

The present invention relates to a cutting machine for excavating trenches in the ground, and more particularly such a machine of the type including at least one substantially vertical support plate on each side of which two cutting drums are mounted for rotation about an axis substantially perpendicular to the plate.

Such cutting machines which generally have two plates and consequently support four drums rotating in pairs in opposite directions so as to take the excavated earth towards a suction pipe situated on the axis of the machine are already known.

As such machines of increasingly large capacity are constructed, it is necessary to increase the thickness of the support plate which has to absorb the forces exerted by the ground on the cutting drums.

This thickness of the support plate creates difficulties during the digging of the trench. This is because the cutting tools mounted on the two drums on the side of the support plate must be sufficiently separated from one another to permit the passage of this plate as the drums rotate. As a result, a ridge is formed at the bottom of the trench, of width generally not less than that of the plate.

As the cutting machine descends, the bottom edge of the support plate butts against this ridge and may, consequently, prevent the progress of the excavation.

Various solutions to this problem have already been proposed. For instance, it has been envisaged to mount the cutting tools situated on the side of the plate movably on the drums, so as to bring the tools of the two drums closer together when they are in a position clear of the support plate. However, this solution has proved difficult to implement insofar as the articulation axes of these tools have to withstand extremely large forces.

There have also been provided in the support plate circular grooves centred on the axis of the drums, so that the cutting tools mounted fixedly on the drums are separated by a distance less than the thickness of the plate (cf. US-A-3,894,587). This solution has proved

satisfactory. However, with the plate thicknesses currently used, the fact remains that the ridge is still of sufficient size to resist the weight of the cutting machine exerted via the bottom surfaces of the edge of the support plate.

The object of the present invention is to provide a different solution to the problem outlined above, optionally in combination with the means already known.

To this end, the subject of the invention is a cutting machine for excavating trenches in the ground, of the type including at least one substantially vertical support plate on side each of which two cutting drums are mounted for rotation about an axis substantially perpendicular to the plate, characterized in that the edge surfaces of said plate which face downwards have portions which are inclined in relation to the direction at right angles to said plate and which extend from one face of the plate to its other face.

Thus, the weight of the cutting machine is transmitted to the ridge via these inclined portions, which therefore exert on the ridge a lateral force component which tends to break it up. Consequently, independently of the means optionally enabling the reduction of the thickness of the ridge, the present invention permits easier loosening of this ridge and ensures better penetration of the cutting machine.

The bottom edge of said plate may be, for example, substantially semicircular, said inclined portions being disposed along successive sectors of said bottom edge.

In a preferred embodiment of the invention, a plurality of portions alternately inclined on each side of the plate are provided.

Thus, the lateral forces exerted by the ridge on the cutting machine may have a substantially zero lateral component, which prevents the deflection of the machine and consequently ensures the verticality of the trench.

A specific embodiment of the invention will now be described by way of a non-limiting example with

reference to the accompanying schematic drawings in which:

- Figure 1 is a side view of the lower part of the cutting machine according to the invention,

5 - Figure 2 is a view, to a larger scale, in the direction of the arrow II of Figure 1, and

- Figure 3 is a bottom view of Figure 2, in which the cutting picks have not been shown.

10 The cutting machine shown in Figure 1 has, in a known manner, a frame 1 on the lower part of which two cutting drums 2 are mounted via vertical support plates 3. The axes 4 of rotation of the drums are perpendicular to the plates 3. In the present case, hydraulic motors 5 are mounted on the plates 3 and have their output shafts
15 integral with the drums 2 so as to cause them to rotate in opposite directions, in the direction of the arrows 6. Thus, the ground loosened by the drums 2 is taken towards the lateral axis 7 of the cutting machine where they are (sic) sucked up by a suction pipe 8.

20 As shown in Figure 2, the cutting drums 2 carry at their periphery cutting picks 9 which ensure the loosening of the earth as the drums rotate. The picks 9a closest to the plate 3 are inclined towards the transverse axis 10 of this plate so as to be as close
25 together as possible.

30 As the drums 2 rotate and the cutting machine descends, a ridge 11 is nevertheless formed at the bottom of the trench 12, the thickness of which ridge is not less than the thickness of the plate 3, and against which the bottom edge of the plate 3 butts as the machine descends.

35 In order to facilitate the loosening of this ridge, the bottom edge of each plate 3, which, in the present case, is semicircular, has inclined surfaces 13. These surfaces are alternately inclined on each side of the axis 10 of the plate 3 along successive sectors. Each surface 13, inclined for example at 45°, runs from one face of the plate 3 to its other face.

Thus, the weight of the cutting machine is

brought to bear on the ridge 11, on one hand by means of transverse forces in the direction of the arrow 14 of Figure 2, and on the other hand by means of torsional forces in the direction of the arrows 15 of Figure 3.

5 These forces bring about the break-up of the ridge 11, with the result that the latter cannot hinder the progress of the cutting of the trench.

10 It will be noted that the alternation of the orientations of the surfaces 13 produces a zero transverse force on the cutting machine, with the result that the latter is not deflected from the vertical as it progresses.

15 A number of variants and modifications of the preceding description are, of course, possible without in any way departing from the scope or the spirit of the invention.

Thus, in particular, known means may be employed so as to reduce the thickness of the ridge before loosening it using the means of the invention.

20 Similarly, the cutting drums, which have been described as being driven by hydraulic motors situated in their hubs, may be driven by any other means, for example via chains connected to motors disposed in the frame.

CLAIMS

1. Cutting machine for excavating trenches in the ground, of the type including at least one substantially vertical support plate (3) on each side of which two cutting drums (2) are mounted for rotation about an axis (4) substantially perpendicular to the plate, characterized in that the edge surfaces of said plate which face downwards have portions (13) which are inclined in relation to the direction at right angles to said plate and which extend from one face of the plate to its other face.

2. Cutting machine according to Claim 1, characterized in that the bottom edge of said plate is substantially semicircular, said inclined portions being disposed along successive sectors of said edge.

3. Cutting machine according to either of Claims 1 and 2, characterized in that it has a plurality of portions alternately inclined on each side of the plate.

