(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 2 184 408 B1

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
09.01.2013 Bulletin 2013/02

(21) Application number: **09174956.4**

(22) Date of filing: **03.11.2009**

(51) Int Cl.:
E02F 7/02 *(2006.01)* ***E02F 9/06*** *(2006.01)*
E02F 3/88 *(2006.01)* ***B63B 27/22*** *(2006.01)*
B65G 67/60 *(2006.01)*

(54) Suction dredger

Saugbagger

Dragueaspiratrice

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

(30) Priority: **06.11.2008 EP 08168527**

(43) Date of publication of application:
12.05.2010 Bulletin 2010/19

(73) Proprietor: **Spauwer Dredging BV**
4401 NA Yerseke (NL)

(72) Inventor: **Den Herder, Adriaan**
4401 NA, Yerseke (NL)

(74) Representative: **Uittenbogaart, Gustaaf Adolf et al**
De Vries & Metman
Overschiestraat 180
1062 XK Amsterdam (NL)

(56) References cited:
EP-A- 0 404 273
DE-B- 1 044 711
JP-A- 2001 122 188
NL-A- 7 706 664
US-A- 1 942 839
US-A- 3 228 539
US-A- 5 049 021

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 2 184 408 B1

Description

[0001] The invention concerns a suction dredger in accordance with the preamble of claim 1. In the known suction dredger the lifting belt transports the load from the side of the ship from under the unloading belt directly to the start of the distribution belt at the centre of the suction dredger. The documents JP 2001 122 188 A and EP 0 404 273 A disclose a suction dredger according to the preamble of claim 1. The disadvantage of the known suction dredger is that the distribution belt cannot rotate backwards far enough at one side of the ship due to interference between the distribution belt and the lifting belt. In accordance with the invention, the suction dredger is defined according to claim 1. By locating and designing the lifting belt in the specified way, the unloading can take place at both sides of the suction dredger.

[0002] In accordance with an embodiment, the suction dredger is according to claim 2. In this way, the load is moved in a direct way from the side of the suction dredger to the lifting belt on the centreline of the ship.

[0003] In accordance with an embodiment, the suction dredger is according to claim 3. In this way, the start of the lifting belt can be near the hold so that the lifting belt can be as long as possible and can be less steep.

[0004] In accordance with an embodiment, the suction dredger is according to claim 4. In this way the suction dredger can unload into vessels moored along either side of the ship.

[0005] Embodiments of the invention are described with the aid of the accompanying drawing in which

Figure 1 shows a side view of a suction dredger,
Figure 2 shows a top view of the suction dredger of figure 1,
Figure 3 shows cross section III-III of the suction dredger of figure 1,
Figure 4 shows cross section IV-IV of the suction dredger of figure 1, and
Figure 5 shows a crane on the suction dredger of figure 1 in schematic cross section.

[0006] Figures 1-5 show a suction dredger 19. The suction dredger 19 is a vessel with a bow 14 and a stern 21 with crew quarters 1 and a propulsion and steering system 20 and a hold 18 for holding sand, shingle or similar material sucked from the bottom of the sea. The suction dredger 19 has a suction pipe 6 that is coupled to the suction pipe gantry 7. The suction pipe 6 has a suction head 2 and a pump 5. During use, the suction pipe 6 extends from the suction pipe gantry 7 into the sea at the side of the suction dredger 19 with the suction head 2 on the sea floor. The pump 5 pumps a mixture of water with sand, shingle or similar into the hold 18. In the hold 18 the sand, shingle or similar settles in as sediment in the hold 18 and excess water flows out of the hold 18.

[0007] After the hold 18 is filled up with sand, shingle or similar the suction dredger 19 ends the loading phase and the suction pipe 6 is brought inboard and the suction dredger 19 sails to an unloading station. At the unloading station the suction dredger 19 is moored alongside a quay or the bow 14 is brought near a location where a distribution belt 9 mounted on the bow 14 can deposit the sand, shingle or similar material. Also the suction dredger 19 can be unloaded while it is anchored and smaller vessels moor alongside.

