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CA 2836145 A1 2014/07/14

(21) 2 836 145

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

(13) A1

(22) Date de dépôt/Filing Date: 2013/12/05

(41) Mise à la disp. pub./Open to Public Insp.: 2014/07/14

(30) Priorité/Priority: 2013/01/14 (DE10 2013 100 322.2)

(51) Cl.Int./Int.Cl. *A01D 34/404* (2006.01)

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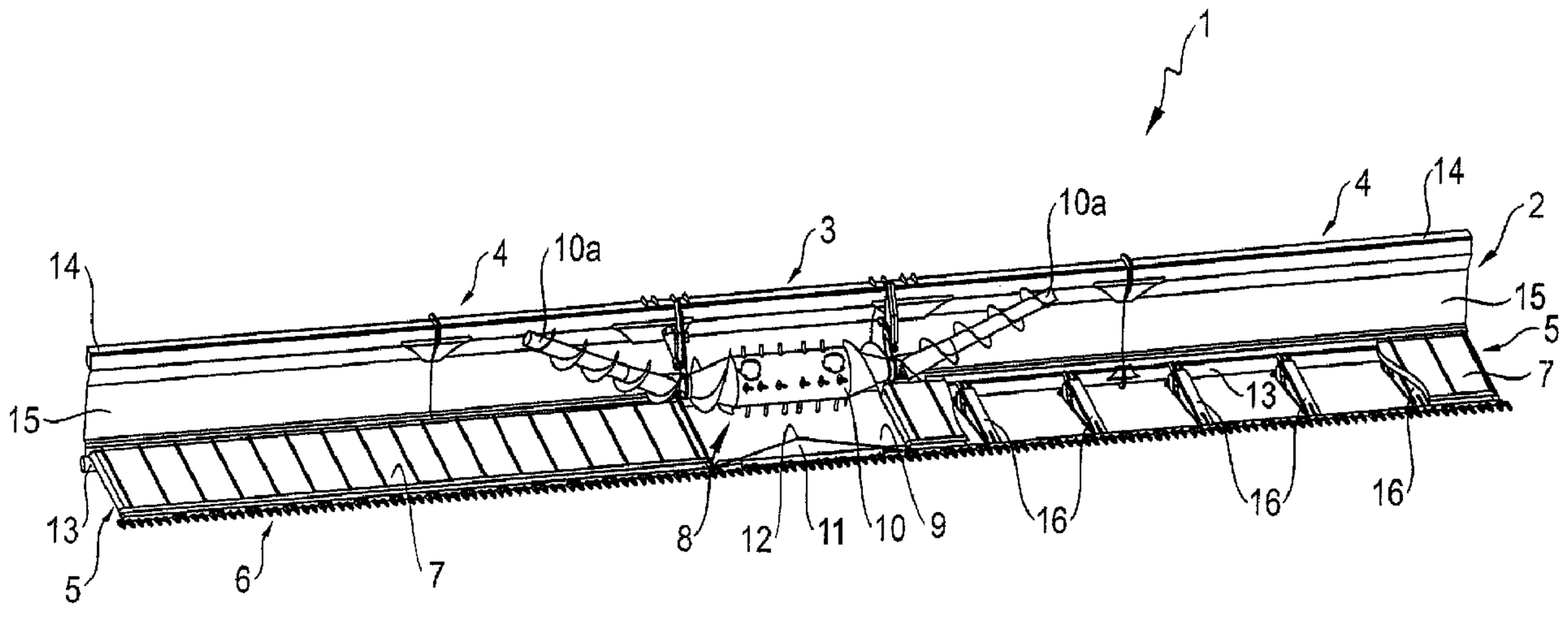
(54) Titre : PLATEFORME DE COUPE
(54) Title: CUTTING PLATFORM



(57) Abrégé/Abstract:
The present invention relates to a cutting platform comprising a centre section disposed on a base frame and at least two side sections disposed adjacent to the centre section, a back wall essentially extending perpendicularly to the base frame, one flexible cutter bar extending across the width of the cutting platform, and at least one conveyor disposed behind the cutter bar, the said conveyor being designed as at least one endless belt on the corresponding side sections and disposed adjacent to the centre section in order to transport the harvested crop cut off by the cutter bar sideways toward the centre section, with the side sections featuring a plurality of pivotable carrying arms disposed on the base frame, the said carrying arms supporting the cutter bar, whereby the respective side section features a plurality of carrying elements bearing the conveyor belt, which are mounted in a bearing position and can be pivoted axially in relation to the base frame.

ABSTRACT

The present invention relates to a cutting platform comprising a centre section disposed on a base frame and at least two side sections disposed adjacent to the centre section, a back wall essentially extending perpendicularly to the base frame, one flexible cutter bar extending across the width of the cutting platform, and at least one conveyor disposed behind the cutter bar, the said conveyor being designed as at least one endless belt on the corresponding side sections and disposed adjacent to the centre section in order to transport the harvested crop cut off by the cutter bar sideways toward the centre section, with the side sections featuring a plurality of pivotable carrying arms disposed on the base frame, the said carrying arms supporting the cutter bar, whereby the respective side section features a plurality of carrying elements bearing the conveyor belt, which are mounted in a bearing position and can be pivoted axially in relation to the base frame.

CUTTING PLATFORM

FIELD AND BACKGROUND

The present invention relates to a cutting platform.

A cutting platform of the type mentioned above is used when large quantities of crops harvested and collected by the cutting platform need to be smoothly transferred across large working widths to a harvester for processing. To ensure optimal ground tracking for the cutting platform on uneven terrain, a plurality of carrying arms jointly supporting the cutter bar and the conveyor are disposed on the cutting platform's base frame in such a way that they are capable of performing a wave-like motion in the cutting platform's longitudinal direction, thus enabling them to adjust to the contours of the ground.

A cutter bar of the type described above is previously known from US 7,937,920 B2. The cutting platform comprises a frame formed by transverse and longitudinal supports, with a centre section and at least two side sections on which conveyor belts for moving materials are installed. A carrying arm capable of pivoting around a horizontal axis is disposed on each longitudinal support beam and extends forwards and perpendicular to the support beam. At the front end, the carrying arms are connected to a flexible cutter bar extending across the width of the cutting platform. At the end of each side section, rollers serving to drive the conveyor are arranged on the same level as the carrying arms. The rollers are supported by the immediately adjacent carrying arms. The conveyor belt surrounds both the rollers as well as the carrying arms. To enable them to follow the ground contour, the carrying arms are deflected vertically, as is the cutter bar and the conveyor belt, both of which are supported by the carrying arms. The deflection of the carrying arms causes the cutter bar to follow the ground contour in a wave-like motion while the conveyor belt is under tension between adjacent carrying arms in a linear progression. This complicates the belt guide and seal arrangement. Gaps may form at the front of the cutting platform between the conveyor belt and the sealing elements, allowing the crop to slip

between the top and bottom of the belt. In addition, the conveyor belt is selectively exposed to higher stress through friction and deformation, resulting in more wear on the conveyor belt.

Accordingly, the task of the present invention is to improve the design of a cutting platform of the above-mentioned type in a way that enables the conveyor belt to better follow the deflection of the arms supporting the cutter bar, thus achieving a better sealing action and less wear.

