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(54) **BULLDOZER**

(57) A bulldozer that is intended for spreading and levelling road surface material over which an asphalt layer is further intended to be applied, which bulldozer is formed of a frame (1, 2) that is articulated in the middle and of bearing chain track wheels (3) and a front bulldozer blade (4a, 4b). The bulldozer blade (4a, 4b) has three parts, a body blade (5) and side blades (6) folding forward substantially to an angle of 90° on both sides, whereby a U-shaped trough (7) is formed in front of the bulldozer.

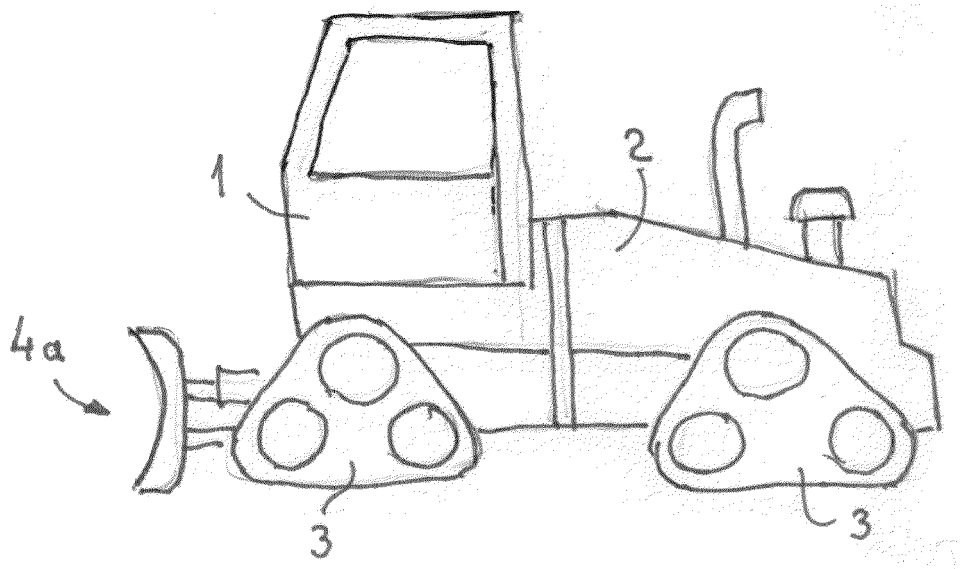

Fig. 1

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Description

[0001] This invention relates to a bulldozer that is intended for spreading and levelling road surface material over which an asphalt layer is further intended to be applied, which bulldozer is formed of a frame that is articulated in the middle and of bearing chain track wheels and a front bulldozer blade.

[0002] Devices that are known per se for levelling roads are so-called road graders having a long frame, front wheels and rear wheels, and wherein the grader blade is located behind the front wheels. The frame is not articulated. This road grader works if the road is long and straight with no bends. The wheels of the road grader easily break a levelled and graded road surface. No evenly bearing track wheels are provided.

Summary of the invention

[0003] The object of this invention is to remedy the defects described above. The bulldozer according to the invention is characterized in that the bulldozer blade has three parts, a body blade and side blades folding forward substantially to an angle of 90° on both sides, whereby a U-shaped trough is formed in front of the bulldozer.

[0004] One embodiment of the invention is characterized in that the side blades are foldable by hydraulic cylinders that are known per se.

[0005] Another embodiment of the invention is characterized in that the bulldozer blade has two troughs in cross-section, wherein the troughs are longitudinally one on top of the other.

[0006] Advantages of the bulldozer according to the invention compared with the known road graders are: Speed, precision, ease of use, the frame jack-knifes, i.e. easy to turn and nimble, surface pressure is low, does not break the levelled surface.