[0008] Rails 22 extend on both sides of the hold 18 and a crane 3 can travel over the rails 22 along the length of the hold 18. The crane 3 has a bucket 4, also known under the names of grab or clamshell. The bucket 4 has a width that is more or less equal to the width of the hold 18 and extends over the width of the hold 18. Cables 26 connect the bucket 4 with a cable drum 25, rotating the cable drum 25 results in hoisting and lowering the bucket 4. The bucket 4 has pistons 27 for opening and closing the bucket 4. After lowering the opened bucket 4 through an opening 36 into the hold 18 and setting it on the sediment deposited in the hold 18, the pistons 27 close the bucket 4 and the cable drum 25 hoists the bucket 4 upwards. After the bucket 4 is hoisted above hatches 29 through the opening 36 and the hatches 29 can rotate around the hinges 31, the hatches 29 rotate downwards by actuating the pistons 32 and close the opening 36 under the bucket 4.

[0009] In closed position, as shown in interrupted lines in figure 5, each hatch 29 forms an inclined surface, a slope, towards a crane belt 23. The crane belts 23 extend on both sides of the opening 36 perpendicular to the rails 22 through an opening 30 in the side of the crane 3 to above an unloading belt 24. At the side of the crane belt 23 away from the hatch 29 a guide plate 33 prevents material to fall off from the crane belt 23. After the bucket 4 above the closed hatches 29 is opened by actuating the pistons 27 the content of the bucket 4, sand, shingle or similar material, falls onto the closed hatches 29 and slides towards the crane belt 23.

[0010] The crane belts 23 transport the sand, shingle or similar material to the unloading belt 24. After the bucket 4 is unloaded, pistons 32 move the hatches 29 upwards to the position as shown in figure 5 and the bucket 4 is lowered into the hold for the next cycle of fetching a batch of sand, shingle or similar material. It will be clear that in the course of unloading the hold 18 wheels 35 mounted in carriages 34 will move the crane 3 along the length of the suction dredger 19.

[0011] In the disclosed embodiment, there are two hatches 29 and two crane belts 23. In a further embodiment the opening 36 is closed with one hatch 29 and there is one crane belt 23 transporting sand, shingle or similar to the unloading belt 24. In the shown embodiment the hatches rotate around a hinge 31. In another embodiment the hatch 29 is coupled by linkage arms to the crane and can make a combined movement so that while rotating the hatch 29 moves sideways as well.

[0012] The unloading belt 24 extends at one side of the suction dredger 19 along the length of the hold 18 to

the bow 14 and ends above a receiving bin 28 of a transverse belt 8. The transverse belt 8, during unloading of the suction dredger 19 located more or less perpendicular to the longitudinal direction of the suction dredger 19, transports the sand, shingle or similar to a receiving bin 16 of a lifting belt 10. The lifting belt 10 is located on the centerline of the suction dredger 19 and transports the sand, shingle or similar to the receiving bin 11 of the distribution belt 9.

[0013] A support cylinder 13 is located on the bow 14 of the suction dredger 19. The support cylinder 13 supports a turning hinge 12 that can rotate around a rotation axis 15. The distribution belt 9 is mounted in the turning hinge 12. The distribution belt 9 can rotate around the rotation axis 15, during unloading the suction dredger 19 the rotation of the distribution belt is limited in order to prevent colliding with the lifting belt 10. The distribution belt 9 has a considerable length, for instance more than the width of the suction dredger 19 or more than twice the width of the suction dredger 19, so that the distribution belt 9 can unload at a considerable length in front of the suction dredger 19.

[0014] By placing the lifting belt 10 supported by a frame 17 in the centreline of the suction dredger 19 the design is such that the end of the distribution belt 9 can be near the side of the suction dredger 19 on either side of the ship as shown in figure 2. For this, the forward end of the lifting belt 10 is high above the distribution belt 9 so that it can partly swivel under the lifting belt 10. The receiving bin 28 of the transverse belt 8 is located as low as possible so that the forward end of the unloading belt 24 is low above the deck and the distribution belt 9 can swivel freely over the end of the unloading belt 9.