SUMMARY

Certain exemplary embodiments can provide a cutting platform comprising a centre section disposed on a base frame and at least two side sections disposed adjacent to the centre section, a back wall essentially extending perpendicularly to the base frame, one flexible cutter bar extending across the width of the cutting platform, and at least one conveyor disposed behind the cutter bar, the said conveyor being designed as at least one endless belt on the corresponding side sections and disposed adjacent to the centre section in order to transport the harvested crop cut off by the cutter bar sideways toward the centre section, with the side sections featuring a plurality of pivotable carrying arms disposed on the base frame, the said carrying arms supporting the cutter bar, wherein the respective side section features a plurality of carrying elements bearing the conveyor belt, which are mounted in a bearing position and can be pivoted axially in relation to the base frame.

Certain embodiments propose that each side section feature a plurality of load-bearing carrying elements bearing the conveyor belt, and that the said elements be mounted in a bearing position and can be pivoted axially in relation to the base frame. The pivotability of the carrying elements upon a vertical deflection of the cutter bar allows the conveyor belt to follow the course of motion of the cutter bar's deflection, thus largely preventing the belt from tightening between neighbouring carrying elements, which results in better sealing ability and less wear on the conveyor belt.

Preferably, the bearing position of the individual carrying elements can be designed as a sliding joint. In addition to the transitory motion, the sliding joint also facilitates a rotary motion around the longitudinal axis of the carrying arm, allowing for a better adjustment of the front conveyor belt section facing the cutter bar to the wave-like motion when the cutter bar is pivoted. This noticeably helps reduce the formation of gaps.

In an advantageous further embodiment, each carrying element may feature a contact surface for the conveyor belt at the end section facing the cutter bar. This serves to guide the conveyor belt supported by the load-bearing elements.

Furthermore, each carrying element may feature a belt guide at its end section facing the back wall. This also serves to guide the conveyor belt.

The carrying elements can be movable in relation to the belt guide. This allows the individual carrying elements to better follow the motion of the cutter bar; the guidance of the conveyor belt between the belt guide and the contact surface is influenced less by this, since the compression strain of the conveyor belt is reduced by the approximately maintained distance between the belt guide and the contact surface.

In particular, the carrying elements may penetrate the belt guide.

The belt guide can be advantageously designed as at least one profiled, plate-shaped segment extending in sections in the longitudinal direction of each carrying element. This minimum of one segment therefore also serves as a bearing surface for the conveyor belt, forming a nearly full-surface base layer for part of the conveyor belt.

The segment may feature a guide recess extending parallel to the base frame. This guide recess serves to retain a corresponding guide element on the inside of the conveyor belt facing the carrying arms, thus ensuring safe guidance for the conveyor belt in order to prevent the conveyor belt from shifting diagonally to the direction of conveyance.

Furthermore, the segment may feature regularly spaced recesses extending parallel to the carrying elements. These recesses, which are preferably designed as slits, allow for great torsional and bending flexibility of the belt guide. This is particularly advantageous since the pivot point of the carrying arms bearing the cutter bar is spaced at a significant distance from the belt guide on the carrying elements.

In an advantageous embodiment, the recesses could be disposed on both sides of the guide recess. The recesses could be manufactured in an economically advantageous way, such as laser incisions.

Preferably, the segment may feature a wall extending in sections, extending perpendicularly to the segment's surface and parallel to the base frame.

In particular, a plurality of material guide elements may be distributed across the width of the cutter bar, arranged side by side and tilted at an angle to the cutter bar. These are used to divert the crops cut by the cutter bar toward the conveyor belt.

Preferably, each material guide element features a leading edge approximately parallel to the top face of the conveyor belt, with a continuous sealing strip extending across the width of at least one side section of the cutting platform, being attached to the said leading edge and overlapping the the conveyor belt in sections.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention is explained in detail below based on an embodiment shown in the drawings.

Shown are:

Fig. 1 a schematic, partially cut-away view of a cutting platform;

Fig. 2 a partial view of a side section of the cutting platform from Fig. 1;

Fig. 3 a partially cut-away view of the front of the cutting platform, seen at an angle from above;

Fig. 4 a partial view of the side section of Fig. 2 from behind;

Fig. 5 a perspective view of carrying elements disposed between conveyor belts in accordance with Fig. 2;

Fig. 6 a partially cut-away view of the front of the conveyor belt, seen at an angle from above;

Fig. 7 a detailed view of a belt guide according to Fig. 6; and

Fig. 8 a partial view of the front area of the cutting platform from the side according to Fig. 1.

DETAILED DESCRIPTION

The drawing shown in Fig. 1 shows a schematic, partially cut-away view of a cutting platform 1. This cutting platform 1 features a base frame 2 with a centre section 3 and at least two side sections 4 arranged adjacent to the centre section 3. On the centre section 3 and the side sections 4, a continuous, flexible cutter bar 6 is arranged on the front side of the cutting platform 1 opposite the base frame 2, the said cutter bar 6 essentially extending across the entire width of the cutting platform 1. On the base frame 2 of the cutting platform 1 reels (not shown) are arranged, extending across the width of a side section 4 and partially across the width of the centre section 3. The purpose of the reels is to improve the acceptance of the harvested crops through the cutter bar 6.

The crop cut off by the cutter bar 6 is transported to a conveyor 5 that is arranged behind the cutter bar 6 and comprises as a minimum one endless looping conveyor belt 7 on the corresponding side sections 4. The endless looping belts 7 are arranged adjacent to the centre section 3 in order to transport the harvested crop cut off by the cutter bar 6 parallel to the longitudinal axis of the cutting platform 1 toward the centre section 3 where it is fed into a feed device 8. The feed device 8 is designed as a driven feed roller 10 with lateral augers 10a extending outwards assigned to it. The feed device 8 transports the harvested crops conveyed laterally to the centre section 3 via the endless conveyor belts 7 to an opening provided in the base frame 2 and located behind the feed roller 10, through which the harvested crop is conveyed via

an intake duct in a combine harvester (not shown) to which the cutting platform 1 can be attached, so it can be further processed by the combine harvester.

The centre section 3 comprises a base plate 9 featuring a contoured design on its top side facing the feed roller 10 arranged above the base plate 9, while the underside of the base plate 9 facing the ground features an essentially flat design. The contoured top side of the base plate 9 features a wedge-shaped, raised projection 11. The projection 11 starts at the leading edge of the cutting platform 1 and tapers off toward the feed device 8, eventually ending in a tip 12 facing the feed roller 10. The projection 11 facilitates a guided crop redirection in order to redirect the harvested crop conveyed by the belts 7 into the intake area of the feed device 8 and improve the crop intake. The height of the projection 11 may vary in order to ensure a sufficient crop redirection.

As shown in Fig. 1, a side section 4 has been partially cut out in order to illustrate the structure of the cutting platform 1 located underneath the belt 7. The structure of the side sections 4 is identical, so that only one side section 4 is shown in the partial cross-section. The base frame 2 features back panels 15 extending vertically to the conveyor belt's 7 direction of movement; these back panels are framed between preferably hollow, cylindrical profile elements 13, 14. In the centre section 3, the feed device 8 is disposed at the profile elements 13, 14 of the base frame 2. Each side section 4 features a plurality of carrying arms 16 disposed on the base frame 2, which can be pivoted around a horizontal axis. The carrying arms 16 of each individual side section 4 support the flexible cutter bar 6 and are vertically deflected with the said cutter bar by irregularities in the ground when the cutting platform 1 is guided across the ground in harvesting mode. The cutter bar 6 is rigidly connected to the respective carrying arms 16.

