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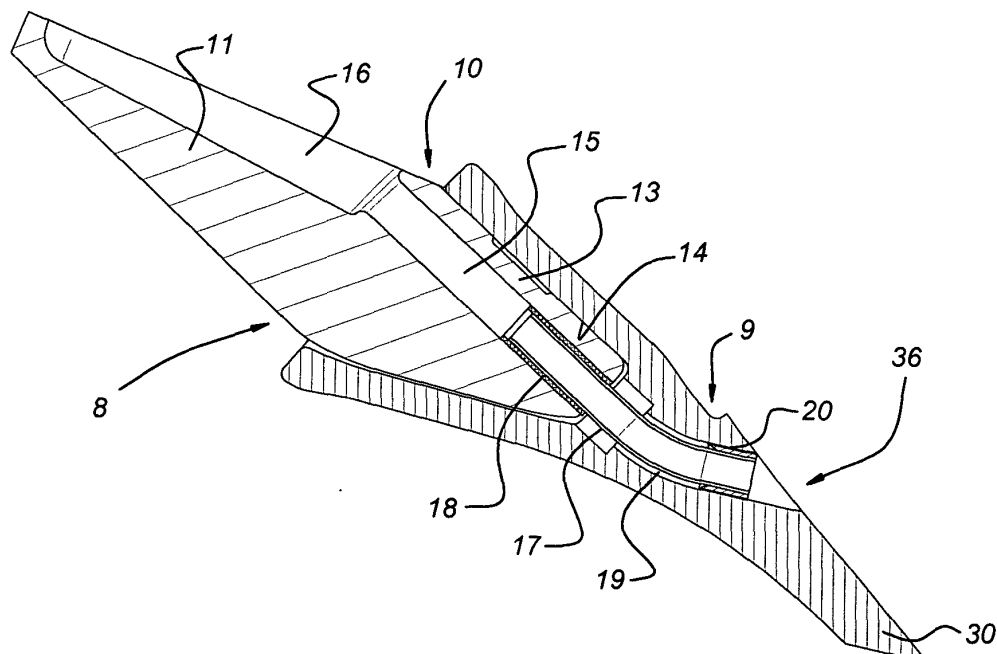
Remarks:
Amended claims in accordance with Rule 86 (2) EPC.

(54) **Cutting member for a dredging system**

(57) A cutting member (8) for dredging system, e.g. for a drag head, comprising a tooth (9) and a tooth holder (10), said tooth (9) being provided with a cavity (14) and said tooth holder (10) being provided with a pointed end (13) which tightly fits in said cavity (14), and a conduit

(15-20) for delivering a water jet near the cutting edge (30). The tooth holder (10) has a tooth holder channel (15) and the tooth (9) has a tooth channel (19), a feed pipe (17) being provided which at one end fits in the tooth holder channel (15) and which at the other end fits in the tooth channel (19).

Fig 5



Description

[0001] The invention is related to cutting member for dredging system, e.g. for a drag head, comprising a tooth and a tooth holder, said tooth being provided with a cavity and said tooth holder being provided with a pointed end which tightly fits in said cavity, and a conduit for delivering a water jet near the cutting edge.

[0002] Such a cutting member is known. By means of such cutting members, bottom material is cut while the dredging system, e.g. a drag head, is moved over the bottom of a body of water. The cut bottom material is collected in the body under the influence of appropriately oriented water jets, and fed to e.g. the hopper of a vessel through a suction tube.

[0003] Furthermore, the water jets incorporated in the cutting members assist in the cutting operation. The water is fed to the conduits in the cutting member at a certain pressure, which should be higher than the ambient water pressure. These water jets also prevent the intrusion of dirt etc. into the conduit.

[0004] The cutting teeth are subject to wear, dependent on the intensity of the cutting process. After a certain amount of time, the cutting teeth have to be replaced by fresh teeth. The worn out teeth have to be disconnected from the tooth holders. Also, the conduit in the cutting members has to be disconnected. In practice, it appears that the connection and disconnection process of the conduit leads to problems, such as an improper sealing between the conduit, tooth holder and tooth which means that dirt etc. can enter into the connection zone. This is highly undesirable, as the connection surfaces may become damaged.

