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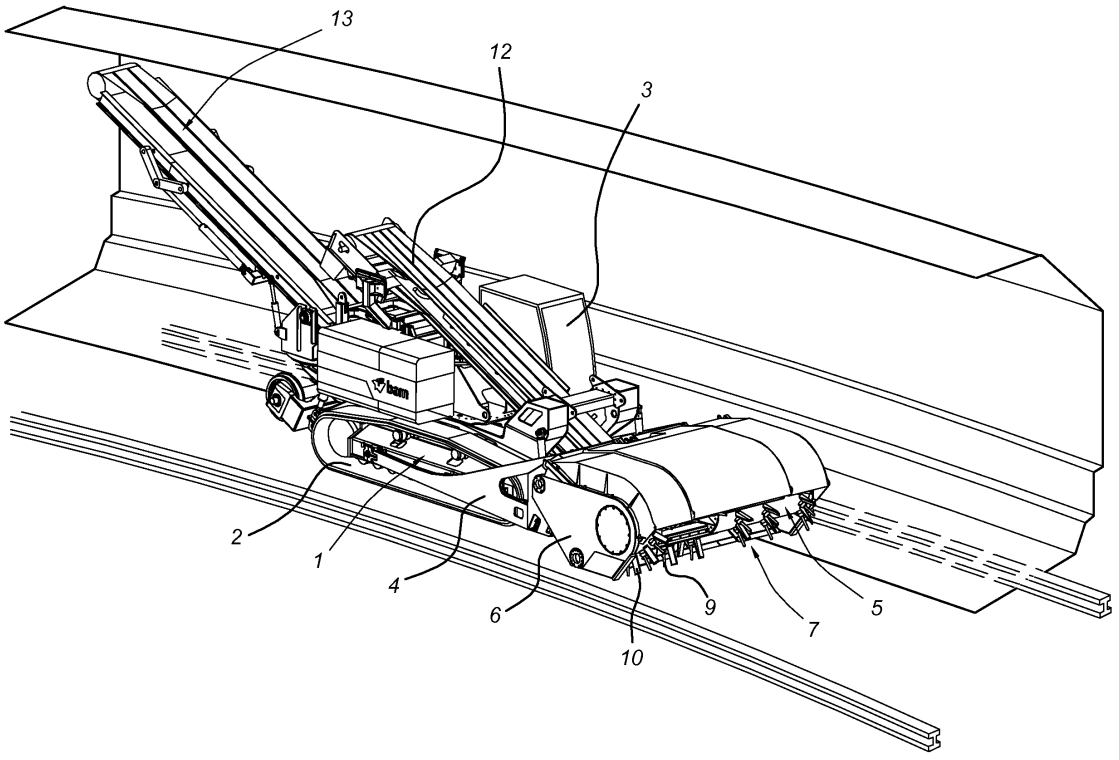
(54) **Device and method for the removal of ballasting material from a ballast bed**

(57) A device for the removal of ballasting material from a ballast bed comprises a mobile bogie, an uptake body incorporated onto the bogie with an uptake surface, as well as an excavating element provided on the bogie. The excavating element is rotationally symmetrical and has a centerline that extends parallel to and at a higher level than the uptake surface of the uptake body.

Fig 1



EP 2 110 476 A2

Description

[0001] The invention relates to a device for the removal of ballasting material from a ballast bed, comprising a mobile bogie, an uptake body incorporated onto the bogie with a pick-up surface, as well as an excavating element provided on the bogie.

[0002] Such a device is known in the prior art from the French patent specification 1.387.729. In this known device, a bucket elevator is mounted on the bogie, which, as viewed in the direction of travel, is mounted at the rear end of the bogie. The part of the bucket elevator that is located directly over the ballast bed exerts a digging and excavating action. This action loosens the ballasting material, which can sometimes be firmly compacted, so that it becomes suitable for excavation. The ballasting material can subsequently be transported upwards behind the bogie by means of the bucket elevator and be discharged onto a conveyor belt. The ballasting material excavated and discharged by the conveyor belt can subsequently be carried away, for example, to a wagon on an adjacent track.

[0003] This known device has various drawbacks. Firstly, it is large in size, particularly in height. Therefore, it is difficult to use this known device to perform work on electrified track sections. This is because the structural height of the known device poses the risk of coming into contact with the electric cables, resulting in problems occurring with regard to electricity and damage.

[0004] A further disadvantage is that the conveyor belt on which the excavated ballasting material is discharged is also located at a fairly considerable distance above the ballast bed. Therefore, it is difficult and labour-intensive for the ballasting material to be carried away. Finally, there is also the disadvantage that the bucket elevator, as viewed in the direction of travel, is located on the rear end of the bogie. This makes it difficult for the driver to manoeuvre, because on the one hand he has to keep observing in the forward direction in order to drive the device on the correct course, whilst on the other hand he needs to keep observing towards the rear in order to ensure that the bucket elevator performs the desired activities.

[0005] The object of the invention, therefore, is to provide a device of the type mentioned in the preamble, that is suitable for use within a narrowly defined limited of a section of railway track, in particular beneath the electric cables of an electrified section, and which is also simple to drive and to operate. That object is achieved in that the excavating element is rotationally symmetrical and can be rotated about a centerline that extends parallel to the uptake surface of the uptake body.

[0006] A relatively simple excavating element is used for the device according to the invention, which only performs a rotating action about a fixed centerline. Such an excavating element can rotate constantly in the same direction in connection with digging loose and moving the ballasting material in the desired direction. The advantage of such a simple excavating element is its fairly small dimensions, at least as regards height. Furthermore, the operation of a rotating excavating element is highly reliable, because of the small number of moving parts, particularly in comparison to a bucket elevator.

[0007] A further advantage is that the excavating element as applied in the device according to the invention does not have to lift the ballasting material that is loosened very far in height, because the uptake body is located in the direct vicinity and to the rear of the excavating element, as viewed in the direction of travel. The forward edge of the uptake surface at least is located underneath the excavating element, so for that reason also, it is not necessary to transport the loosened ballasting material very high. It can be transported directly backwards onto the uptake body. This ensures that the ballasting material thus loosened and moved can be taken up from the ballast bed onto the uptake body in a reliable manner. Because all of these actions are performed directly above the ballast bed, the overall height of the device according to the invention can remain more limited than that in the aforementioned prior art. Therefore, the device can be used universally for all track sections, also those with electric cables.