The drawing in Fig. 2 shows a partial view of a side section 4 of the cutting platform from Fig. 1. The purpose of this figure is to explain the structure and design of the conveyor 5 of the individual side sections 4, comprising a minimum of one endless looping belt 7. The conveyor belt 7 is supported by a plurality of separate carrying elements 17 disposed above the carrying arms 16 and extending through the endless

conveyor belt 7. The carrying elements 17 are mounted in the base frame 2 and thus enable the conveyor belt 7 to perform a vertical compensating motion when the cutting platform 1 is guided across the ground in harvesting mode, as is explained in more detail below. The carrying elements 17 extend in the direction of the cutter bar 6 on a level above and parallel to the carrying arms 16. The conveyor belt 7 is actuated and redirected on either side of each side section 4 by deflection rollers 22, at least one of which is drivable in order to contantly actuate the conveyor belt 7.

The drawing in Fig. 3 shows a partially cut-away view of the front of the cutting platform 1, seen at an angle from above. This drawing shows that each of the carrying elements 17 extending in the direction of the cutter bar 6 features a contact surface 19 for the conveyor belt 7 at its end section facing the cutter bar 6. In the embodiment shown, the contact surface 19 is designed as profiled sheet metal disposed on a metal transition sheet 20 attached to the cutter bar 6. Viewed across the width of the cutting platform 1, a plurality of metal transition sheets is disposed side by side; their purpose is to redirect the crops cut off by the cutter bar 6 to the conveyor belt 7. The contact surface 19 extends - at least in sections - perpendicular to the longitudinal axis of the carrying elements 17 so that the edge of the conveyor belt 7 extending at a right angle to the conveyor belt's 7 direction of rotation abuts on and is supported by the contact surface 19. The metal transition sheets 20 protrudes above the contact surface 19 vertically in order to prevent crops from entering the area between the contact surfaces 19 and the cutter bar 6. Underneath the carrying elements 17, skid shoes 18 are disposed, which are connected to the cutter bar 6 at one end and pivotably hinged to the corresponding carrying arm 16 at the other end. The cutting platform 1 is guided across the ground on these skid shoes 19; when the ground is uneven, the skid shoes perform a compensating motion which is transferred to the carrying arms 16 and results in a vertical deflection of the cutter bar 6 and/or the conveyor belt 7.

Fig. 4 shows a partial view of the side section 4 of Fig. 2 from behind. In an area of the back wall 15 adjacent to the bottom profile element 13, the parallel carrying elements penetrate through the back wall 15 in sections. The end section of each

carrying element 17 is mounted in a sliding joint 21. As the drawing in Fig. 5 shows, the carrying arms 16 bearing the cutter bar 6 can be pivoted around a common pivot axis 22 parallel to the bottom profile element 13, while the carrying elements 17 bearing the conveyor belt 7 are independently mounted in the back wall 15. A vertical deflection (at least in sections) of the cutter bar 6 results in a rotary motion of at least one carrying arm 16 around the common pivot axis 23. The individual carrying elements 17 disposed in the area above the deflected carrying arm 16 are also vertically deflected; these are guided through the corresponding sliding joint 21 and displaced in an essentially horizontal direction. Depending on the nature of the deflection of the cutter bar 6, i.e. partial lifting or lowering of the cutter bar 6, this results in a relative movement of the carrying elements 17 in relation to the sliding joints 21 in this area. The relative movement of the carrying elements 17 is limited by the maximum permissible vertical deflection of the cutter bar 6 supported by the carrying arms 16.

Fig. 6 shows a partially cut-away view of the front of the conveyor belt, seen at an angle from above. Fig. 7 shows a detailed view of a belt guide according to Fig. 6. As the drawing in Fig. 7 shows, the conveyor belt 7 features a guide element 6 on the side facing the carrying elements 17, which is continuous when viewed in the direction of rotation; for example, this may be a rib with a polyhedral cross-section guided by a belt guide 24 into a guide recess 25 corresponding to the shape of the guide element 26. The end sections of the belt guide 24 facing the back wall 15 are disposed in a relatively mobile arrangement on the carrying elements 17. This ensures that when the cutter bar 6 is partially vertically deflected, leading to a horizontal movement of the carrying elements 17 in this area toward the sliding joints 21, the belt guide 24 essentially retains its position in relation to the adjacent carrying elements 17 that are not deflected, thus ensuring an even movement of the conveyor belt 7. The belt guide is designed as at least one profiled, plate-shaped segment 27 extending in sections in the longitudinal direction of each carrying element 17, and being penetrated by the latter. The segment 27 features a wall 29 extending in sections perpendicular to its surface and parallel to the back wall 15, which serves as a boundary for the conveyor belt's 7 freedom of movement in the longitudinal direction

of the carrying elements 17. The top view of the belt guide in Fig. 7 shows that the segment 27 is divided into sections by recesses 28 extending parallel to the carrying elements 17. These recesses 28 are arranged opposite each other, which results in a high degree of torsional and bending flexibility of the belt guide 24. A further advantageous aspect of the embodiment of the belt guide 24 is that the relationship between the width of the guide groove 25 and the distance between the wall 29 and the guide groove 25 is selected in such a way that the guidance of the conveyor belt 7 is either primarily assumed by the guide rib 26 and the corresponding guide groove 25 or by the wall 29 and the outer edge of the conveyor belt 7. If a section of the cutter bar 6 drops from a mid-level position, the guide rib 26 and the corresponding guide groove 25 will take over the guidance of the conveyor belt 7. If the cutter bar 6 is partially raised, the contact surface 29 and the outer edge of the conveyor belt 7 will take over the guidance of the conveyor belt 7.

The drawing in Fig. 8 shows the cutter bar 6 and a partial view of the front area of the cutting platform 1 from the side. As the drawing shows, a plurality of material guide elements designed as metal transition sheets 20 are disposed side by side across the width of the cutter bar 6 at an angle, as can be seen in the drawings in Fig. 2 and 3. Each material guide element features a leading edge 31 approximately parallel to the top face of the conveyor belt 7, with a continuous sealing strip 30 extending across the width of at least one side section 4 of the cutting platform 1, being attached to the said leading edge and overlapping the conveyor belt 7 in sections. The continuous sealing strip 30 ensures reliable sealing action even when compensating for height and length through the motion of the carrying elements 17 caused by the vertical deflection of the cutter bar 6.