[0015] In figure 2 the distribution belt 9 is shown at the port side with uninterrupted lines and the distribution belt 9" is shown at the starboard side with interrupted lines. The advantage of the unloading at both sides is that unloading can take place in vessels at both sides of the suction dredger 19 so that the unloading is more or less uninterrupted when unloading into one vessel at one side and thereafter in the next vessel at the other side. Figure 2 shows the maximum reach of the distribution belt 9 with the stripe-dot line, the distribution belt 9 can be tilted upwards so that obstacles within the reach can be avoided.

[0016] After the hold 18 is emptied, the suction dredger 19 is prepared for the next sea voyage. For this the lifting belt 10 is lowered on deck, for instance by moving the backward end of the lifting belt 10 backwards while rotating the frame 17 backwards. The front end of the lifting belt so lowers towards the deck on which it is secured. The distribution belt 9 is rotated backwards and lowered and secured on the center of the suction dredger 19. The crane 3 is secured on deck near the crew quarters 1.

Claims

1. Suction dredger (19) comprising a hold (18) for holding a load such as sand, shingle or similar, a crane (3) for moving the load from the hold onto a crane belt (23) and the crane belt transports the load onto an unloading belt (24) along the hold, a base (13) located at a forward position of the suction dredger, a distribution belt (9) supported on the base and swivable extending over a length that is longer than the width of the suction dredger and a lifting belt (10) for moving the load from the unloading belt to above the base and the distribution belt **characterized in that** the suction dredger comprises a pump (5) that fills the hold with the load by pumping a mixture of water with sand, shingle or similar into the hold, the sand, shingle or similar settles in the hold as sediment and excess water flows out of the hold, the base comprises a support cylinder (13) located on the bow, during use the lifting belt (10) is located in the centreline of the suction dredger (19) and is designed such that the distribution belt (9) can swivel at both sides of the suction dredger backwards to a position partly under the lifting belt while swivelling freely over the end of the unloading belt.

2. Suction dredger in accordance with claim 1 wherein a transverse belt (8) extends from under the end of the unloading belt to the start of the lifting belt and moves the load from the unloading belt (24) to the lifting belt (10).

3. Suction dredger in accordance with claim 2 wherein the transverse belt (8) is more or less perpendicular to the centreline of the suction dredger (19).

4. Suction dredger in accordance with one of the previous claims wherein the distribution belt (9) can swivel backwards so that its end can be near the side of the suction dredger on either side of the suction dredger (19).

Patentansprüche

1. Saugbagger (19) mit einem Laderaum (18) zum Aufnehmen einer Ladung, z. B. Sand, Kies o. ä., einem Kran (3) zum Bewegen der Ladung vom Laderaum auf ein Kranband (23), und das Kranband transportiert die Ladung auf ein Entladeband (24) entlang dem Laderaum, einer Basis (13), die an einer Vorwärtsposition des Saugbaggers angeordnet ist, einem Verteilungsband (9), das auf der Basis getragen wird und sich schwenkbar über eine Länge erstreckt, die länger als die Breite des Saugbaggers ist, und einem Hebeband (10) zum Bewegen der Ladung vom Entladeband zu einer Stelle über der Basis und dem Verteilungsband, **dadurch gekennzeichnet, dass** der Saugbagger eine Pumpe (5) aufweist, die den Laderaum durch Pumpen einer Mischung aus Wasser mit Sand, Kies o. ä. in den Laderaum mit

der Ladung füllt, sich der Sand, Kies o. ä. im Laderaum als Sediment absetzt und Wasserüberschuss aus dem Laderaum fließt, die Basis einen Tragzylinder (13) aufweist, der am Bug liegt, im Gebrauch das Hebeband (10) auf der Achse des Saugbaggers (19) liegt und so gestaltet ist, dass das Verteilungsband (9) an beiden Seiten des Saugbaggers nach hinten zu einer Position teilweise unter dem Klemmband schwenken kann, während es über dem Ende des Entladebands frei schwenkt.