[0008] In this connection, reference is made to the prior art as known from the European patent specification 1.348.057, from which a device is also known for the removal of ballasting material from a ballast bed. This known device is provided with a bogie equipped with caterpillar tracks, on the front end of which an excavator bucket is arranged that has a relatively sharp, toothed leading edge. The bogie and the excavator bucket are pushed against the ballast bed by means of the drive of the caterpillar track. The leading edge of the excavator bucket thereby digs itself into the ballast bed. As a result, the ballasting material has to be cut out in slices or layers and this cut off ballasting material has to be transferred to the uptake surface of the excavator bucket.

[0009] There are rotating elements provided on this uptake surface, with a centerline that is directed somewhat obliquely upwards, which must ensure that the ballasting material taken up is then transported centrally onto a conveyor belt. With this known device, the ballasting material is not so much loosened, but cut loose by the relatively sharp leading edge of the excavator bucket. The disadvantage of this known device is also that, in particular with tightly compacted ballasting materials, very high pushing forces need to be exerted in order to force the excavator bucket into the ballasting material. Furthermore, there is the risk that the excavator bucket is pushed too deep into the ballasting material, and that it becomes jammed. In such a situation the bogie has to be driven in reverse and the excavation procedure repeated. Such a procedure is time-consuming and moreover a high-powered drive is necessary. This makes the device and its use relatively expensive.

[0010] The excavating element used for the device according to the invention can be constructed in numerous

ways. An example is a shaft with radially protruding digging or excavating elements. However, preference is given to an embodiment wherein the excavating element comprises a drum along with digging elements extending radially outwards in relation to the surface of the drum. A roller element embodied in the form of a drum has the advantage of relatively high rigidity along with relatively low weight. Therefore, the entire device can remain relatively light-weight, whereby a relatively low-powered drive can be used, even if only due to the fact that this device is used to loosen and not to cut away the ballasting material. The light-weight construction of the drum-shaped excavating element has the further advantage that the tendency for the device to pitch downwards is thus restricted.

[0011] The digging or excavating elements may have various different forms; preference is given to digging elements comprising teeth, provided with a toothed surface which is oriented obliquely in respect of the centerline of the drum. Under the influence of said oblique orientation of the flat toothed surfaces in conjunction with the direction of rotation of the drum, an effect can be created of transporting towards the centre of the drum, as viewed in the direction of the centerline of the same. Such a transporting effect is particularly desirable with a relatively broad excavating element, because the ballasting material loosened needs to be transported centrally onto a conveyor belt, for example, which is used for the further disposal.

[0012] Alternatively, other digging elements can be used, such as digging elements in the form of pin-shaped projections. It goes without saying that various types of digging elements can be used simultaneously, such as the aforementioned tooth-shaped and pin-shaped digging elements. The arrangement of the digging elements on the drum can also be achieved in different ways. The construction preferably provides digging elements arranged in circles on the surface of the drum, but other arrangement of the digging elements are also conceivable, for example, a helical arrangement.

[0013] The width of a ballast bed may vary; however this is mostly within certain limits. Moreover, various obstacles may arise adjacent to the ballast bed, such as masts for electric cables, signal posts and the like. It is of great importance that the device according to the invention can pass by such obstacles without hindrance, which generally result in a restriction of the available width of the ballast bed. Firstly, the device can pass by such obstacles by steering past them in a suitable manner. Equally though, situations may occur whereby such a procedure is problematic. This may be the case when obstacles are located directly opposite each other. The only remaining option would then be to remove one or more of the obstacles. However, this is highly undesirable because then specialists need to be deployed and, moreover, this also requires permission from the authorities who operate the section of track. Such a procedure therefore leads to high costs, because the obstacles removed also have to be replaced.

[0014] In this connection, in the device according to the invention, a further improvement can be achieved in that the dimension of the excavating element, or of the drum, can be varied, as viewed in the direction of the centerline thereof. The drum in particular may comprise two sections that can be moved towards each other or away from each other, as viewed in the direction of the centerline of the drum. The drum, which is wide enough to cover the ballast bed entirely, can therefore be adjusted to suit the local circumstances. If there are obstacles in the track section to be travelled by the device, the drum can be made temporarily narrower. After the obstacle has been passed by, the drum can be returned to its previous, desired width in order to handle the further track section in the appropriate manner.

[0015] Varying the drum's width can be achieved in many different ways, for example by using telescopic drum sections. However, preference is given to an alternative embodiment wherein the drum sections are provided with lugs extending axially on their mutually opposed ends, as viewed in the circumferential direction, which include slots so that the lugs of the one drum section can slide into the slots of the other drum section.

[0016] In such an embodiment of the drum, the entire surface thereof is made available for the positioning of digging elements. Although the digging elements are moved in respect of each other when the width of the drum is varied, the effect of the digging elements exerted on the ballast bed is still maintained. In connection with a quick and simple operation, an actuator, such as a hydraulic piston/cylinder device, may be included on the interior of the drum sections in order to move the drum sections towards each other or away from each other.

[0017] Apart from the drum, the uptake body can also have a fairly large width. For the same reason, in order to avoid obstacles, the uptake body may comprise two uptake body sections that can be moved towards each other or away from each other respectively, as viewed in the direction of the drum's centerline. In particular, the excavating element can be rotatably suspended on the uptake body. The uptake body may comprise opposing side walls, wherein the excavating element is mounted pivotally to the end walls.

[0018] The uptake body may also be combined with a conveyor belt. The mid-section of the uptake body is in that case open. By providing a conveyor belt at the opening between the uptake body sections, the ballasting materials loosened and moved can be guided directly onto the conveyor belt or alternatively from the uptake body sections onto the conveyor belt. The aforementioned movement occurs under the influence of the centering effect of the obliquely positioned teeth on the drum. In that case, the conveyor belt fulfils a dual function, notably, as part of the uptake body, but also as a means of carrying away the ballasting material taken up by the uptake body. For this purpose in particular, the uptake body sections may extend outwardly to both sides of the conveyor belt.

[0019] As already mentioned in the foregoing, the uptake body may be either fixed or variable in width. Also, in the embodiment previously described, in order to ensure that the ballasting material loosened can be taken up by the conveyor belt in a reliable manner, and then can be transported away, fixed base sections (29) can be arranged on both sides of the conveyor belt (12); also, the uptake body sections (17, 18) may each comprise an uptake surface section (19, 20) that can slide over a corresponding base section (29).