List of reference signs

1	Cutting platform	**30**	Sealing strip
2	Base frame	**31**	Leading edge
3	Centre section		
4	Side section		
5	Conveyor		
6	Cutter bar		
7	Conveyor belt		
8	Feed device		
9	Base plate		
10	Feed roller		
10a	Auger		
11	Projection		
12	Tip		
13	Profile element		
14	Profile element		
15	Back wall		
16	Carrying arm		
17	Carrying element		
18	Skid shoes		
19	Contact surface		
20	Transition sheet		
21	Sliding joint		
22	Deflection roller		
23	Pivot axis		
24	Belt guide		
25	Guide recess		
26	Guide element		
27	Segment		
28	Recess		
29	Wall		

Claims

1. A cutting platform comprising a centre section disposed on a base frame and at least two side sections disposed adjacent to the centre section, a back wall essentially extending perpendicularly to the base frame, one flexible cutter bar extending across the width of the cutting platform, and at least one conveyor disposed behind the cutter bar, the said conveyor being designed as at least one endless belt on the corresponding side sections and disposed adjacent to the centre section in order to transport the harvested crop cut off by the cutter bar sideways toward the centre section, with the side sections featuring a plurality of pivotable carrying arms disposed on the base frame, the said carrying arms supporting the cutter bar, wherein the respective side section features a plurality of carrying elements bearing the conveyor belt, which are mounted in a bearing position and can be pivoted axially in relation to the base frame.

2. The cutting platform according to claim 1, wherein the bearing position of the respective carrying element is designed as a sliding joint.

3. The cutting platform according to claim 1 or 2, wherein each carrying element features a contact surface for the conveyor belt at its end section facing the cutter bar.

4. The cutting platform according to claim 1 or 2, wherein a belt guide is disposed on the end sections of the carrying elements facing the back wall.

5. The cutting platform according to claim 4, wherein the carrying elements are movable in relation to the belt guide.

6. The cutting platform according to claim 4 or 5, wherein the carrying elements penetrate the belt guide.

7. The cutting platform according to any one of claims 4 to 6, wherein the belt guide is designed as at least one profiled, plate-shaped segment extending in sections in the longitudinal direction of each carrying element.

8. The cutting platform according to claim 7, wherein the segment features a guide recess parallel to the base frame.

9. The cutting platform according to claim 7 or 8, wherein the segment features regularly spaced recesses extending parallel to the carrying elements.

10. The cutting platform according to claim 9, wherein the recesses are disposed on both sides of the guide recess.

11. The cutting platform according to any one of claims 7 to 9, wherein the segment features a wall extending in sections, being perpendicular to its surface and parallel to the base frame.

12. The cutting platform according to any one of claims 1 to 11, wherein a plurality of material guide elements is distributed across the width of the cutter bar, arranged side by side and tilted at an angle to the cutter bar.

13. The cutting platform according to claim 12, wherein each material guide element features a leading edge approximately parallel to the top face of the conveyor belt, with a continuous sealing strip extending across the width of at least one side section of the cutting platform, being attached to the said leading edge and overlapping the conveyor belt in sections.