[0007] The invention will now be described by way of example with reference to the accompanying drawing, in which

List of the figures

[0008]

Fig. 1 illustrates a bulldozer as a side view,

Fig. 2 illustrates a bulldozer blade as viewed from above,

Fig. 3 is the same as Fig. 2, but with side blades folded forward, and

Fig. 4 illustrates a bulldozer blade according to another embodiment as a side view.

Detailed description of the invention

[0009] The bulldozer is intended for spreading and levelling road surface material. An asphalt layer is further intended to be applied over the levelled surface. The bulldozer is formed of a frame 1, 2 that is articulated in the middle and of bearing chain track wheels 3 and a front bulldozer blade 4a, 4b. The bulldozer blade has three parts, a body blade 5 and side blades 6 folding forward substantially to an angle of 90° on both sides, whereby a U-shaped trough 7 is formed in front of the bulldozer. The side blades 6 are foldable by hydraulic cylinders that are known per se. Not illustrated in the drawing.

[0010] In Fig. 4, the bulldozer blade 4b has two troughs in cross-section, wherein the troughs 8, 9 are longitudinally one on top of the other.

[0011] The frame of the bulldozer is divided into two parts, a front part 1 and a rear part 2, attached to each other in an articulated manner. The articulation is arranged in the vertical direction, whereby the front part and the rear part may pivot relative to each other in the horizontal plane. This enables nimbler operation of the device because due to the articulation, the device can be turned even in a narrow place. At the same time, the precision of work is improved and the device may also be easily used at winding and narrow work sites.

[0012] The device comprises bearing chain track wheels 3 by means of which the weight of the device can be distributed over a larger area than by using traditional wheels, whereby the device leaves less marks on the working surface, or does not leave any marks at all. Two of the chain track wheels may be arranged in the front part on opposite sides thereof and two may be arranged in the rear part on opposite sides thereof. The device may also comprise more of the chain track wheels in the front part and/or the rear part on different sides thereof. The chain track wheel may have a triangular design, when the chain track wheel is viewed from the side. Thus, the chain track wheel comprises three track wheels that are arranged so that two of the track wheels are arranged so to speak facing the ground, and one is arranged over these two track wheels in the middle, as is illustrated in Fig. 1. The track of the track wheel is arranged to run around the track wheels.

[0013] The bulldozer blade of the device is fixedly attached to the front part of the frame, such that the position of the bulldozer blade may be changed. The bulldozer blade may be tilted as desired forward and backward, or it may be turned in the horizontal plane, whereby the material being worked may be guided to the side with the bulldozer blade. The bulldozer blade may be attached to the front part of the frame for example with hydraulic cylinders by means of which the position of the bulldozer blade may be changed. The front part of the bulldozer may comprise a cab in which the control devices of the device are arranged. The control devices may comprise means required to control the device, such as a steering wheel and control means for moving the device forward

and backward. In addition, the cab may comprise bulldozer blade control means for changing its position. The bulldozer blade must be fixedly attached, because the material being levelled, such as stones, gravel etc., is very heavy and the bulldozer blade must withstand the forces exerted by the material without the bulldozer blade starting to move by the effect of the forces applied thereto. By fixed attachment it is meant that the bulldozer blade is rigidly attached to the front part of the bulldozer, whereby the bulldozer blade is supported by the whole weight of the device. The bulldozer blade 4a, 4b may be attached to the front part 1 fully or partly hydraulically, e.g. by hydraulic cylinders, whereby the position of the bulldozer blade may be changed hydraulically.

[0014] The bulldozer blade comprises a body blade 5 and side blades 6 arranged at both ends of the body blade 5. The angle of the side blades 6 in relation to the body blade 5 may be adjusted in the horizontal plane between 90-180 degrees. In Fig. 2 the side blades 6 are at an angle of 180 degrees relative to the body blade 5 and in Fig. 3 the side blades are at an angle of 90 degrees relative to the body blade 5. The angle of each side blade 6 may be adjusted independently, irrespective of the angle of the other side blade, or the angle of the side blades may be adjusted synchronously.