[0020] The ballasting material that is loosened and transferred onto an uptake surface section can then be pushed sideways by the fixed base sections and onto the conveyor belt. The fixed base sections in particular can each overlap at the top a side edge of the conveyor belt, thus ensuring that the ballasting material is not deposited next to the conveyor belt, causing possible damage.

[0021] The ballasting material loosened is moved from the uptake surface sections by the fixed base sections and onto the conveyor belt, for example by means of rotors of which the centre of rotation is in a transverse direction in respect to, and in particular can be oriented perpendicular to, the uptake surface sections. To this end, the rotors can be suspended on the uptake body, and also be transversely movable in order to follow the variations in width of the uptake body in the desired manner.

[0022] To ensure the further protection of the delicate conveyor belt, and in particular the foremost portion thereof, located at a low level in the vicinity of the uptake body, the uptake body may comprise a base-plate on its leading edge, from which base-plate a protecting plate extends obliquely upwards and to the rear, such that the reversing roller of the conveyor belt is located within the cavity formed between the base-plate and the protecting plate.

[0023] The invention relates further to a method for the removal of ballasting material from a ballast bed by means of the device as described in the foregoing, comprising the steps of:

- propelling of the device,
- loosening of the ballasting material by means of the excavating element during the forward propulsion of the device,
- during the forward propulsion of the device, movement of the loosened ballasting material from the ballast bed onto the uptake body, under influence of the excavating element,
- the removal of the ballasting material taken up from the uptake body as well as
- the disposal of the ballasting material removed from the uptake body.

[0024] In the method according to the invention, the advantage is achieved that the ballasting material is first loosened and is only then taken up by the uptake body. Therefore, the loosening of the ballasting material and the transport of the loosened ballasting material are in fact performed in direct succession. The method according to the invention is highly efficient in that the step-by-step operations of the loosening, uptake and the removal and disposal of the ballasting materials are performed continuously and progressively as the device moves along.

[0025] The uptake body itself is barely loaded because it fulfils no function in loosening the ballasting material. The uptake body performs no excavating or cutting action on the ballasting material. A further advantage is that all activities are performed at the front end of the device, thus enabling the operating personnel to steer the device along the correct path and, at the same time, monitor the removal of the ballasting material.

[0026] As described in the foregoing, as the tasks related to the removal of the ballasting material are performed, obstacles may be encountered. In this connection, the method according to the invention provides for varying the dimension of the uptake body and the rotating excavating element, as viewed in the direction transversely in relation to the ballast bed.

[0027] The invention will now be described in more detail according to several embodiments shown in the figures.

Fig. 1 shows a first view in perspective of the device according to the invention.
Figure 2 shows a plan view.
Figure 3 shows a second view in perspective.
Figure 4 shows a bottom view in perspective.
Figure 5 shows a fourth view in perspective.
Figure 6 shows a vertical cross-sectional view through the centre of the device.
Figure 7 shows a cross-section according to VII-VII of figure 6.

[0028] The device according to the invention shown in figures 1- 5 comprises a complete bogie 1, provided with caterpillar tracks 2 by means of which the device can be moved over an uncompacted surface. A driver's cabin 3 is also provided on the bogie in the usual manner, in order to accommodate the operating personnel and is able, whilst viewing in a forward direction, to observe the steering and the removal of a ballasting material. The device is further provided with the customary drive mechanisms, not shown here.

[0029] There is a drum-shaped excavating element 5 mounted on the front end of the bogie by means of a subframe 4 that can be slewed upwards and downwards. In particular, this excavating element is rotatable in respect of the lateral walls 6 of the uptake body assembly 7. The drum-shaped excavating element 5 comprises a drum 8 and the tooth-shaped digging or excavating elements 9 and the pin-shaped digging or excavating elements 10 in a regularly distributed crosswise arrangement. As shown in figure 1, these digging elements 9, 10 may be

arranged according to a helical position, although it is also possible to opt for an annular arrangement thereof (not shown) or any other desired arrangement.

[0030] The uptake body 7 comprises a fixed uptake surface 11. The uptake body 7 further comprises two uptake body sections 17, 18, each with an uptake surface section 19, 20 on the side, to which each of the walls 6 is attached. These uptake body sections 17, 18, and in particular the uptake surface sections 19, 20, are angled obliquely in and directed upwardly and towards the rear. The uptake body sections 17, 18 can be moved away from each other or towards each other by means of the hydraulic piston/cylinder device 23. Accordingly, the uptake surface sections 19, 20 slide across the fixed base sections 29, as shown in figures 6 and 7. These base sections 29 are fixed with respect to the fixed frame 33 of the uptake body 7. The hydraulic piston/cylinder devices 23 are attached on the one hand to the fixed extensors 24 of the frame 33 and, on the other hand, to the supports 25 of the uptake surface sections 17, 18.

[0031] As the width of the uptake body 7 is varied, the uptake surface sections 19, 20 each slide across a corresponding fixed base section 29, such that the ballasting material collected can be reliably fed towards the centre to the conveyor belt 12. The fixed base sections 29 are constructed with an oblique portion, such that a trough-like shape is created that promotes the collection and disposal of the ballasting material by means of the conveyor belt 12. This central feed is further promoted by means of the rotors 26.

[0032] The drum 8 comprises two drum sections 13, 14, each provided with lugs 15 and slots 22 enclosed between them. The lugs 15 of the one drum section 13 fit into the slots 22 of the other drum section 14, and vice versa. It is thereby possible to vary the width of the drum 8 along with the uptake body 7, notably between the narrow position shown in figure 1 and the wide position shown in figure 2.

[0033] In operation, the device according to the invention travels in a forward direction, whilst the drum-shaped excavating element 5 rotates such that the pin-shaped digging elements 9, 10 dig into, loosen and transport the ballasting material in a backwards direction to the uptake body 7. The ballasting material, that may initially be tightly compacted, is thus loosened by means of the digging elements 9, 10 and at the same time, or immediately thereafter, transported to the uptake body.

[0034] To this end, the conveyor belt 12 is provided, mounted obliquely on the bogie, and connected to the uptake body 7 for carrying away the ballasting material thus obtained obliquely in an upward direction and to the rear. Additionally, there is a conveyor belt 13 provided on the bogie that can be slewed to the right and to the left, onto which the ballasting material is collected which is taken up by the obliquely mounted conveyor belt 12. With the aid of the pivotal conveyor belt 13, this ballasting material can then be carried away in the desired direction, for example to a wagon on an adjacent track (not shown).