[0005] The object of the invention is to provide cutting member of the type mentioned before in which these problems have been solved. This object is achieved in that the tooth holders have a tooth holder channel and the teeth have a tooth channel, a feed pipe being provided which at one end fits in the tooth holder channel and which at the other end fits in the tooth channel.

[0006] In the cutting member according to the invention, the flow path for the water is defined by the feed pipe which extends both into the tooth holder as well as into the tooth. Thus, it is not necessary to seal the tooth and the tooth holder at their facing surfaces. Thereby, a more simple connecting and disconnecting process of the tooth and the tooth holder is possible. Also, a better sealing can be obtained.

[0007] In this connection, the feed pipe can be sealed with respect to the tooth holder channel by means of a sealing system. Furthermore, the feed pipe can be guided with respect to the teeth channel by means of a guiding sleeve.

[0008] Additionally the tooth holder may have a connection surface which is connected to a plenum chamber, a chamber being provided which opens out in said connection surface and which is connected to the tooth holder channel, said plenum chamber having feed openings

which opens out in said tooth holder chamber.

[0009] The invention is also related to a drag head for a dredging system, comprising a body which at one end comprises connection means for connecting to a suction tube, a visor which is hingeably connected to the body opposite the connection means, at least one row of cutting members according to any of the preceding claims arranged in the visor, which cutting members each comprise a tooth and a tooth holder, said tooth holders being provided with a pointed end and said teeth being provided with a cavity which tightly fits in said cavity, each cutting member comprising a conduit for delivering a water jet near the cutting edge, as well as water supply means connected to the conduit.

[0010] According to the invention, the tooth holder has a tooth holder channel and the tooth has a tooth channel, a feed pipe being provided which at one end fits in the tooth holder channel and which at the other end fits in the tooth channel.

[0011] The invention will now be explained further with reference to a cutting member incorporated in a drag head as shown in the figures.

Figure 1 shows a view in perspective of the drag head.

Figure 2 shows a front view of the drag head.

Figure 3 shows a side view of the drag head.

Figure 4 shows a cross section according to IV - IV of figure 2.

Figure 5 shows an enlarged cross section according to V — V of figure 2 of a tooth incorporated in the drag head.

Figure 6 shows a cross section through the drag head similar to the cross section shown in figure 4, in operation.

[0012] The drag head shown in figures 1 up to 3 comprises a main body 1 at one end of which the mounting flange 2 is mounted. By means of the mounting flange 2, the drag head can be connected to a suction tube and a dredging vessel (not shown). At the other end, the body 1 carries a so called visor 3 through the hinge connection 4. The angle orientation of the visor 3 can be adjusted with respect to the body 1 by means of the hydraulic piston/cylinder devices 5.

[0013] The visor carries two rows 6, 7 of cutting members 8, each provided with a jet nozzle 36 (other numbers of rows are possible as well). These cutting members are shown on an enlarged scale in figure 5. Each cutting member 8 comprises a cutting tooth 9 as well as a tooth holder 10. The tooth holders 10 have a mounting part 11 by means of which they are connected to a cross bar 12 of each row 7, 8. Furthermore, each tooth 9 has a cavity 14 in which the pointed end 13 of the mounting part 11 is tightly fitted. By means of a pin (not shown) extending through the holder and the tooth, axial displacements are prevented.

[0014] The tooth holders 10 each have a channel 15

which at one end opens out in a chamber 16 and the other end of which receives a feed pipe 17. The feed pipe 17 is tightly fitted within the tooth holder channel 15 by means of a sealing system 18. Furthermore, the tooth 9 has a tooth channel 19, which has a somewhat curved shape and into which a correspondingly curved section of the feed pipe 17 extends as well. At its free end, the feed pipe 17 is guided with respect to the tooth channel 19 by means of a guiding sleeve 20.

[0015] As shown in figure 4, the tooth holder chamber 16 of each tooth holder 10 is in communication with a feed opening 21 in the cross bars 12. These cross bars each delimit a plenum chamber 22, which plenum chambers 22 are fed with pressurized water by means of the respective feed lines 23, 24. These feed lines 23, 24 are each connected to a manifold 25 which in turn, by means of supply tube 26, is supplied with pressurized water.