[0015] A bar that is fitted with a camera for imaging the road surface or other material being moved may be attached to the upper part of the body blade of the bulldozer blade. The cab of the device may comprise a display to which the signal of the camera may be transmitted and the driver or user of the device sees in real time what is happening in front of the bulldozer blade. Thus the driver is able to react quickly if something appears in front of the bulldozer blade that should not be there, or is able to control the device in places that require precision.

[0016] The upper part of the body blade 5 may also comprise two transmitters by means of which the position of the bulldozer blade may be determined. The transmitters are arranged at the ends of the upper part of the body blade so that one transmitter is close to a first side part and another transmitter is close to a second side part. Thus the exact position of the blade can be detected. The detection of the position may be based on GPS (Global Positioning System). The device may also comprise more transmitters. Two masts may be attached to the body blade 5 such that the masts are attached to the upper edge of the body blade close to the point of attachment of the side parts, whereby they extend vertically upwards from the surface being worked. The transmitters can be attached to these masts.

[0017] The body blade 5 and the side blades 6 may each comprise a cutting edge part that is arranged to the lower edge of the blades, extending vertically towards the surface being levelled, i.e. during work the cutting edge is oriented at an angle of approximately 90 degrees relative to the surface being worked. This has the advantage that the bulldozer blade is not lifting, i.e. it does not peel material off the surface being worked, but only levels it to a desired level. The cutting edge part may be manufactured from a different material than the other parts of the bulldozer blade. The cutting edge part may be removably attached to the blades, whereby the cutting edge parts may be replaced as they wear down.

[0018] The bulldozer blade may have two troughs in cross-section, i.e. cross-section as viewed from the side, wherein the troughs 8, 9 are longitudinally, i.e. in the vertical direction, one on top of the other above the cutting edge part. By means of these troughs the material being levelled/moved does not uncontrollably accumulate in front of the bulldozer blade, but can be spread evenly along the whole width of the bulldozer blade. This way the material being levelled can also be better compacted.

Claims

1. A bulldozer that is intended for spreading and levelling road surface material over which an asphalt layer is further intended to be applied, which bulldozer is formed of a frame (1, 2) that is articulated in the middle and of bearing chain track wheels (3) and a front bulldozer blade (4a, 4b), **characterized in that** the bulldozer blade (4a, 4b) has three parts, a body blade (5) and side blades (6) folding forward substantially to an angle of 90° on both sides, whereby a U-shaped trough (7) is formed in front of the bulldozer.

2. The bulldozer according to claim 1, **characterized in that** the side blades (6) are foldable by hydraulic cylinders that are known per se.

3. The bulldozer according to claim 1 or 2, **characterized in that** the bulldozer blade (4b) has two troughs in cross-section, wherein the troughs (8, 9) are longitudinally one on top of the other.

4. The bulldozer according to claim 1, wherein the frame (1,2) comprises a front part and a rear part attached to each other in an articulated manner.

5. The bulldozer according to claim 4, wherein the front part of the frame comprises two chain track wheels arranged on opposite sides of the front part, and the rear part of the frame comprises two chain track wheels arranged on opposite sides of the rear part.

6. The bulldozer according to claim 4 or 5, wherein the bulldozer blade () is fixedly attached to the front part of the frame, so that the position of the bulldozer blade may be changed from the cab.

7. The bulldozer according to any of claims 1-6, wherein the angle of the side blades in relation to the body blade may be adjusted between 90-180 degrees.

8. The bulldozer according to any of claims 1-7, where-

in the angle of each side blade may be adjusted independently, irrespective of the angle of the other side blade.

9. The bulldozer according to any of claims 1-8, wherein a bar that is fitted with a camera for imaging the road surface material is attached to the upper part of the body blade (5).