[0035] In connection with the coverage width, the excavating element 5 and the uptake body 7 can be varied in respect of their width across the ballast bed. To this end, the drum 8 comprises the drum sections 13, 14, that can be moved toward each other and away from each under the effect of the hydraulic piston/cylinder device 23. The drum sections 13, 14 are each provided with lugs 15 and slots 22 enclosed between them. The lugs 15 of the one drum section 13 fit into the slots 22 of the other drum section 14, and vice versa. It is thereby possible to vary the width of the drum 8, notably between the narrow position shown in figure 1 and the wide position shown in figure 2.

[0036] As previously stated, the lower portion of conveyor belt 12, which is inclined obliquely in an upward direction and to the rear, extends between both of the uptake surface sections 19, 20 and the fixed base sections 29. The ballasting material is transported under the effect of the digging elements 9, 10 onto the uptake surface sections 19, 20 and henceforth onto the conveyor belt 12. In order to ensure that the ballasting material that was loosened and transferred onto the uptake surface sections 19, 20 is transported centrally onto the conveyor belt 12, as previously described, there are rotors 26 arranged above the uptake surface sections 19, 20. These are mounted to the housings 27, which are shown as being transparent for reasons of clarity, which, in turn, are each attached to one of the sections of uptake body 17, 18. The motors 28, for driving the related rotors 26, are arranged within the housings 27. In order to additionally ensure that the ballasting material transferred onto the uptake surface sections 19, 20 can be fed centrally onto the conveyor belt 12, the tooth-shaped digging elements 9 have a particular orientation. The flat tooth surfaces 21 thereof are positioned obliquely so that such a centering effect is achieved, in conjunction with the direction of rotation of the excavating element 5, as indicated by the curved arrow.

List of references

[0037]

1. Bogie
2. Caterpillar track
3. Cabin
4. Auxiliary frame
5. Excavating element
6. Side wall
7. Uptake body section
8. Drum
9. Tooth-shaped digging element
10. Pin-shaped digging element
11. Uptake surface
12. Obliquely inclined conveyor belt
13. Pivotal conveyor belt
14. Drum section
15. Drum section

16. Lug
17. Uptake body section
18. Uptake body section
19. Uptake surface section
20. Uptake surface section
21. Toothed surface
22. Slot
23. Hydraulic piston/cylinder arrangement
24. Fixed extensor
25. Support on uptake body section
26. Rotor
27. Housing
28. Engine
29. Fixed base plate
30. Base plate
31. Protection plate
32. Reverse roller conveyor belt
33. Fixed bogie uptake body

Claims

1. Device for the removal of ballasting material from a ballast bed, comprising a mobile bogie (1), an excavating element (5) provided on the bogie (1) for the excavation of ballasting material, as well as an uptake body (7) mounted on the bogie (1) with an uptake surface (11) for receiving the excavated ballasting material, **characterized in that** the excavating element (5) is rotationally symmetrical and rotates about a centerline that extends parallel to the uptake surface (11) of the uptake body (7).

2. Device according to claim 1, wherein the excavating element (5) comprises a drum (8) as well as digging or excavating elements (9, 10) extending radially outwards with respect to the surface of the drum (8).

3. Device according to claim 2, wherein the digging elements comprise teeth (9) provided with a tooth surface (21) that is directed obliquely with respect to the centerline of the drum (8).

4. Device according to claim 3, wherein the oblique orientation of the flat tooth surfaces (21) in combination with the direction of rotation of the drum (8) effectuates a transport operation towards the centre of the drum (8), as viewed in the direction of the centerline thereof.

5. Device according to any of the claims 2-4, wherein the digging elements comprise pins (10).

6. Device according to any of the claims 2-6, wherein the digging elements (9, 10) are arranged according to circles or helically on the surface of the drum (8).

7. Device according to any of the claims 2-6, wherein the drum (8) comprises two drum sections (14, 15) that can be moved towards each other or away from each other respectively, as viewed in the direction of the centerline of the drum (8).

8. Device according to claim 7, wherein the drum sections (14, 15) are provided with lugs (16) extending out from their mutually opposed ends, which include slots (22), so that the lugs (16) of the one drum section can slide within the slots (22) of the other drum section.

9. Device according to claim 7 and 8, wherein an actuator, such as a hydraulic piston/cylinder device (23) is incorporated inside the drum sections (14, 15) for moving the drum sections (14, 15) towards each other or away from each other respectively.

10. Device according to any of the claims 1-9, wherein the uptake bod y (7) comprises two uptake body sections (17, 18) that can be moved towards each other or away from each other respectively, as viewed in the direction of the centerline of the drum (8).

11. Device according to any of the claims 1-10, wherein the excavating element (5) is rotatably suspended on the uptake body (7).

12. Device according to claim 11, wherein the uptake body (7) has opposing end walls (6) and the excavating element (5) is mounted pivotally to the end walls (6).

13. Device according to any of the claims 1-12, wherein a conveyor belt (12) is provided for carrying away the ballasting materials transferred onto the uptake body.

14. Device according to claim 13, if depending on any claims 10-12, wherein the sections of uptake body (17, 18) extend outwardly from both sides of the conveyor belt (12).

15. Device according to claim 14, wherein fixed base sections (29) are located on both sides of the conveyor belt (12) and the uptake body sections (17, 18) each comprise an uptake surface section (19, 20) that can slide across a corresponding fixed base section (29).

16. Device according to any of the claims 13-15, wherein the uptake body (7) comprises a base-plate (30), on the leading edge of which base-plate a protecting plate (31) extends obliquely upwards and to the rear, and the reversing roller (32) of the conveyor belt (12) is accommodated within the cavity formed

between the base-plate (30) and the protecting plate (31).

17. Device according to any of the claims, wherein the uptake body (7) and the excavating element (5) are located at the front end of the bogie (1), as viewed in the direction of travel.

18. Device according to any of the preceding claims, wherein at least one rotor (26) is located above the uptake surface (11) for transporting the excavated ballasting material towards the centre of the uptake surface (11).

19. Method for the removal of ballasting material from a ballast bed by means of the device according to any of the claims 1- 18, comprising the steps of:

- propelling of the device,
- loosening of the ballasting material by means of the excavating element (5) during the forward propulsion of the device,
- during the propulsion of the device, movement of the loosened ballasting material from the ballast bed onto the uptake body (7), under the effect of the excavating element (5),
- the removal of the ballasting material taken up from the uptake body (7) as well as
- the disposal of the ballasting material removed from the uptake body (7).