2. Saugbagger nach Anspruch 1, wobei sich ein Querband (8) von einer Stelle unter dem Ende des Entladebands zum Anfang des Hebebands erstreckt und die Ladung vom Entladeband (24) zum Hebeband (10) bewegt.

3. Saugbagger nach Anspruch 2, wobei das Querband (8) mehr oder weniger senkrecht zur Achse des Saugbaggers (19) ist.

4. Saugbagger nach einem der vorstehenden Ansprüche, wobei das Verteilungsband (9) nach hinten schwenken kann, so dass sein Ende nahe der Seite des Saugbaggers auf jeder Seite des Saugbaggers (19) liegen kann.

Revendications

1. Drague aspiratrice (19) comprenant une cale (18) destinée à contenir une charge telle que du sable, de l'éboulis ou similaire, une grue (3) destinée à déplacer la charge à partir de la cale sur une bande de grue (23) et la bande de grue transportant la charge sur une bande de déchargement (24) le long de la cale, une base (13) située sur une position avant de la drague aspiratrice, une bande de distribution (9) portée par la base et pouvant pivoter s'étendant sur une longueur plus longue que la largeur de la drague aspiratrice, et une bande de levage (10) destinée à déplacer la charge à partir de la bande de déchargement jusqu'au dessus de la base et de la bande de distribution, **caractérisée en ce que** la drague aspiratrice comprend une pompe (5) qui remplit la cale avec la charge en pompant un mélange d'eau et de sable, d'éboulis ou similaire dans la cale, le sable, l'éboulis ou similaire se fixe dans la cale sous la forme de sédiment et l'excès d'eau s'écoule de la cale, la base comprend un cylindre de support (13) situé sur la proue avant, pendant l'utilisation la bande de levage (10) est située dans la ligne centrale de la drague aspiratrice (19) et est conçue de sorte que la bande de distribution (9) puisse pivoter des deux côtés de la drague aspiratrice vers l'arrière à une position en partie sous la bande de levage tout en pivotant librement sur l'extrémité de la bande de déchargement.

2. Drague aspiratrice selon la revendication 1, dans laquelle une bande transversale (8) s'étend depuis le dessous de l'extrémité de la bande de déchargement au début de la bande de levage et déplace la charge à partir de la bande de déchargement (24) à la bande de levage (10).

3. Drague aspiratrice selon la revendication 2, dans laquelle la bande transversale (8) est plus ou moins perpendiculaire à la ligne centrale de la drague aspiratrice (19).

4. Drague aspiratrice selon l'une quelconque des revendications précédentes, dans laquelle la bande de distribution (9) peut pivoter vers l'arrière de sorte que son extrémité puisse être proche du côté de la drague aspiratrice de chaque côté de la drague aspiratrice (19).