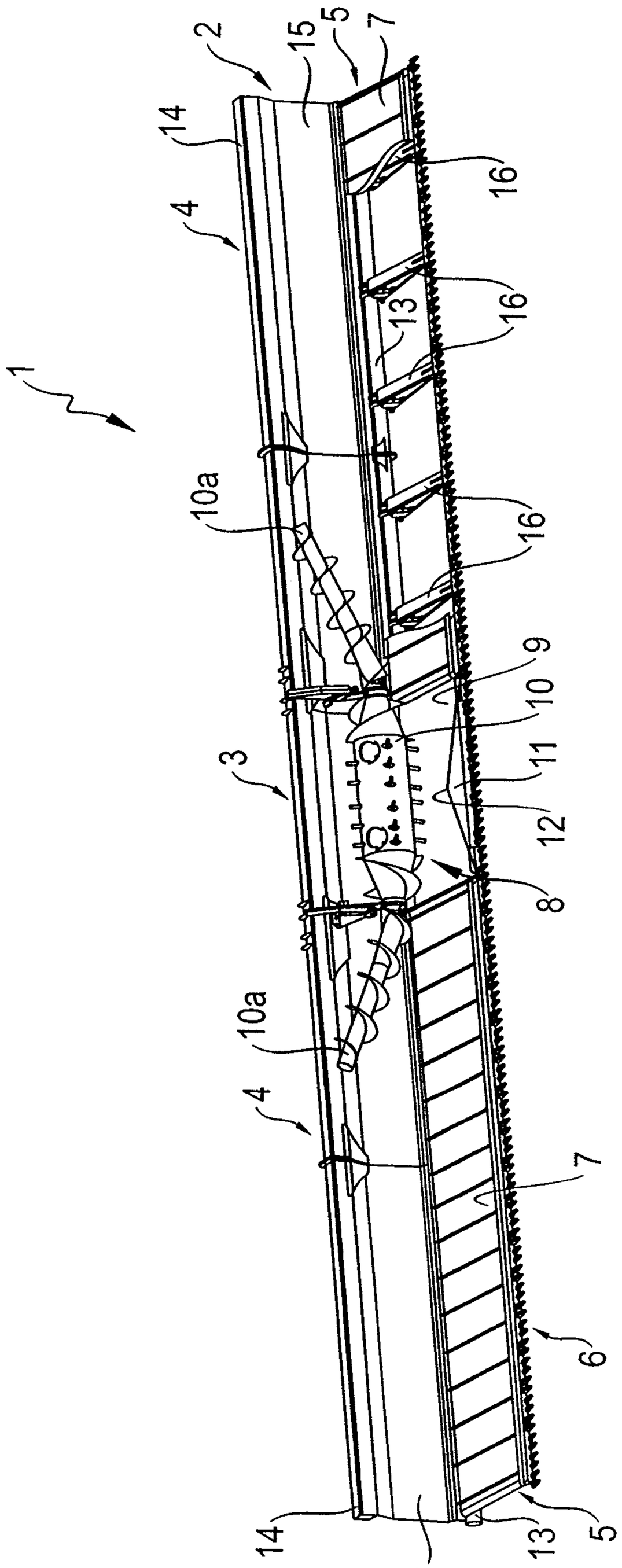


Fig. 1

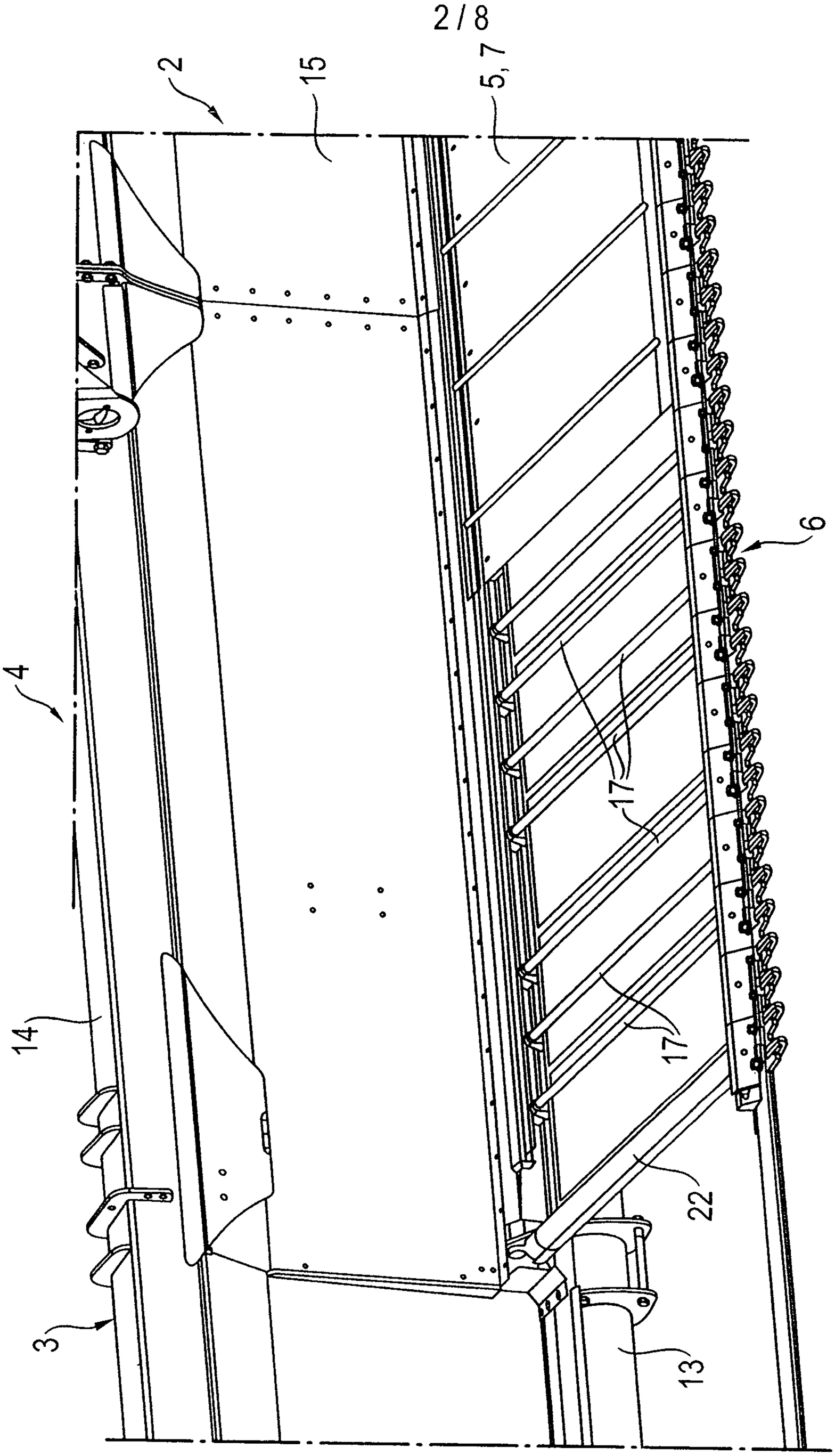


Fig. 2

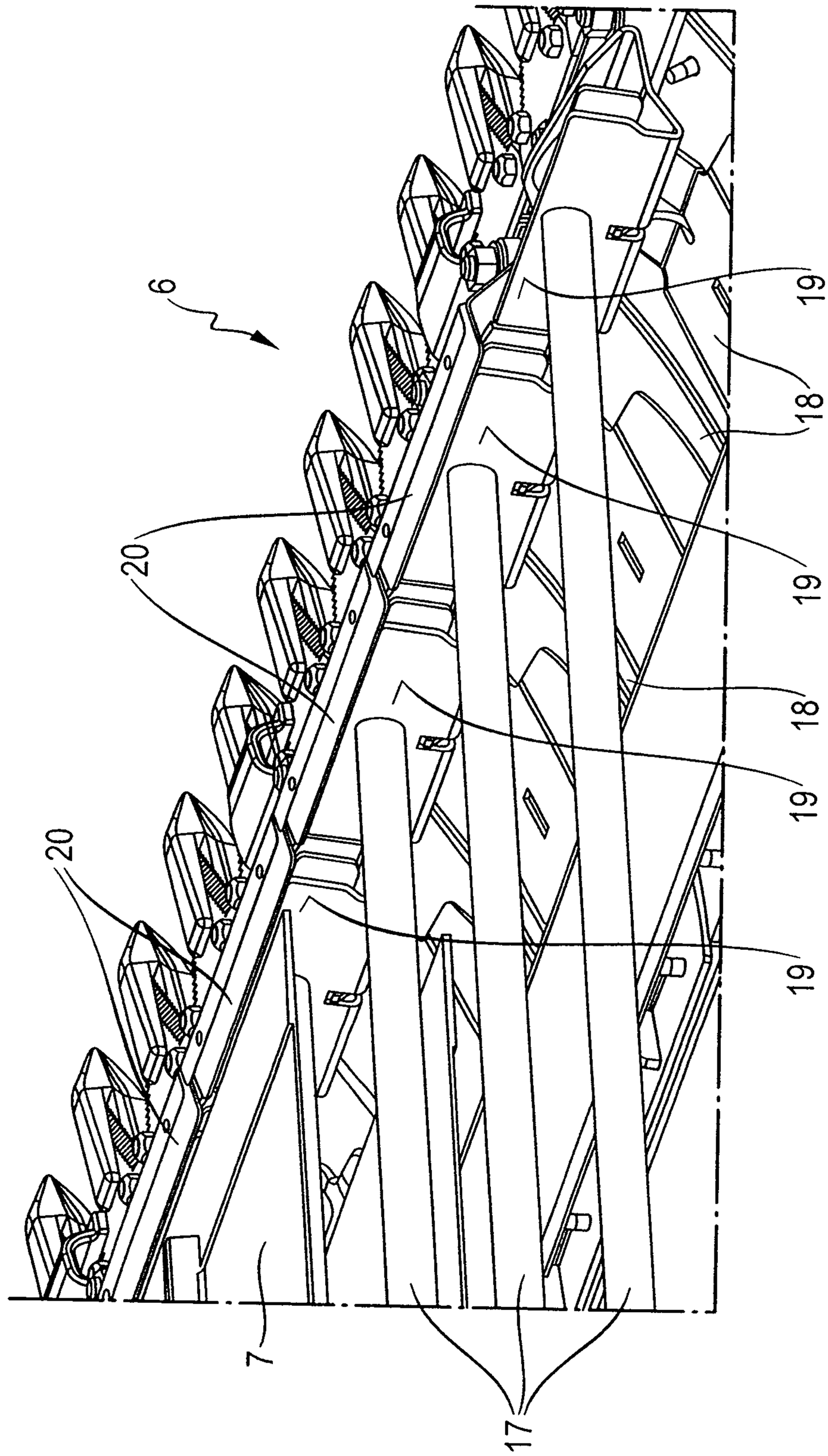