20. Method according to claim 19, comprising the step of:

- the loosening the ballasting material and the transport of the loosened ballasting material in direct succession.

21. Method according to claim 19 and 20, comprising the steps of:

- the provision of an excavating element (5), the centerline of which is essentially parallel to the surface of the ballast bed,
- the loosening of the ballasting material by causing the rotation of the excavating element (5).

22. Method according to claim 21, comprising the step of:

- varying the dimension of the uptake body (7) and the rotating excavating element (5), as viewed in the direction transversely in relation to the ballast bed.

23. Method according to any of the claims 19-22, comprising the step of:

- continuous, progressive execution of the steps of the loosening, uptake, removal and disposal of the ballasting material.

24. Method according to claim 23, comprising the step of:

- positioning of the uptake body (7) to the rear of the excavating element (5), as viewed in the direction of travel.

25. Method according to any of the claims 19-24, comprising the steps of:

- the provision of an uptake body (7) in the form of a trough (6, 17-20),
- the uptake of the loosened ballasting material into the trough (6, 17-20).

26. Method according to claim 25, comprising the steps of:

- the provision of a disposal element (7) in the form of a conveyor belt (12),
- the disposal of the ballasting material taken up from the uptake body (7) by means of the conveyor belt (12).

27. Method according to any of the claims 19-26, comprising the steps of:

- the provision of an uptake body (7) in the form of a conveyor belt (12),
- the uptake of the loosened ballasting material onto the conveyor belt (12),
- the disposal of the ballasting material dug loose by means of the conveyor belt (12).

28. Method according to any of the claims 19-27, comprising the step of:

- the transport of the ballasting material in a backwards direction by means of the excavating element (5).

30. Method according to any of the claims 19-28, comprising the step of:

- the centering of the ballasting material towards the centre of the excavating element (5) by means of the excavating element (5), as viewed in the direction of the centerline thereof.