[0016] Furthermore, jet nozzles 28 are connected to the body 1, which jet nozzles 28 are in communication with the supply pipe 26 as well through plenum chamber 27.

[0017] Figure 6 shows the general orientation of the drag head according to the invention with respect to the bottom 29 of a water body during a cutting operation. The visor 3 is oriented with respect to the body 1 through the piston/cylinder devices 5 in such a way that the teeth have their cutting ends 30 slightly oriented downwards; in such a way that the water jets 30 delivered from the cutting teeth 8 are oriented slightly upwardly. Additional water flows are delivered by the jet nozzles 28, 31 and 32, for urging the cut bottom material to the body 1 and the suction tube.

[0018] Although reference has been made to a drag head, the cutting member according to the invention is applicable in a wide variety of dredging systems such as with a cutting head, with buckets etc.

Claims

1. Cutting member (8) for dredging system, e.g. for a drag head, comprising a tooth (9) and a tooth holder (10), said tooth (9) being provided with a cavity (14) and said tooth holder (10) being provided with a pointed end (13) which tightly fits in said cavity (14), and a conduit (15-20) for delivering a water jet near the cutting edge (30), **characterised in that** the tooth holder (10) has a tooth holder channel (15) and the tooth (9) has a tooth channel (19), a feed pipe (17) being provided which at one end fits in the tooth holder channel (15) and which at the other end fits in the tooth channel (19).
2. Cutting member according to claim 1, wherein the tooth holder channel (19) and the feed pipe (17) are correspondingly curved.
3. Cutting member according to claim 1 or 2, wherein

the feed pipe (17) is sealed with respect to the tooth holder channel (15) by means of a sealing systems (18).

4. Cutting member (8) according to any of the preceding claims, wherein the feed pipe (17) is guided with respect to the tooth channel (19) by means of a guiding sleeve (20).
5. Drag head for a dredging system, comprising a body (1) which at one end comprises connection means (2) for connecting to a suction tube, a visor (3) which is hingeably connected to the body (1) opposite the connection means (2), at least one row of cutting members (8) according to any of the preceding claims arranged in the visor (3), which cutting members each comprise a tooth (9) and a tooth holder (10), said tooth holders (10) being provided with a pointed end (13) and said teeth (9) being provided with a cavity (14) which tightly fits in said cavity (14), each cutting member (8) comprising a conduit (15-20) for delivering a water jet near the cutting edge (30), as well as water supply means (26) connected to the conduit (15-20), wherein the tooth holders (10) have a tooth holder channel (15) and the teeth (9) have a tooth channel (19), a feed pipe (17) being provided which at one end fits in the tooth holder channel (15) and which at the the other end fits in the tooth channel (19).
6. Drag head according to claim 5, wherein the tooth holder channel (19) and the feed pipe (17) are correspondingly curved.
7. Drag head according to claim 5 or 6, wherein the feed pipe (17) is sealed with respect to the tooth holder channel (15) by means of a sealing system (18).
8. Drag head according to any of the claims 5-7, wherein the feed pipe (17) is guided with respect to the teeth channel (19) by means of a guiding sleeve (20).
9. Drag head according to any of the claims 5-8, wherein the tooth holder (10) has a connection surface which is connected to a plenum chamber (22), a chamber (16) being provided which opens out in said connection surface and which is connected to the tooth holder channel (15), said plenum chamber having a feed opening (21) which opens out in said tooth holder chamber (16).

Amended claims in accordance with Rule 86(2) EPC.

1. Cutting member (8) for dredging system, e.g. for a drag head, comprising a tooth (9) and a tooth holder (10), said tooth (9) being provided with a cavity (14) and said tooth holder (10) being provided with a

pointed end (13) which tightly fits in said cavity (14), and a conduit (15-20) for delivering a water jet near the cutting edge (30), **characterised in that** the tooth holder (10) has a tooth holder channel (15) and the tooth (9) has a tooth channel (19), a feed pipe (17) being provided which at one end fits in the tooth holder channel (15) and is sealed with respect to the tooth holder channel (15) by means of a sealing system (18) and which at the other end fits in the tooth channel (19) and is guided with respect to the tooth channel (19) by means of a guiding sleeve (20).

