherein the beam has at least one access opening to the beam interior housing space, preferably the access opening is provided in the trailing side of the beam, preferably the device comprises at least one closure for selective closure of the access opening.

3. A device as claimed in claim 1 or 2 wherein the device comprises a removable cover for the beam, preferably the cover is of a plastics material.

4. A device as claimed in any preceding claim wherein the device comprises means to draw the beam over a region of material in a winching arrangement.

5. A device as claimed in any preceding claim wherein the beam comprises means to facilitate releasable jointing of the beam to an adjacent beam, preferably the jointing means comprises at least one male member protruding from one beam for engagement with at least one co-operating female member of another beam.

6. A device as claimed in claim 5 wherein the beam

comprises means to align the beam relative to an adjacent beam upon jointing, preferably the alignment means comprises at least one male member protruding from one beam for mating with at least one co-operating female member of another beam.

7. A device as claimed in any preceding claim wherein the material engaging member extends beyond an end of the beam to form a screeding bridge between the beam and an adjacent beam, preferably the material engaging member extends from a base side of the beam to support the base side above the material during screeding.

8. A device as claimed in any preceding claim wherein the beam has a substantially trapezoidal shape in transverse cross-section, preferably the leading side and the trailing side of the beam diverge outwardly towards a base side of the beam.

9. A device as claimed in any preceding claim wherein the leading material engaging member is configured to divert material, which has accumulated on the member, forward, in the direction of travel of the beam, in a generally rotational movement, preferably the leading material engaging member is shaped to scoop accumulated material forward in a generally rotational movement.