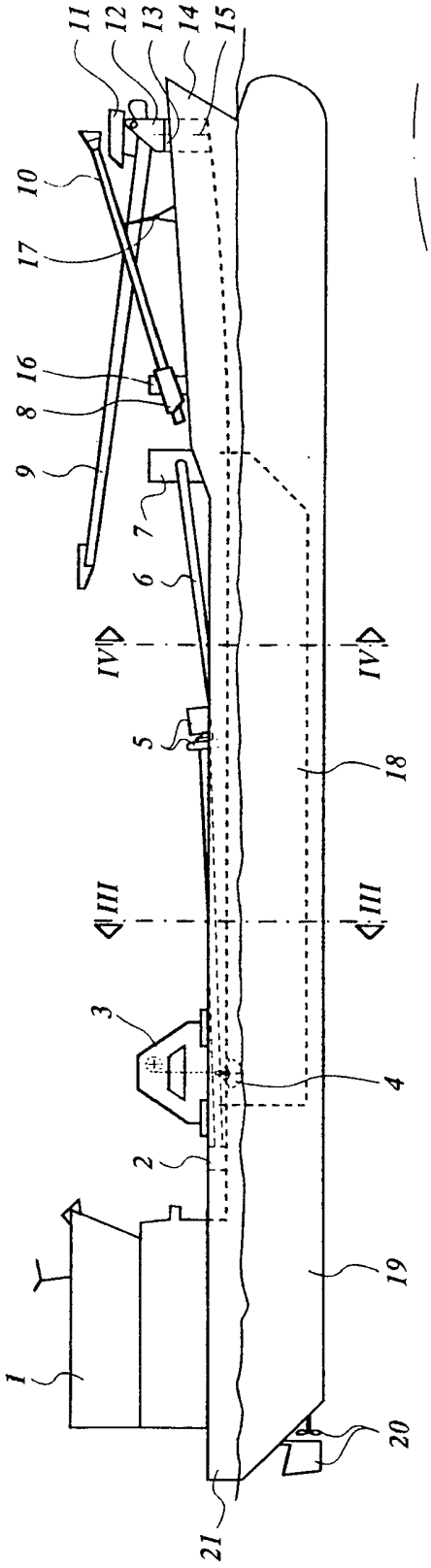

11
12
13
14
15
10
17
16
8
9
7
6
IV
IV
5
18
III
III
3
4
2
19
1
20
21

Fig. 1

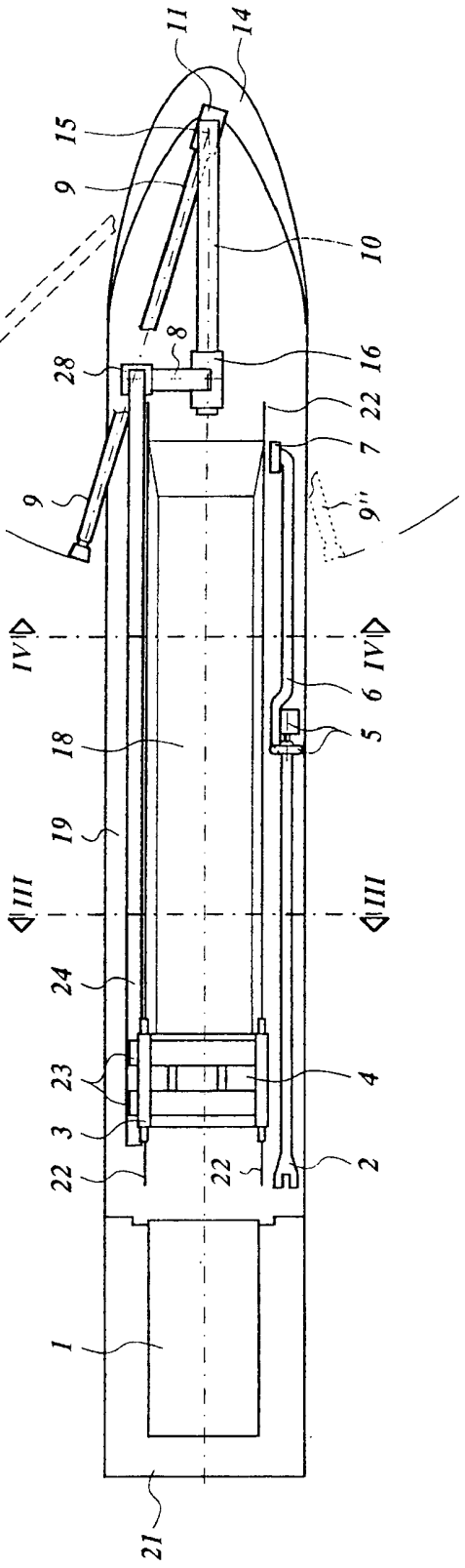

11
14
15