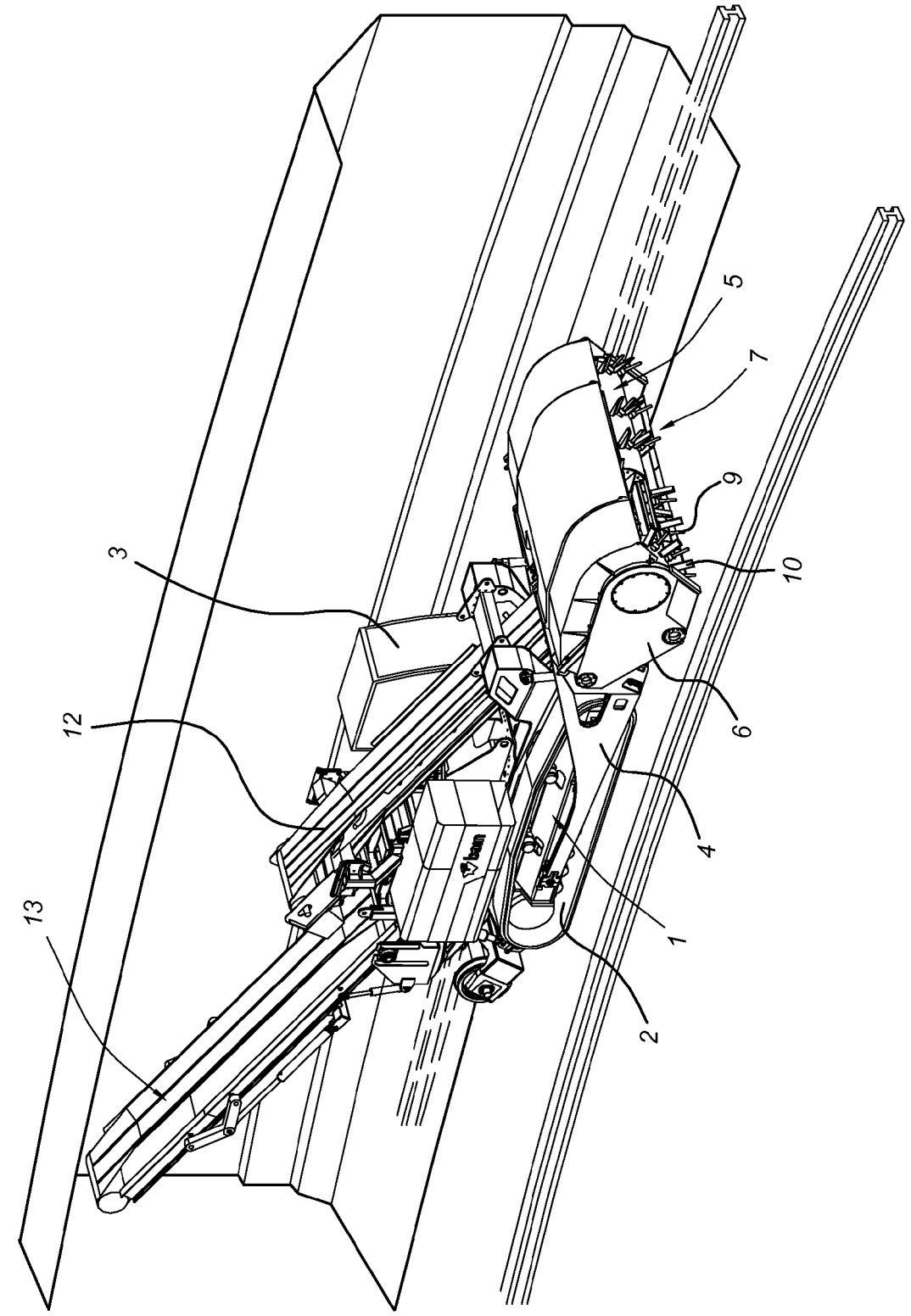


Fig 1

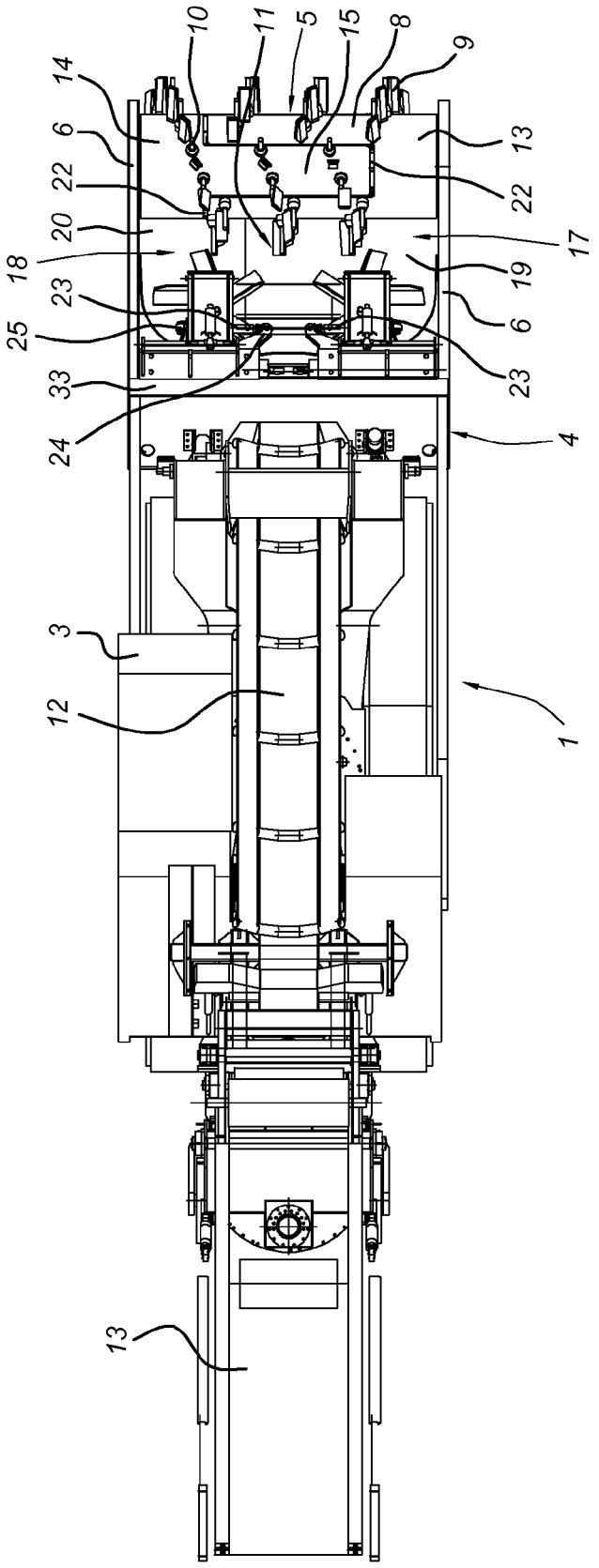