10. A device as claimed in any preceding claim wherein the beam is of stainless steel.

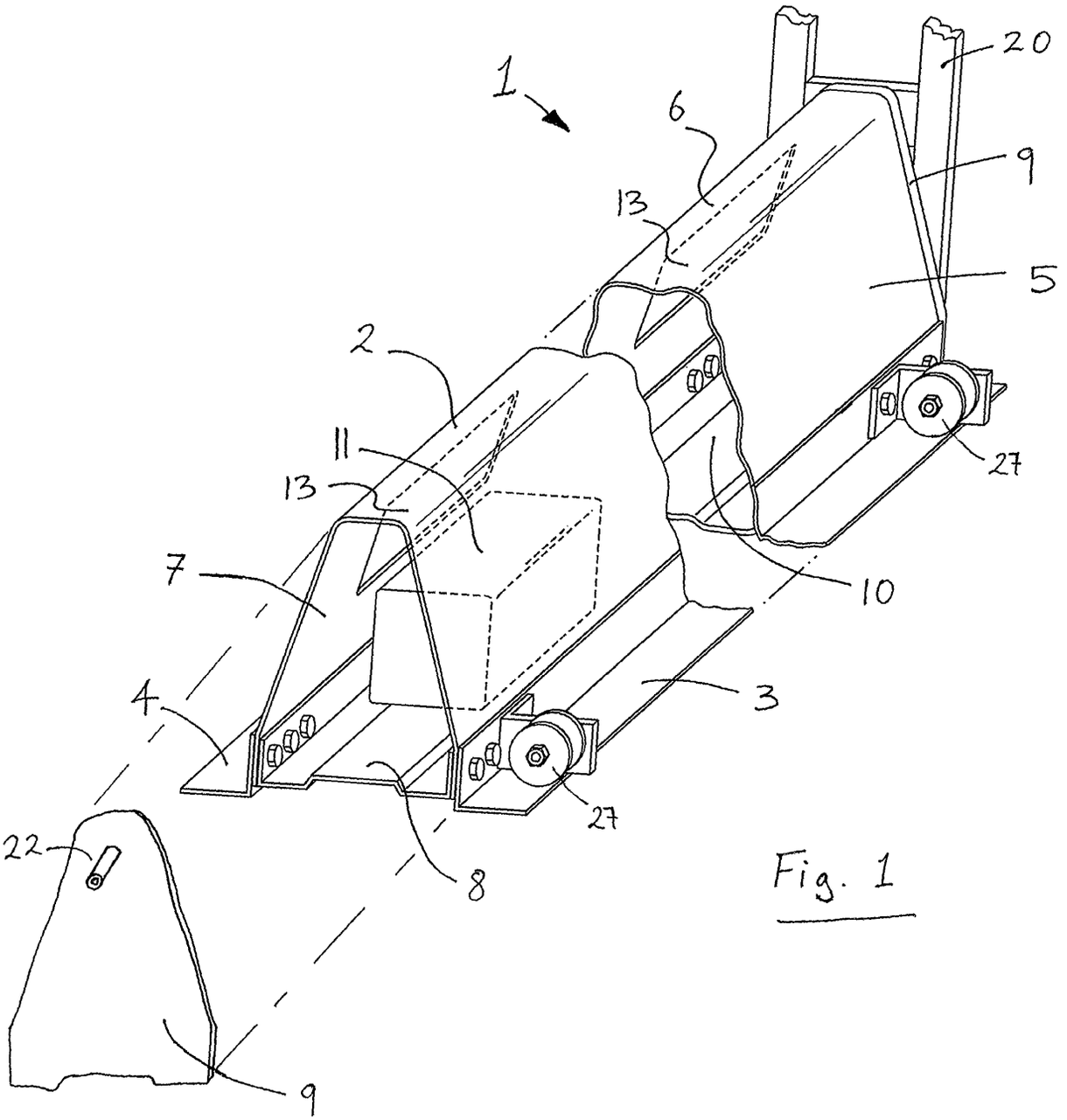

Fig. 1