2. Cutting member according to claim 1, wherein the tooth holder channel (19) and the feed pipe (17) are correspondingly curved.

3. Drag head for a dredging system, comprising a body (1) which at one end comprises connection means (2) for connecting to a suction tube, a visor (3) which is hingeably connected to the body (1) opposite the connection means (2), at least one row of cutting members (8) according to any of the preceding claims arranged in the visor (3), which cutting members each comprise a tooth (9) and a tooth holder (10), said tooth holders (10) being provided with a pointed end (13) and said teeth (9) being provided with a cavity (14) which tightly fits in said cavity (14), each cutting member (8) comprising a conduit (15-20) for delivering a water jet near the cutting edge (30), as well as water supply means (26) connected to the conduit (15-20), wherein the tooth holders (10) have a tooth holder channel (15) and the teeth (9) have a tooth channel (19), a feed pipe (17) being provided which at one end fits in the tooth holder channel (15) and is sealed with respect to the tooth holder channel (15) by means of a sealing system (18) and which at the other end fits in the tooth channel (19) and is guided with respect to the tooth channel (19) by means of a guiding sleeve (20).

4. Drag head according to claim 3, wherein the tooth holder channel (19) and the feed pipe (17) are correspondingly curved.

5. Drag head according to claims 3 or 4, wherein the tooth holder (10) has a connection surface which is connected to a plenum chamber (22), a chamber (16) being provided which opens out in said connection surface and which is connected to the tooth holder channel (15), said plenum chamber having a feed opening (21) which opens out in said tooth holder chamber (16).