Fig 2

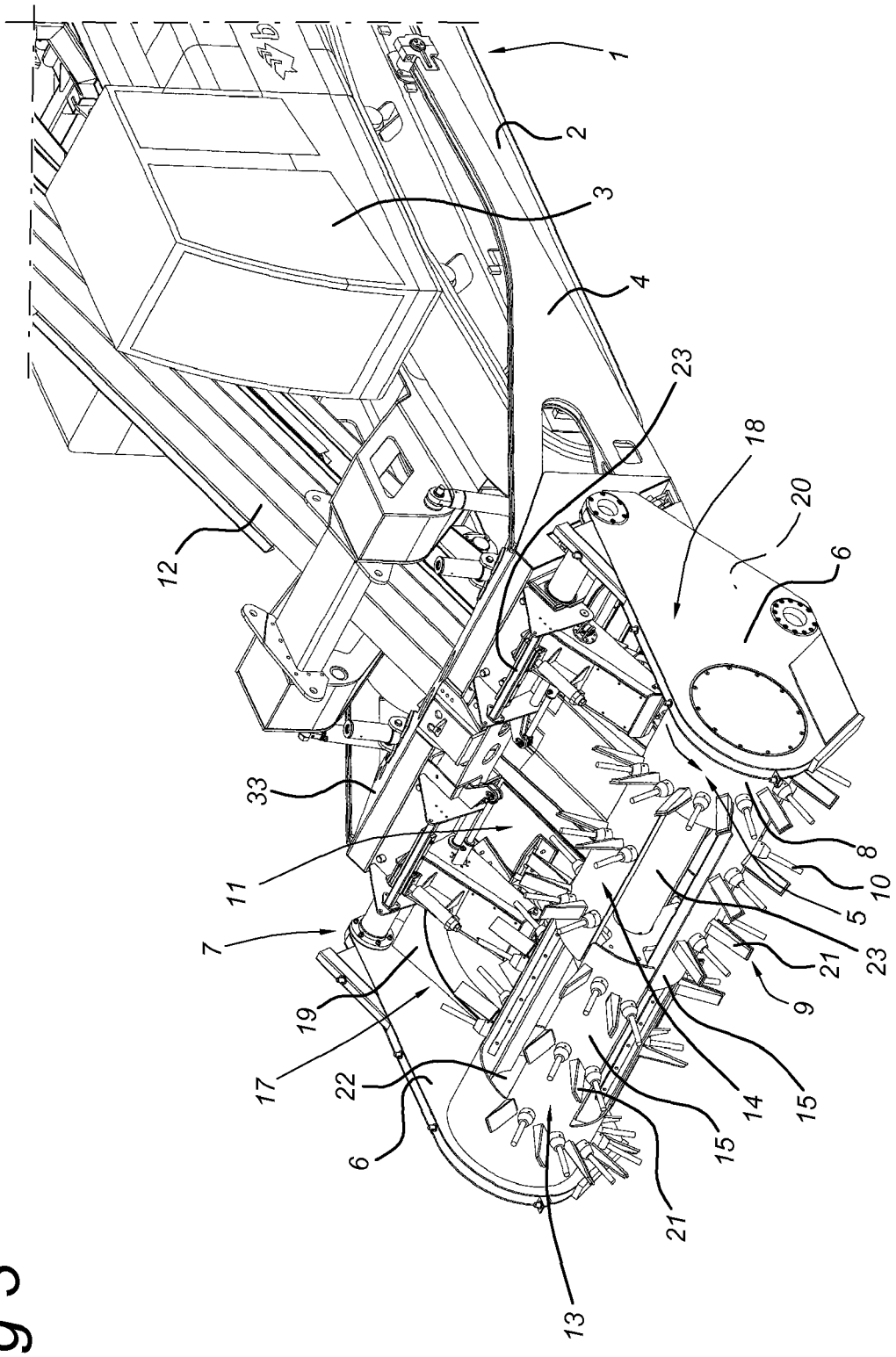
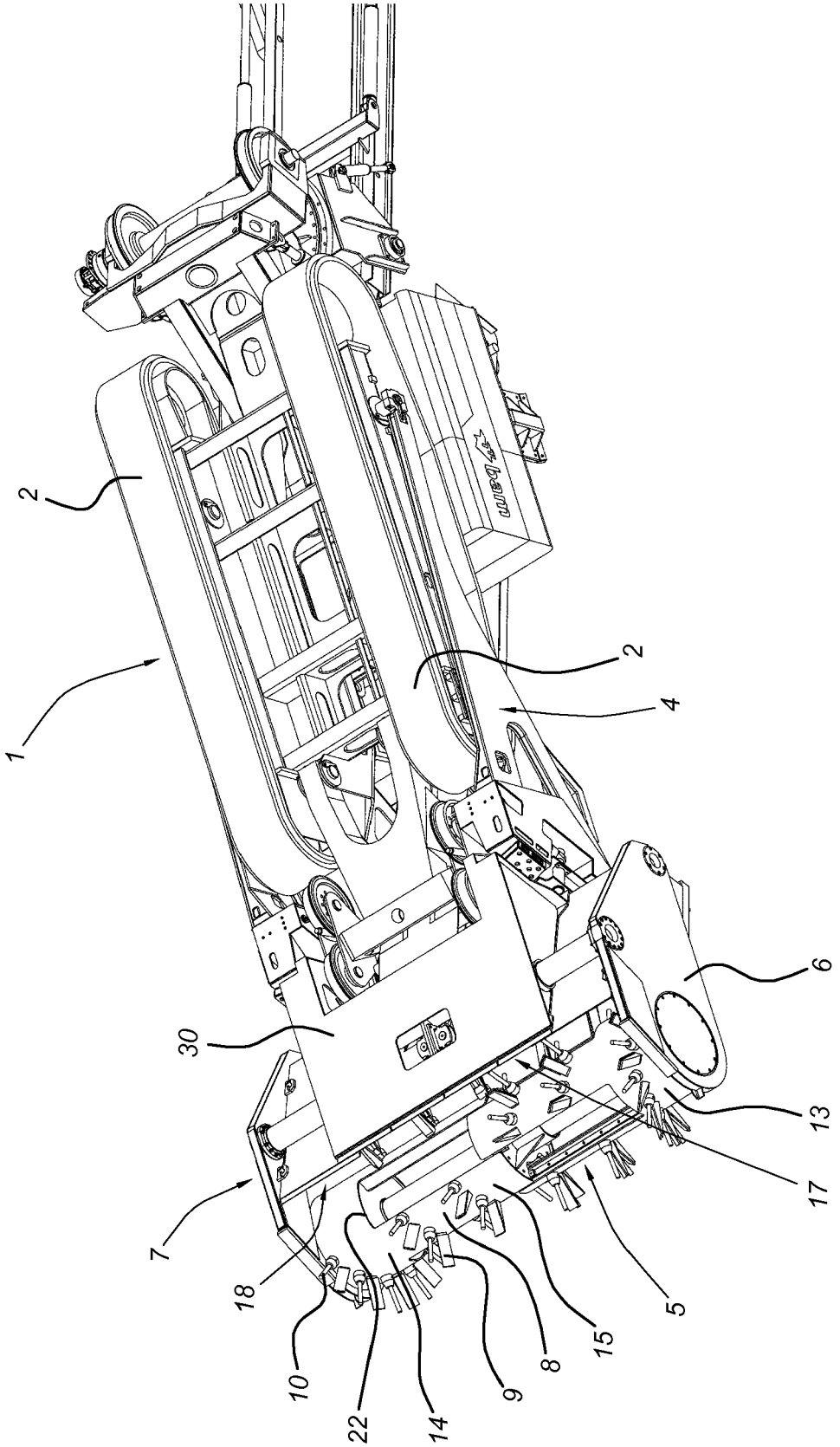