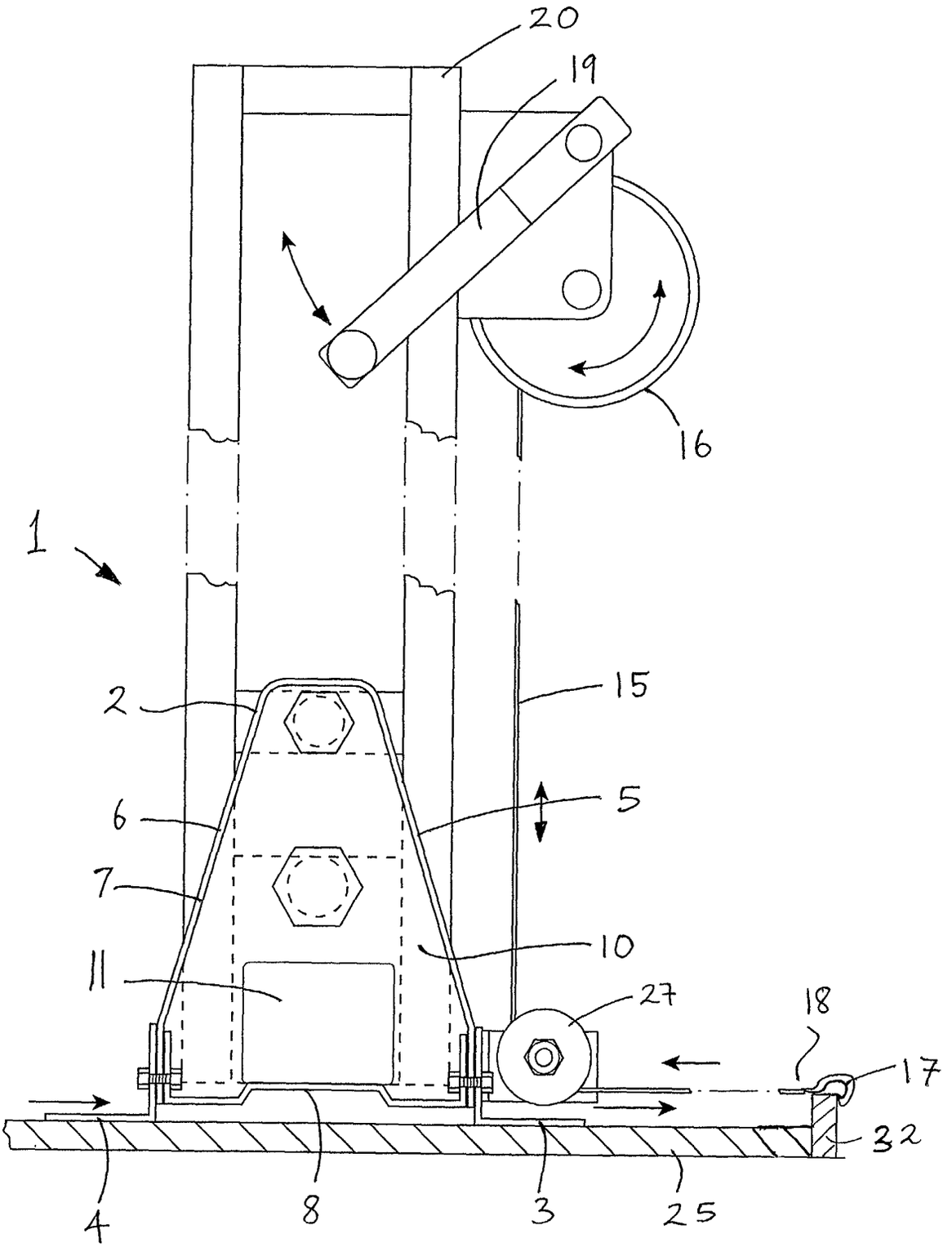

Fig. 2

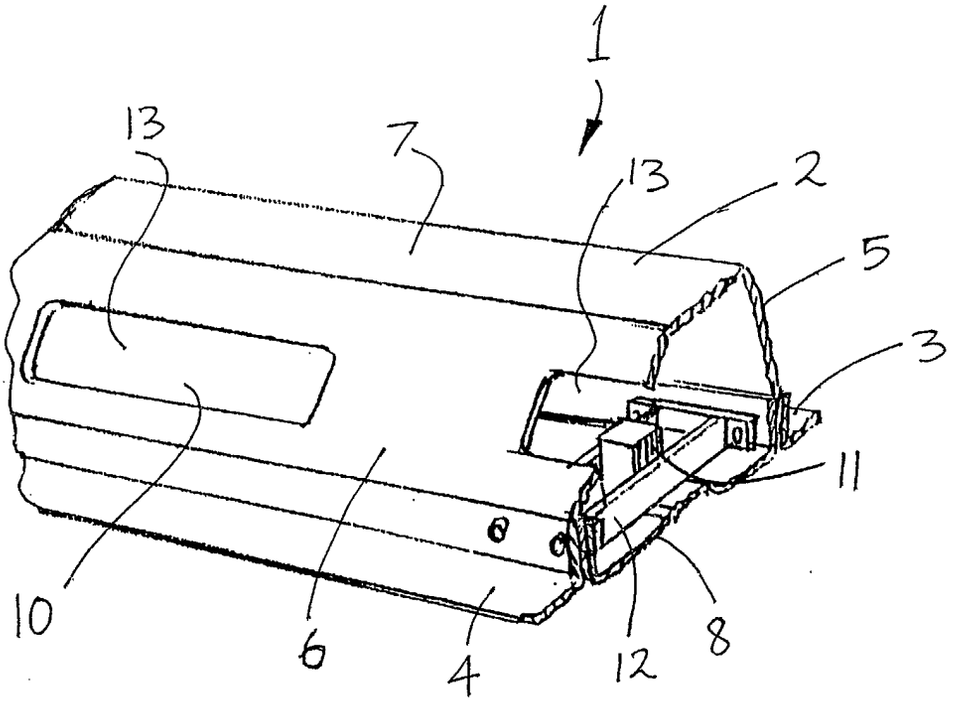

Fig. 3

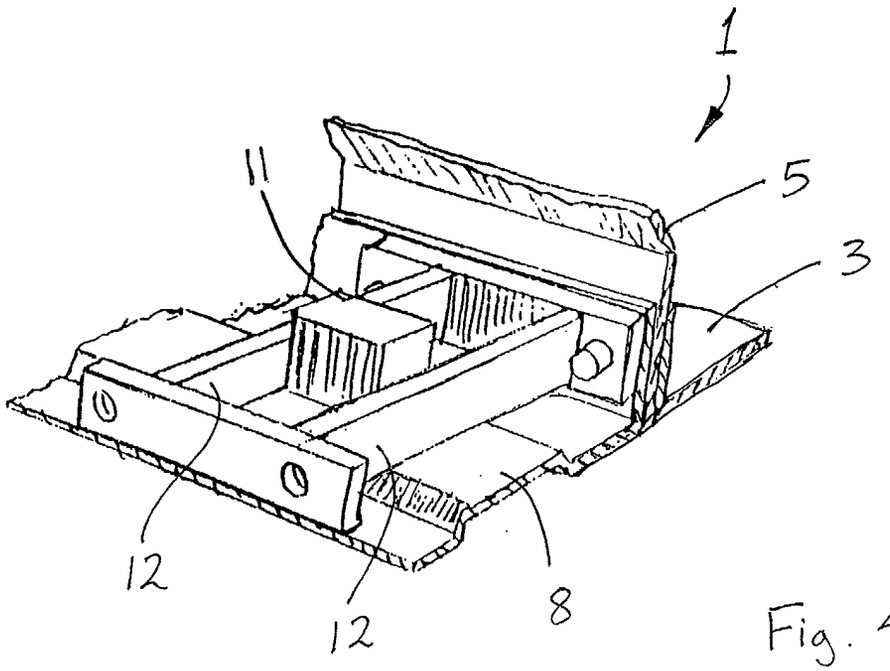

Fig. 4

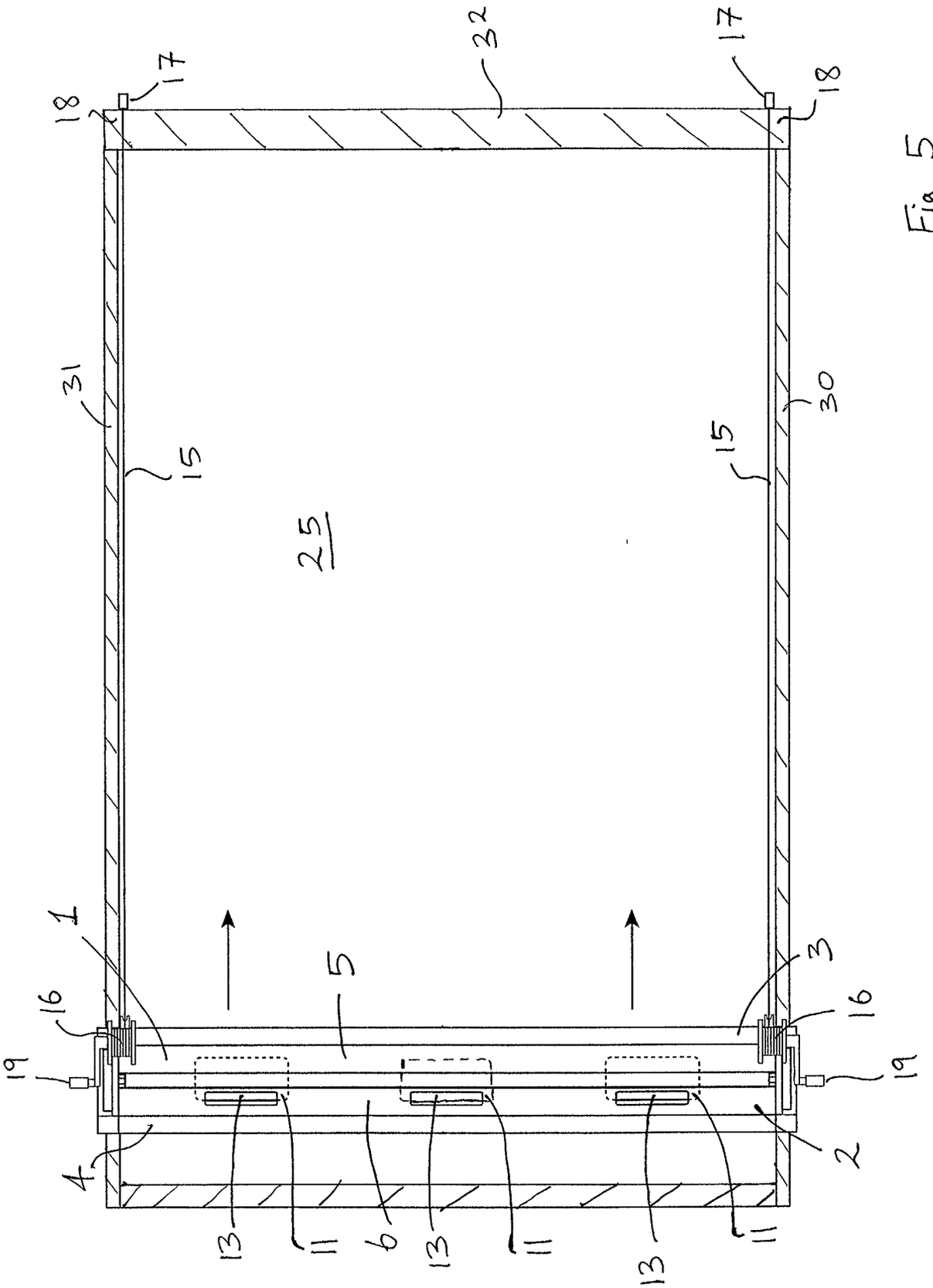