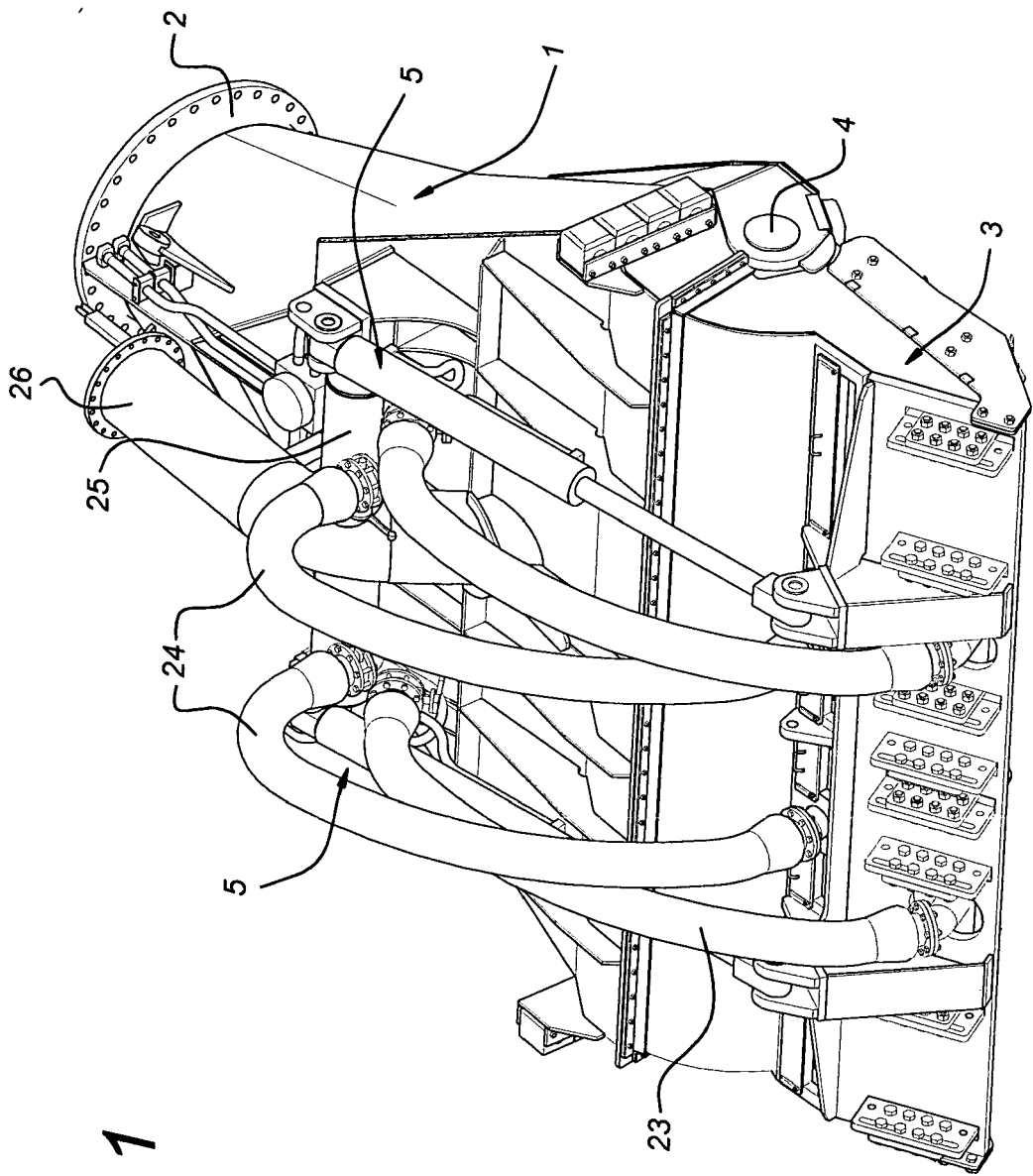