Fig. 3

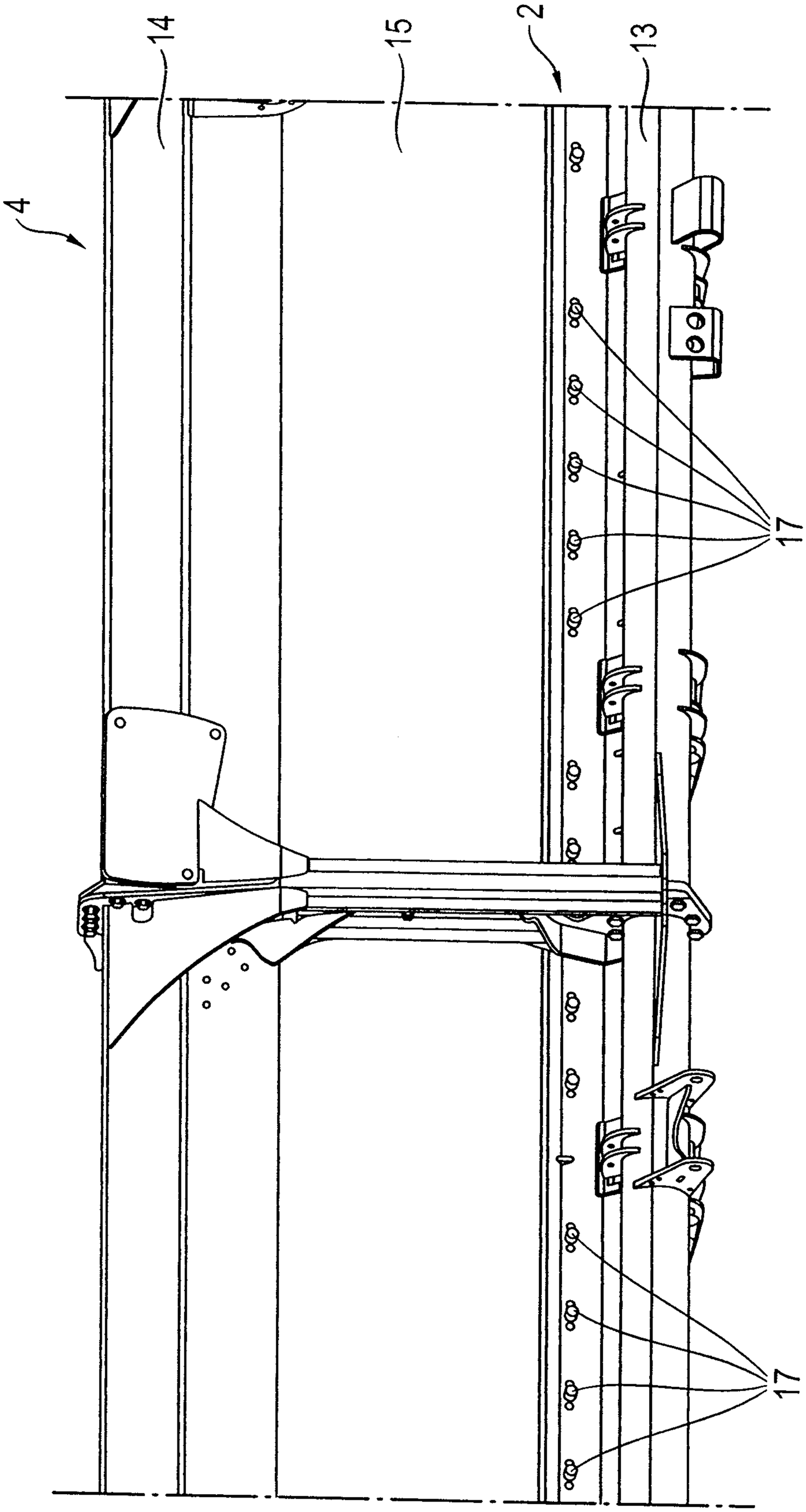


Fig. 4

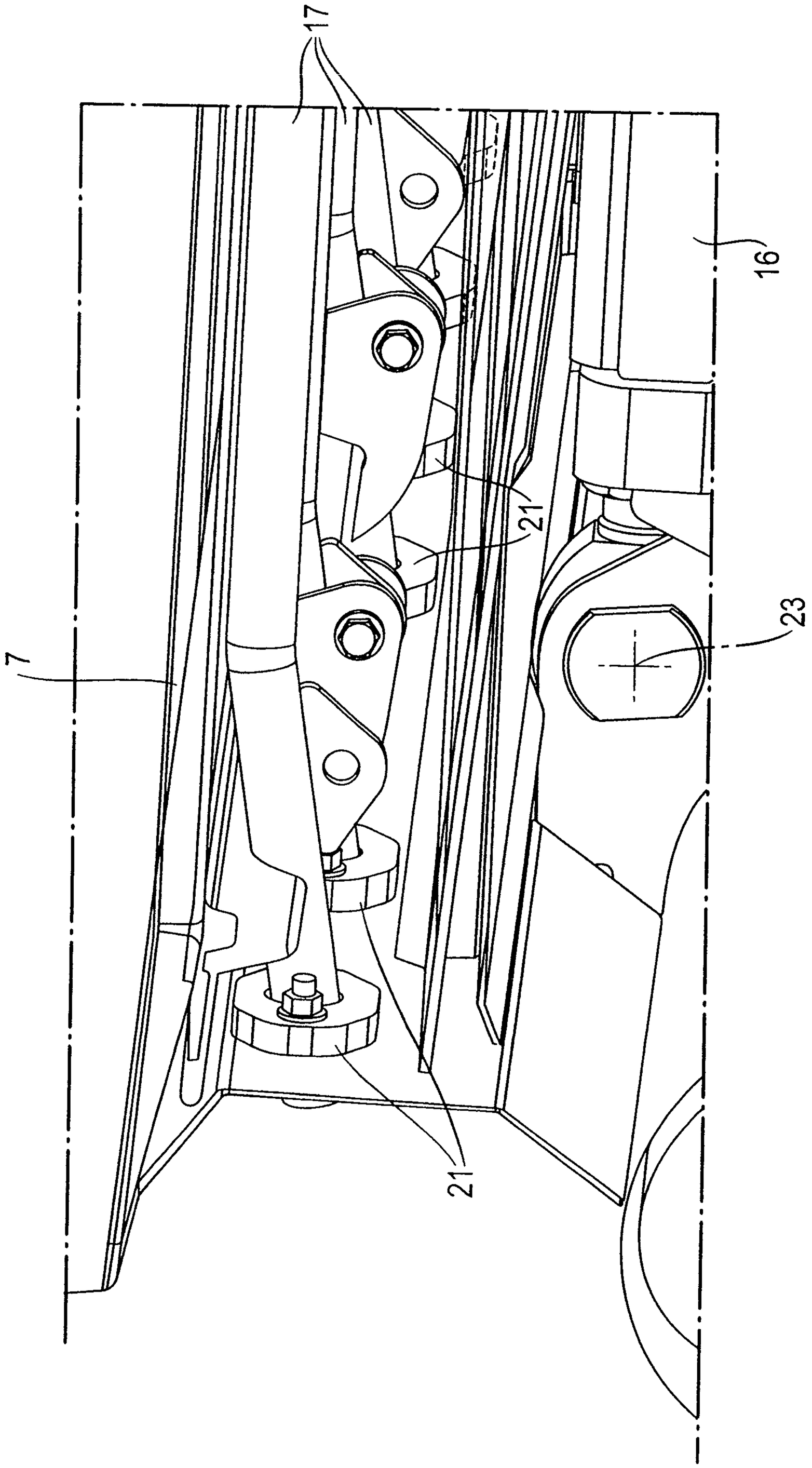