Fig. 5

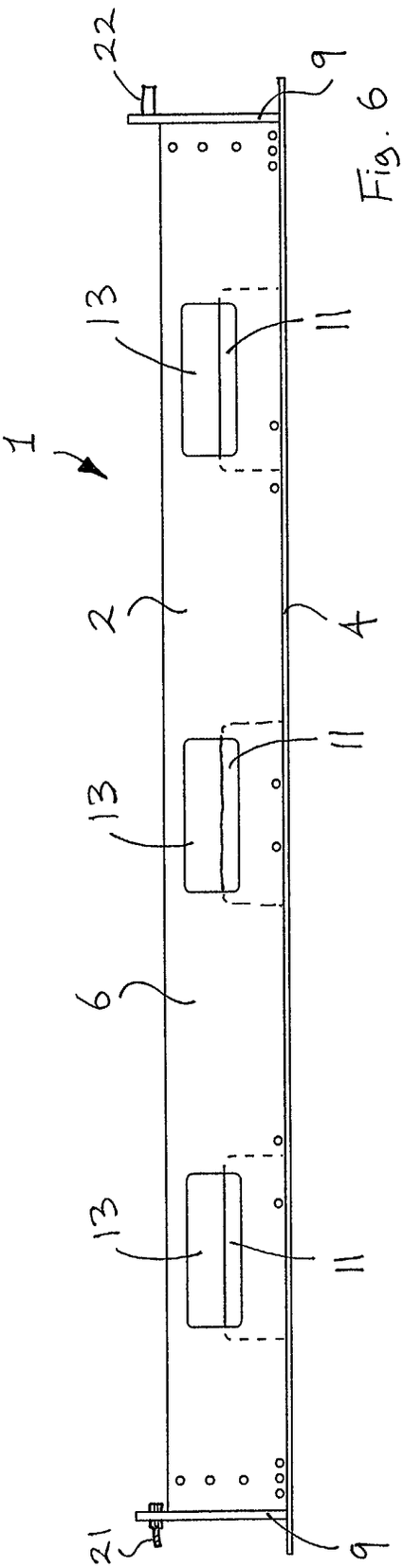

Fig. 6

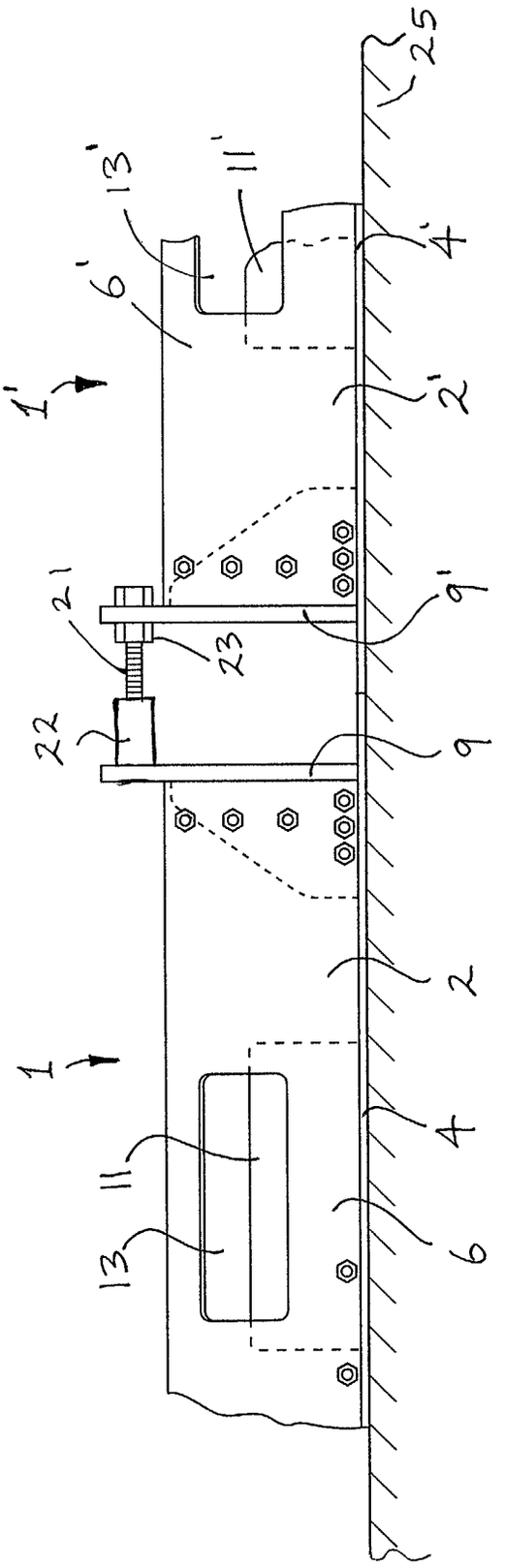

Fig. 7

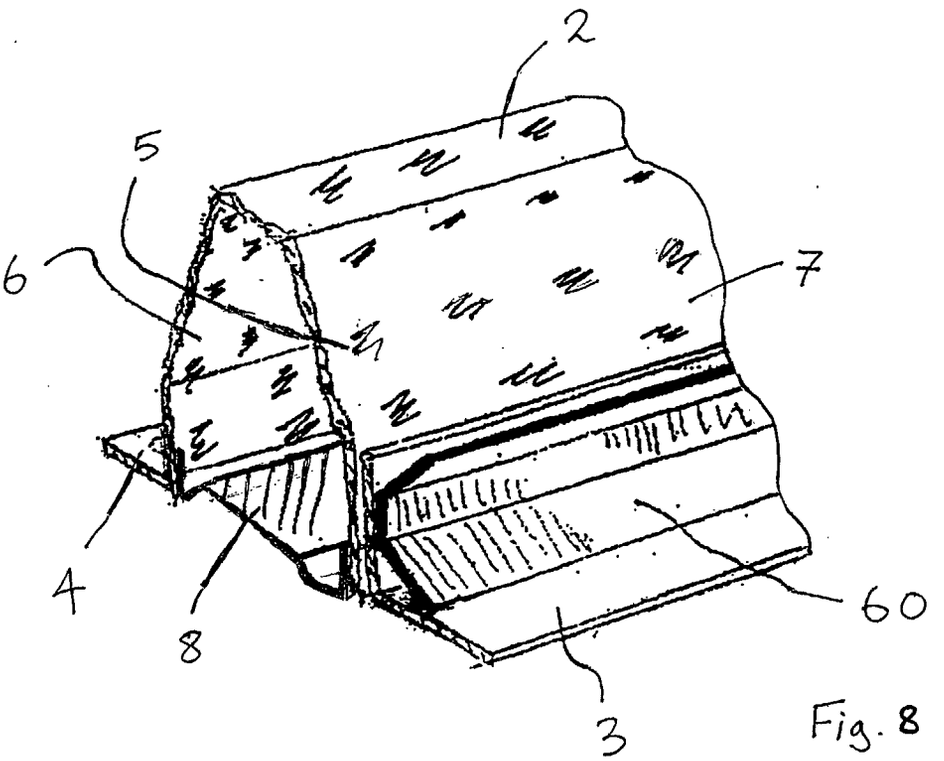

Fig. 8

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EUROPEAN SEARCH REPORT

Application Number
EP 02 39 4019

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)
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
MUNICH	11 July 2002	Festor, E

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