9
10
9'
8
28
16
22
7
9''
9
IV
IV
6
5
18
19
III
III
24
23
4
3
22
22
2
1
21

Fig. 2

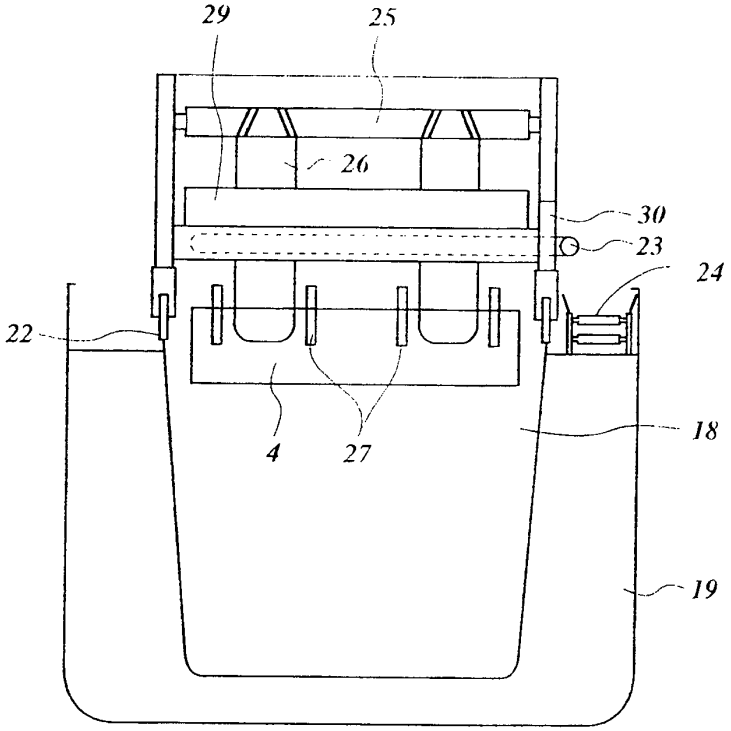


Fig. 3

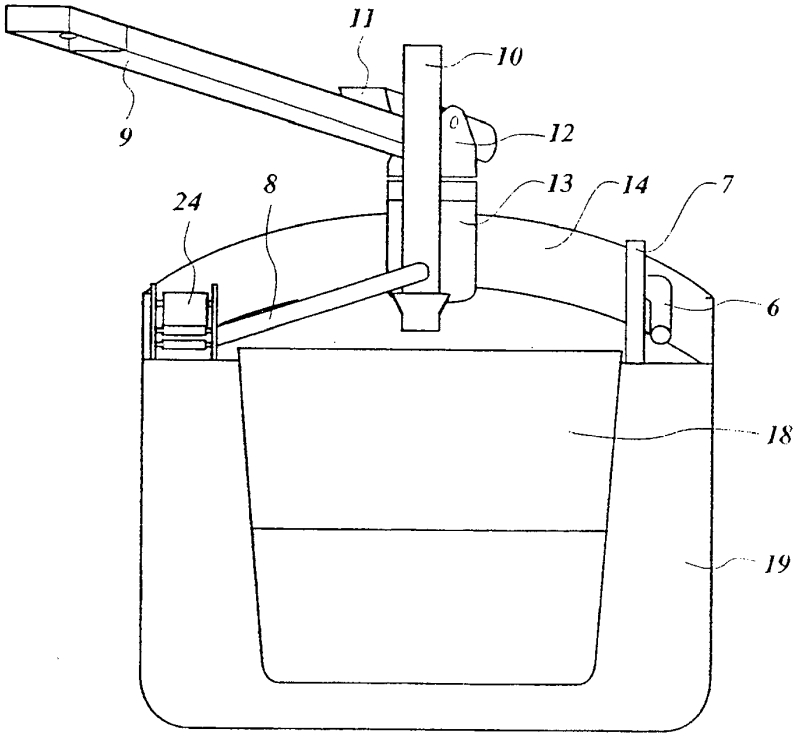