Fig. 5

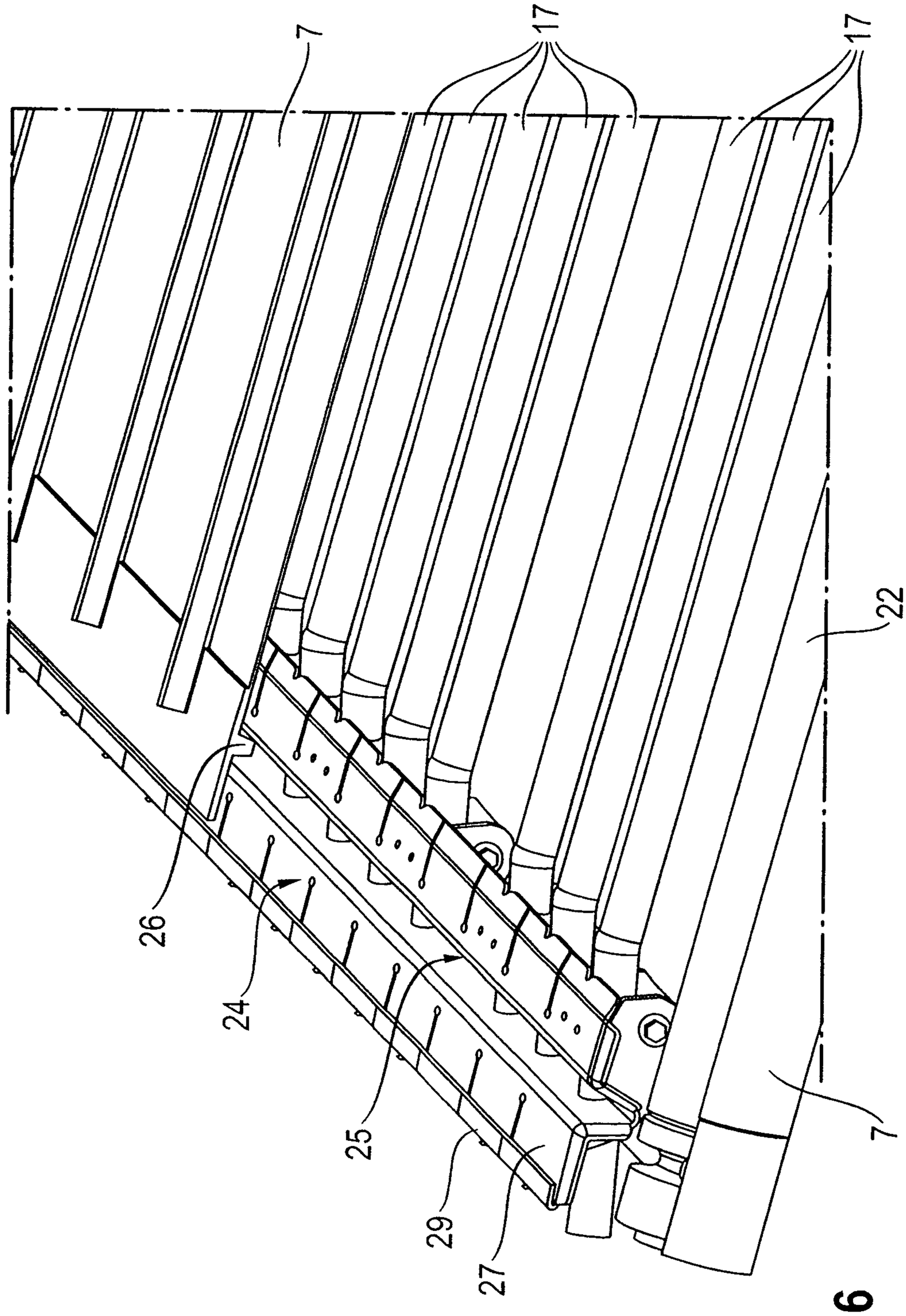


Fig. 6

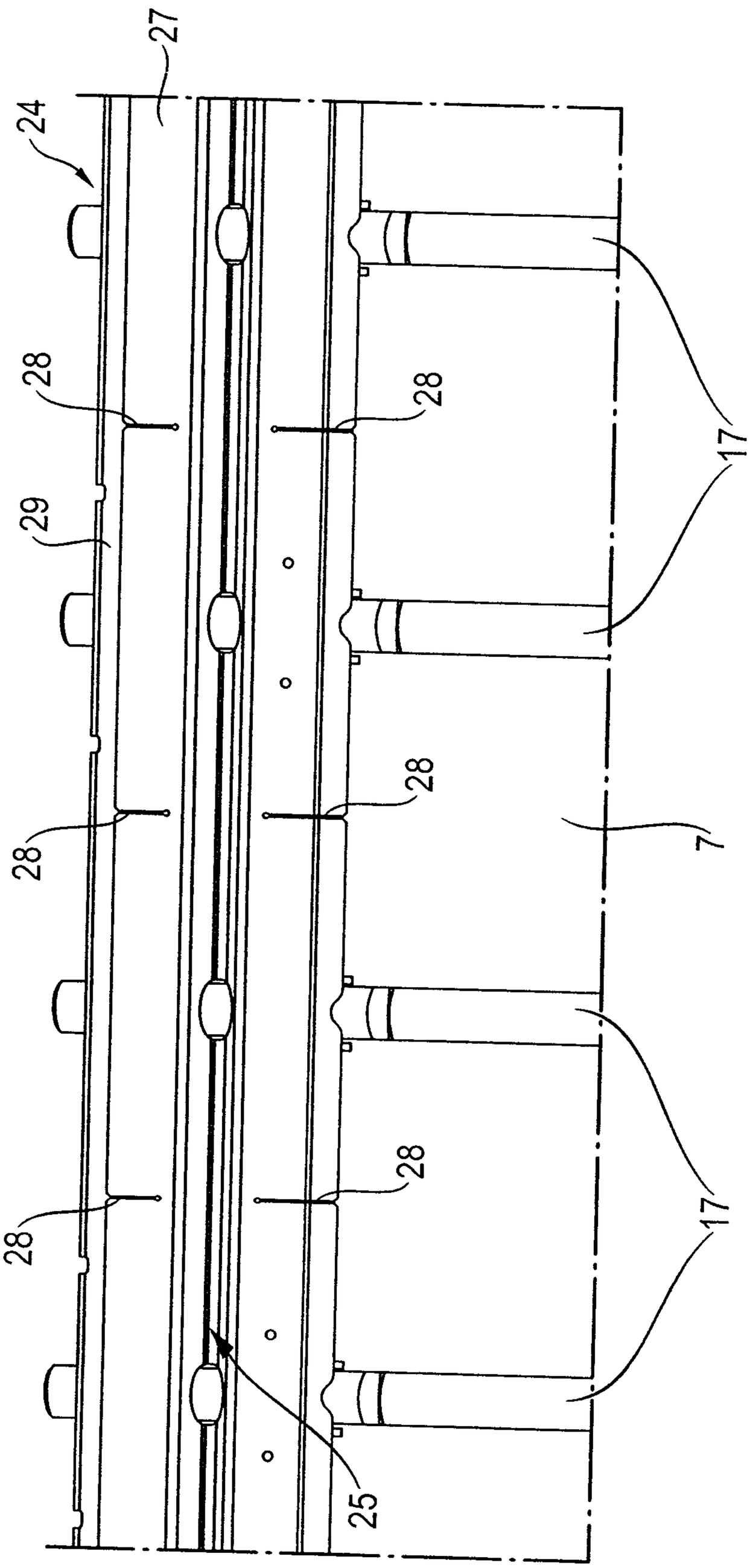


Fig. 7