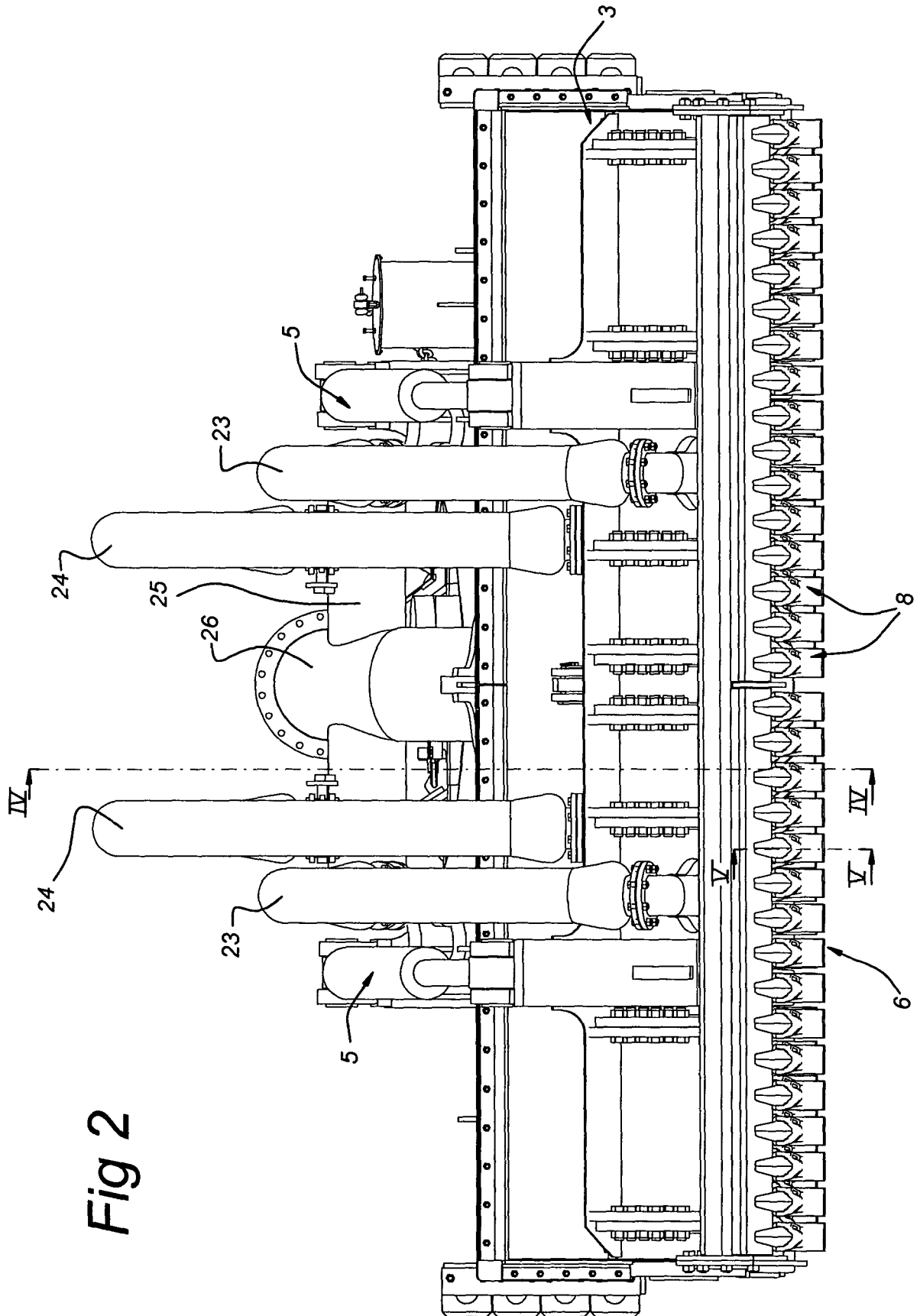