Fig. 4

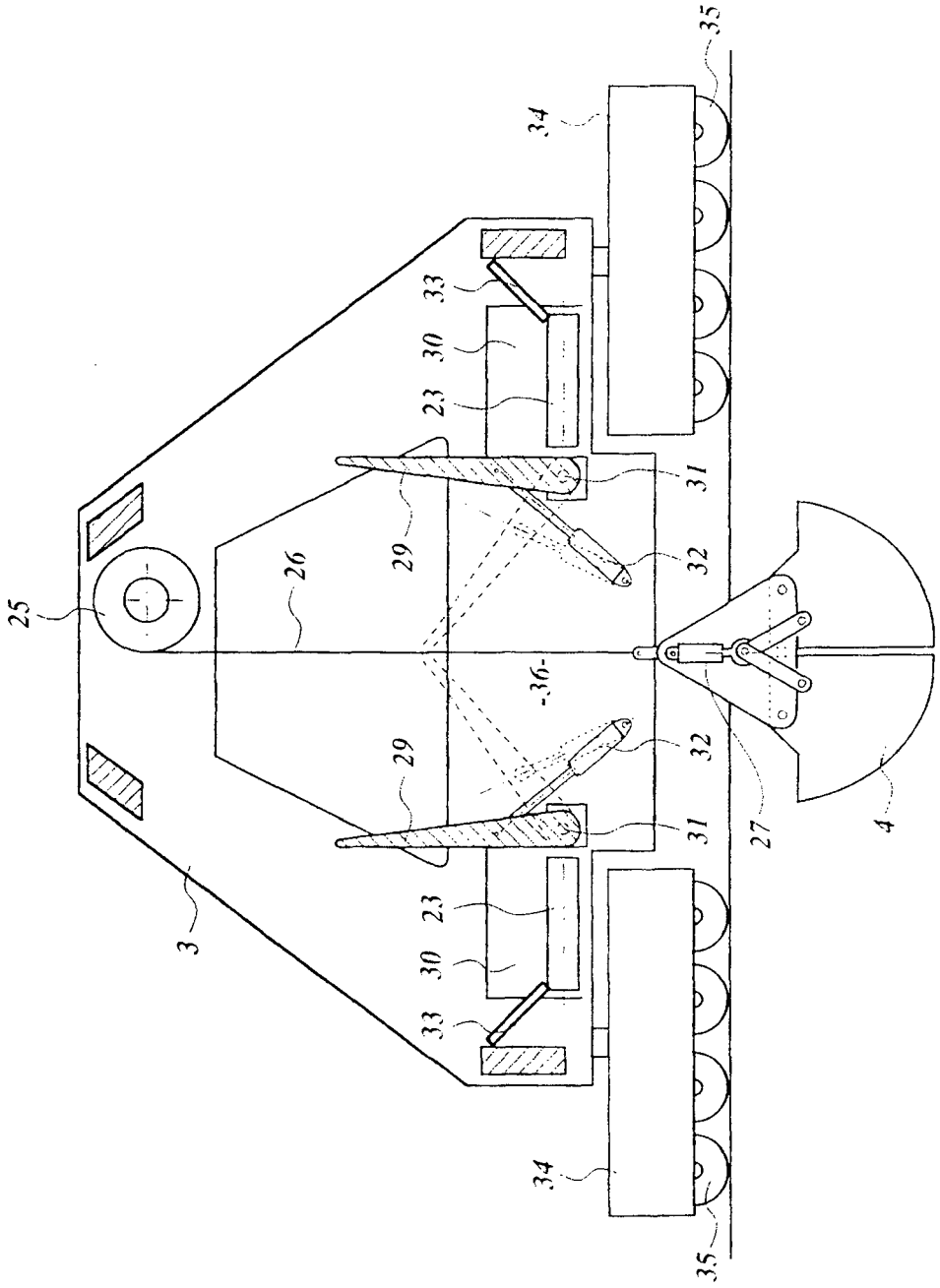


Fig. 5

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP 2001122188 A **[0001]**
- EP 0404273 A **[0001]**