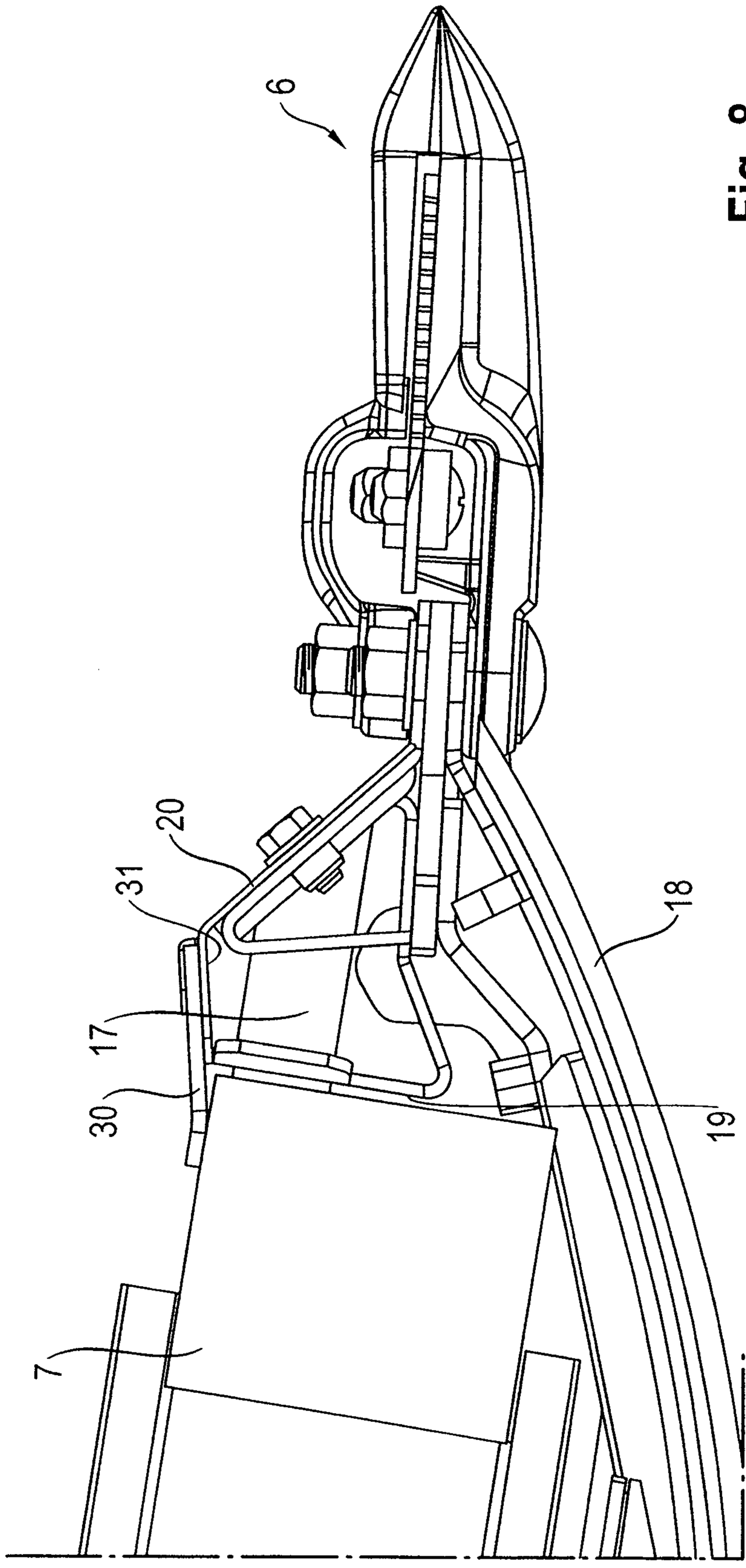
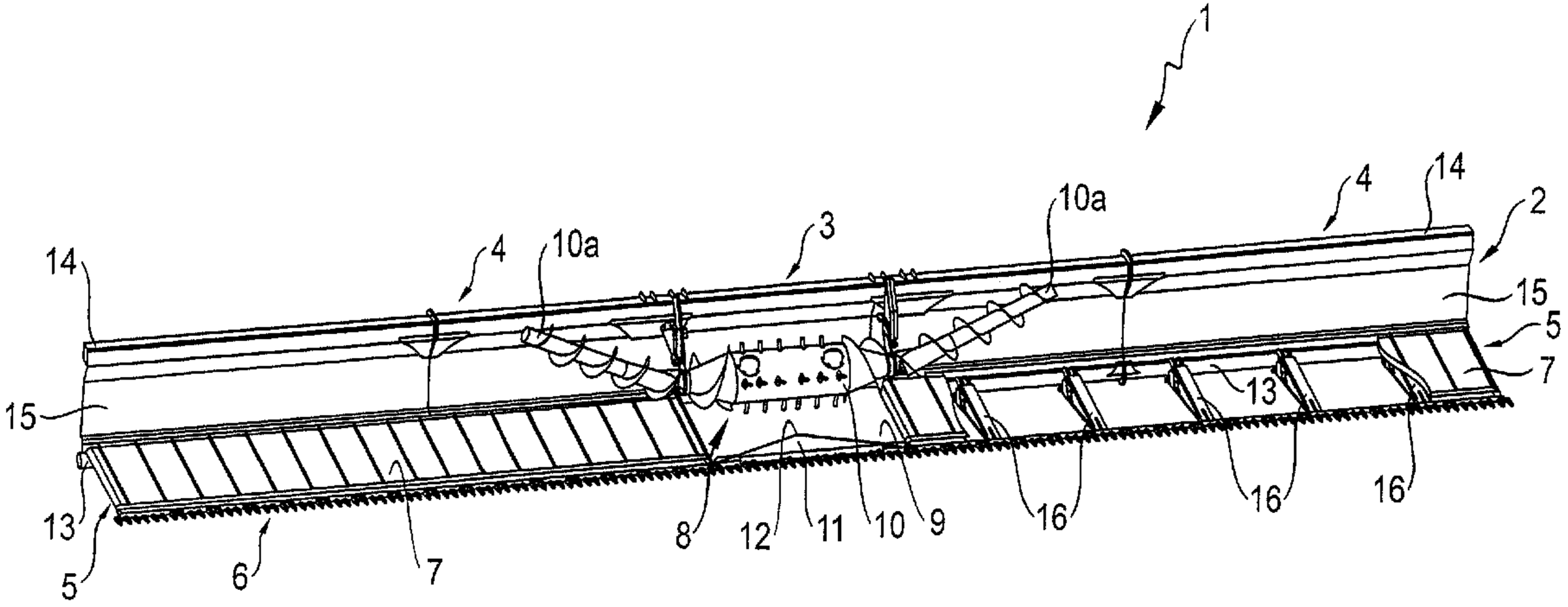


Fig. 8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