10. The bulldozer according to any of claims 1-9, wherein the upper part of the body blade (5) comprises two transmitters by means of which the position of the bulldozer blade may be determined and of which one transmitter is positioned close to the point of attachment of a first side blade and another transmitter is positioned close to the point of attachment of a second side blade.

11. The bulldozer according to any of claims 1-10, wherein the body blade (5) and the side blades () each comprise a cutting edge part () that is arranged to the lower edge of the blades, extending vertically towards the surface being levelled.

12. The bulldozer according to any of claims 1-11, wherein that the bulldozer blade (4b) has two troughs in cross-section, wherein the troughs (8, 9) are in the vertical direction one on top of the other above the cutting edge part ().

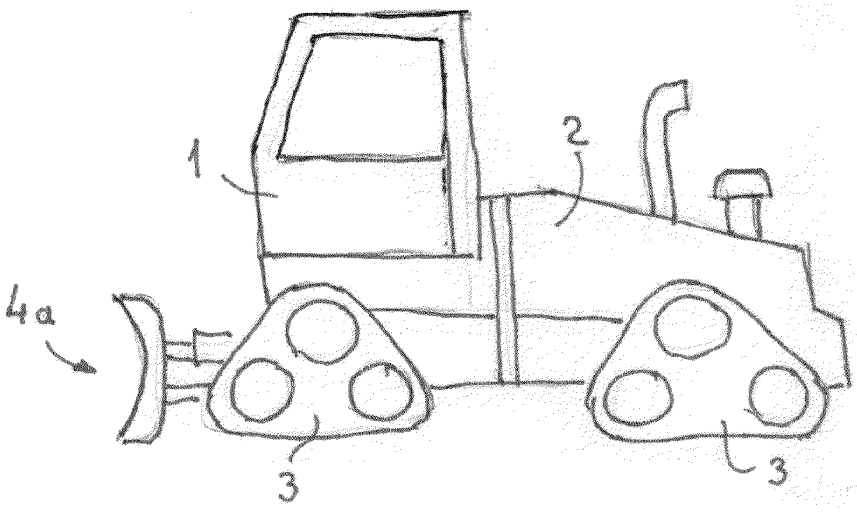

Fig. 1

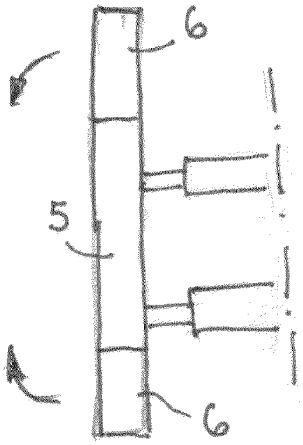

Fig. 2

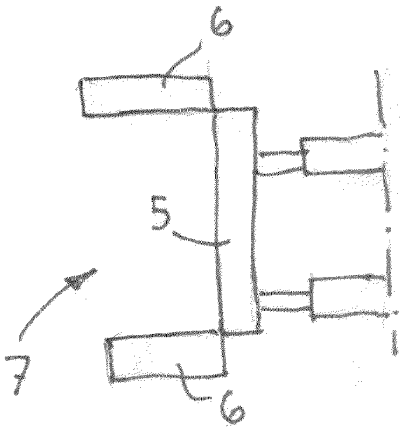

Fig. 3

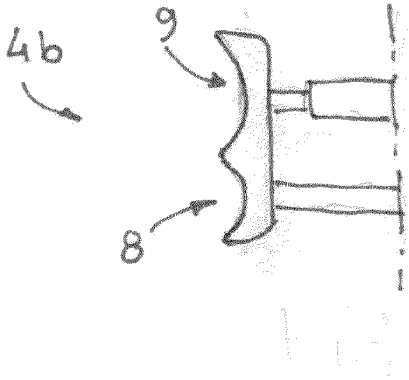

Fig. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 21 19 7319

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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1 The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	7 February 2022	Rocabruna Vilardell

CATEGORY OF CITED DOCUMENTS

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