Fig 3

Fig 4



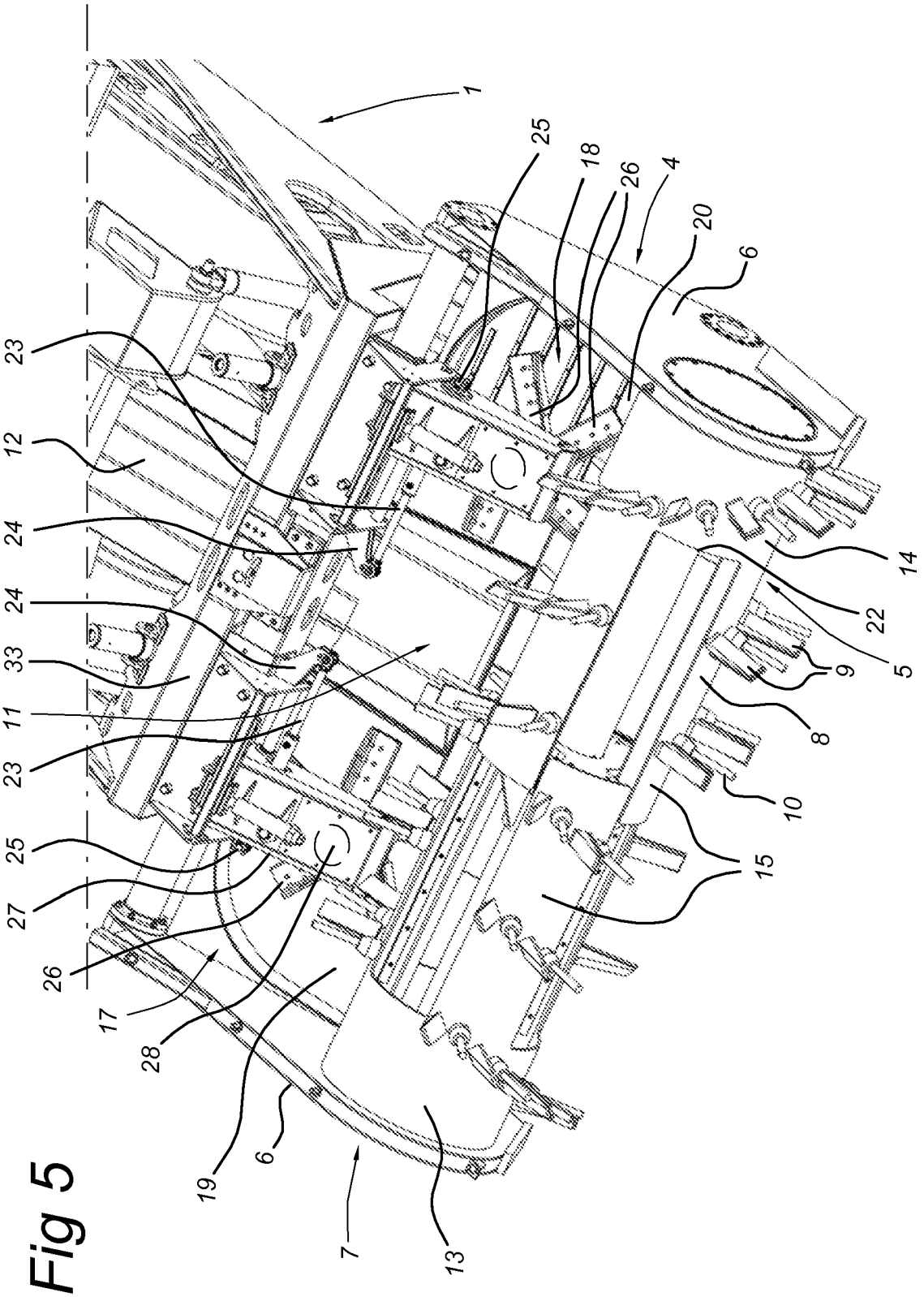

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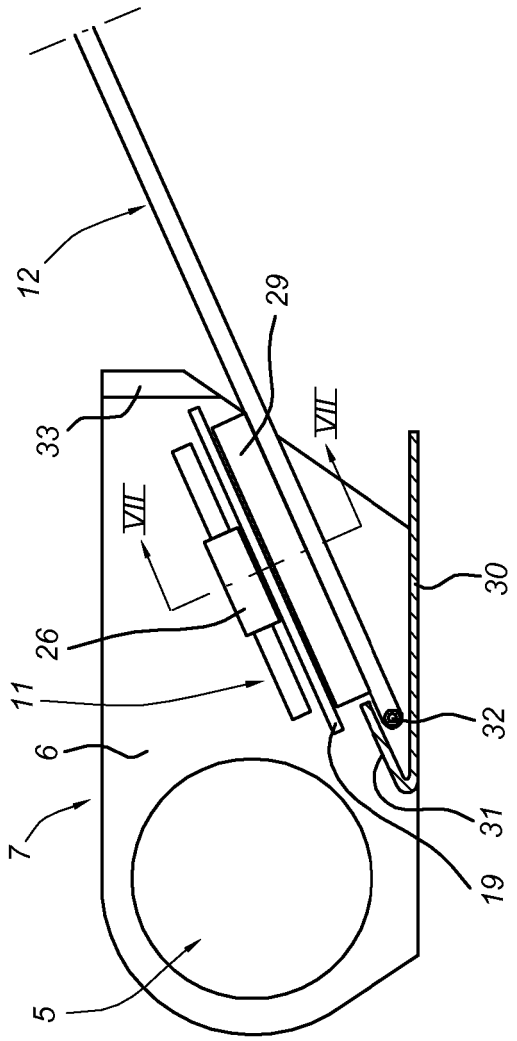
Fig 5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33
VIII
VIII
30
26
11
32
6
31
7
19
5

Fig 6

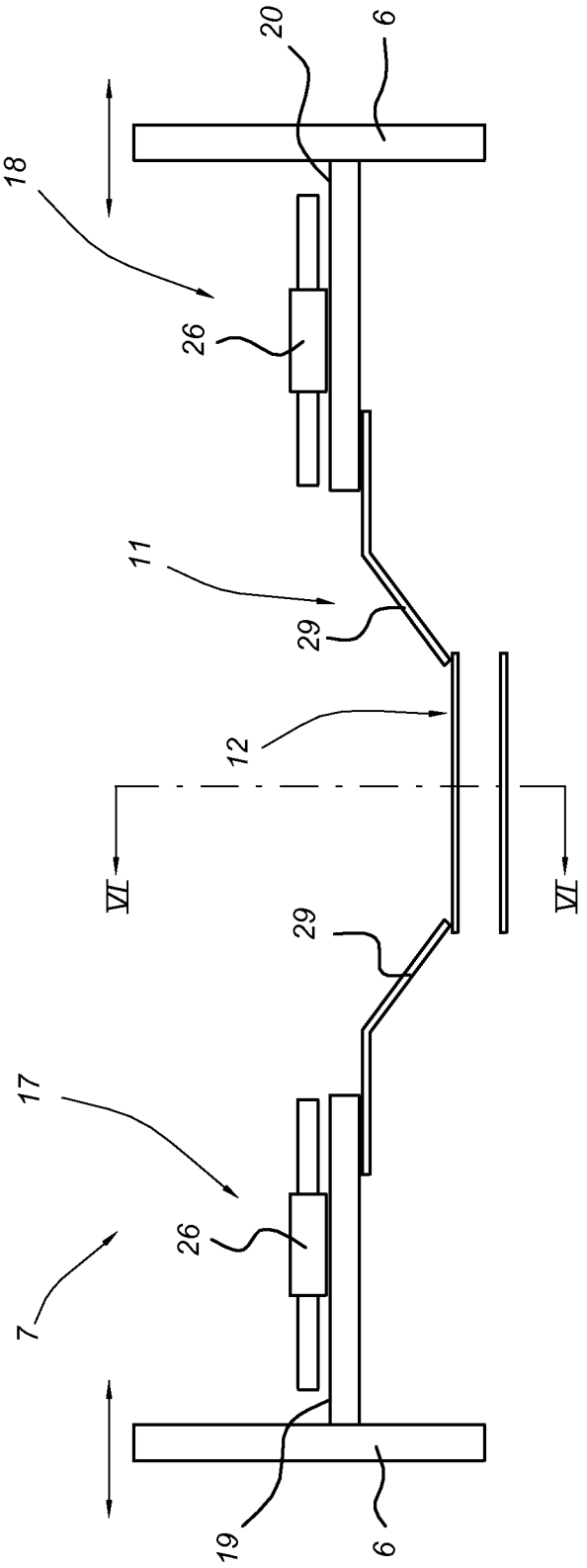
20
6
18
26
11
29
12
VI
VI
29
17
26
7
19
6

Fig 7

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- FR 1387729 **[0002]**
- EP 1348057 A **[0008]**