Fig 1



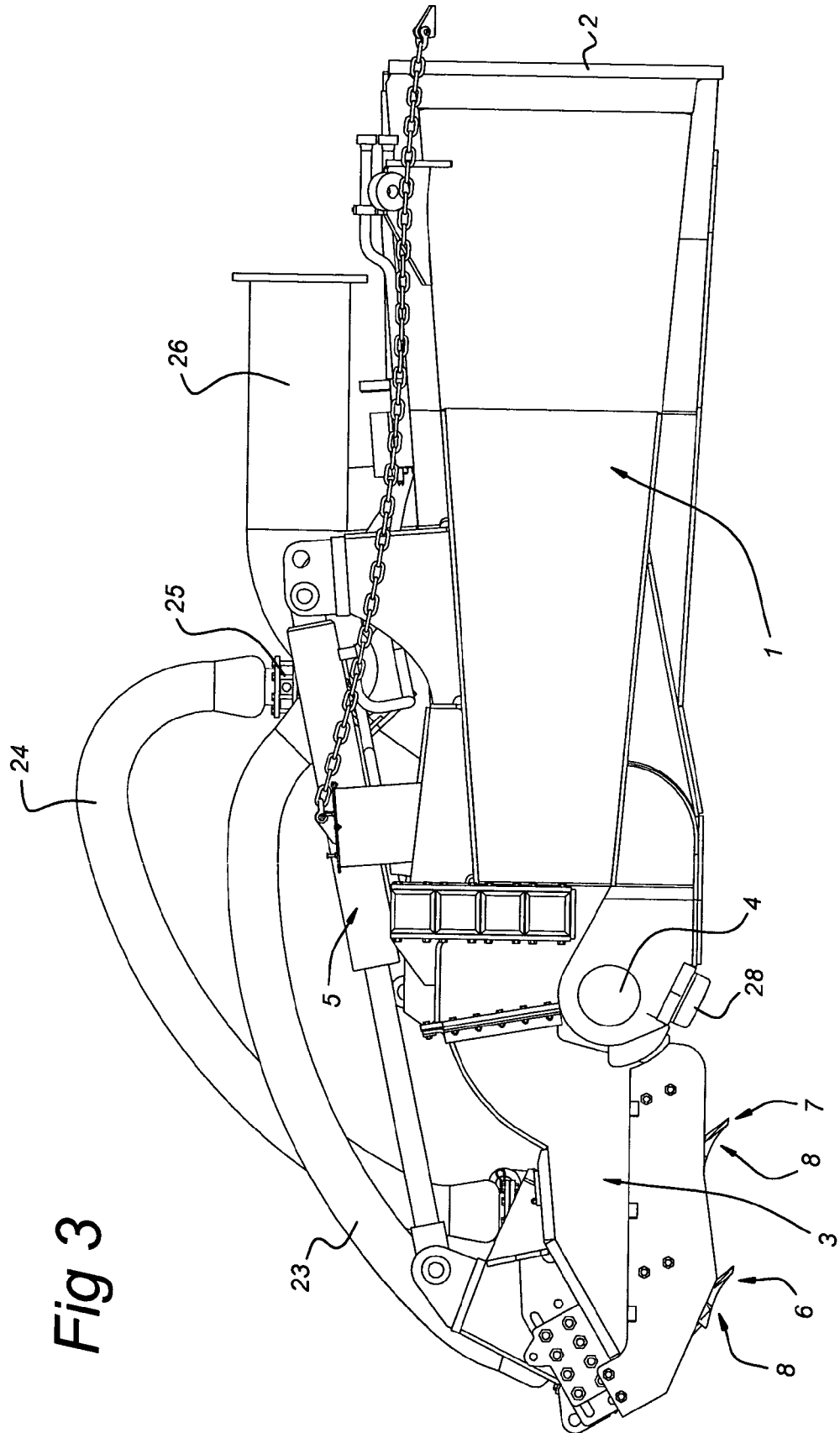


Fig 4

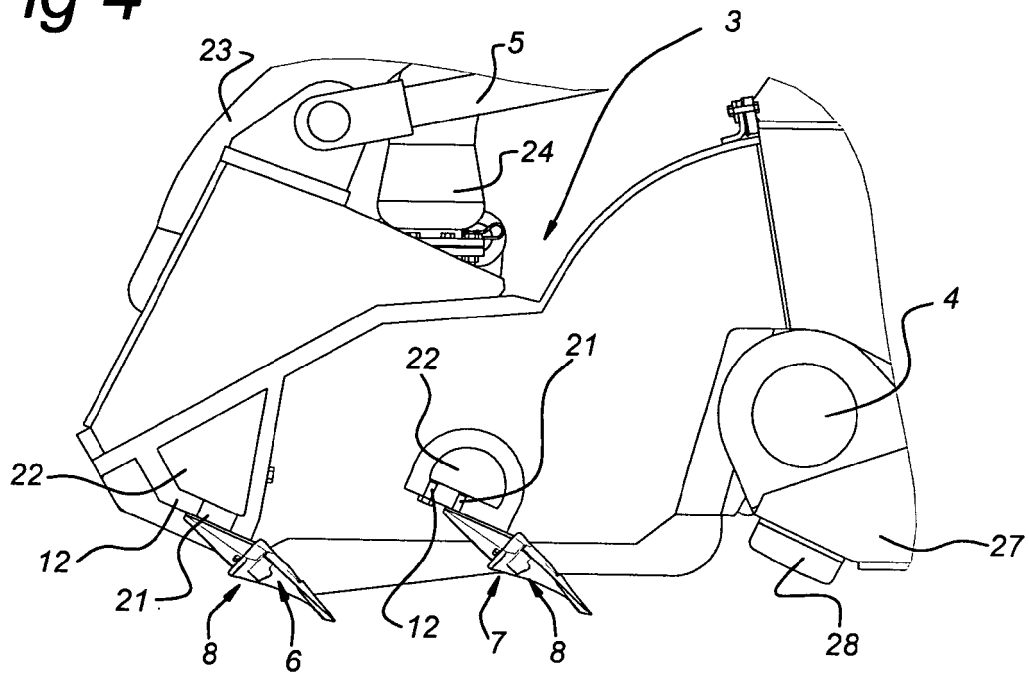


Fig 5

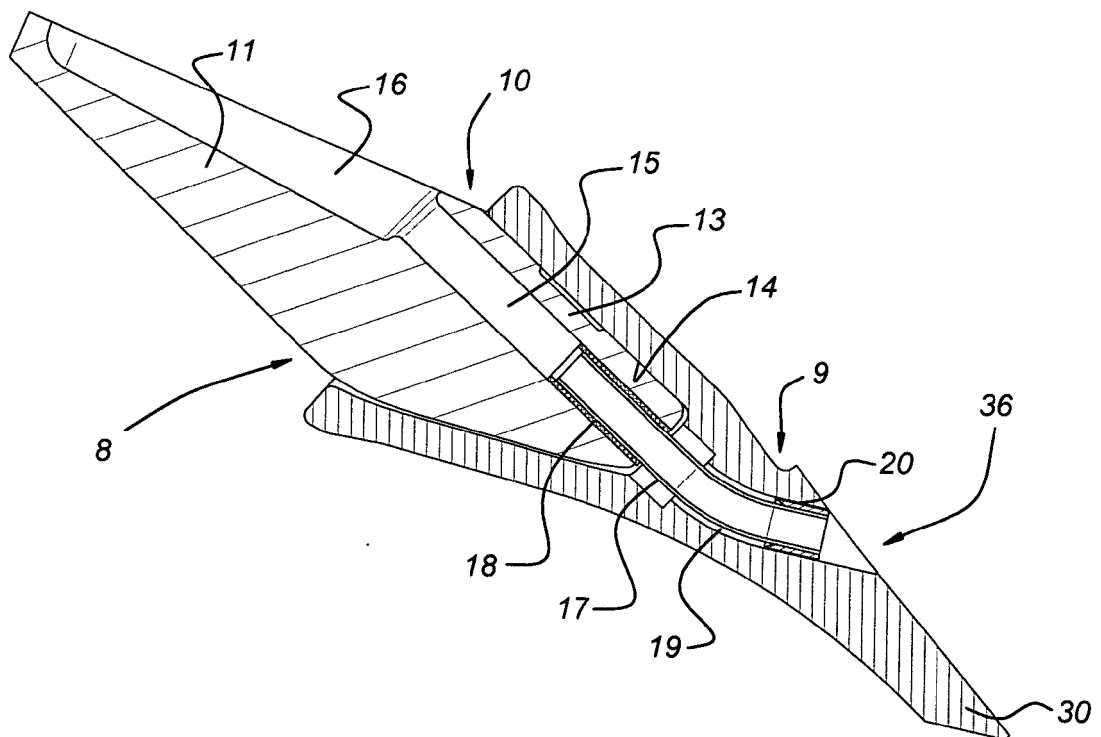
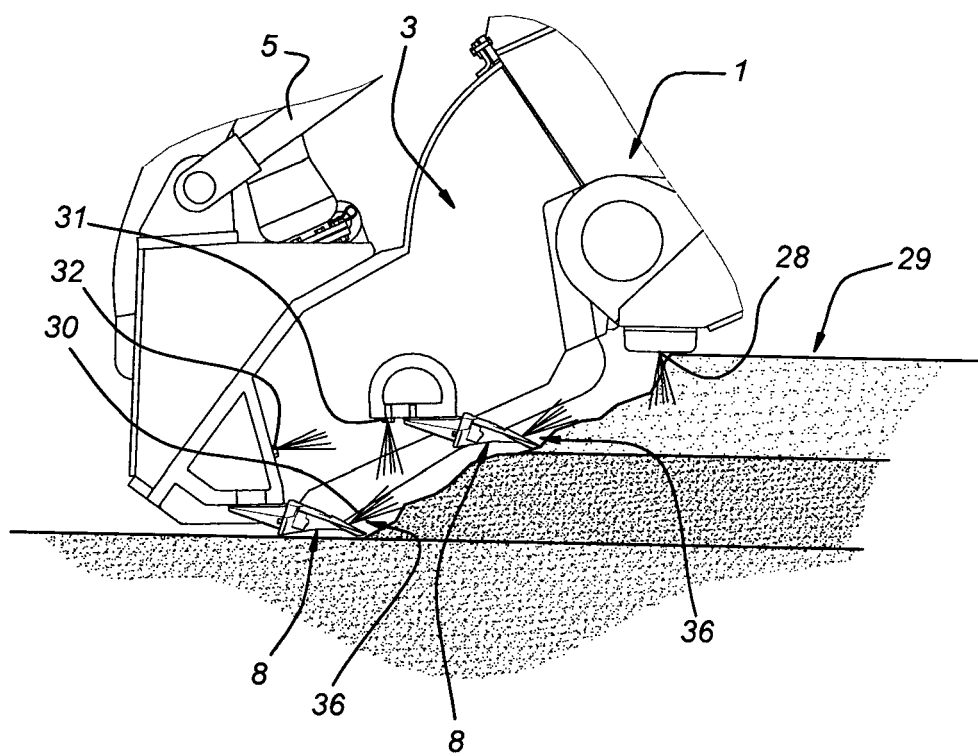


Fig 6





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EUROPEAN SEARCH REPORT

Application Number
EP 04 07 7954

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