

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

Such drilling devices are already known comprising generally two plates, and accordingly supporting four drums
10 turning in pairs in opposite senses in such a manner as to deliver the drilling debris to a suction nozzle positioned on the axis of the device.

As such devices are progressively being built larger and larger, it is necessary to increase proportionately the
15 thickness of the support plate which has to withstand the forces imposed by the ground on the drill drums.

This thickness of the support plate produces difficulties in excavating the trench. In effect, the drilling tools mounted on the two drums next to the support
20 plate must be sufficiently spaced from each other to allow passage past this plate on rotation of the drums. This results in the formation of a step at the bottom of the trench, of a width at least equal to that of the plate.

As the drilling device descends, the lower edge of the
25 support plate comes into abutment on said step, and as a result may impede continued excavation.

Different solutions for this problem have already been suggested. Thus it has been proposed to mount the

drilling tools positioned next to the plate in a movable fashion on the drums, in such a way that they get closer to each other when in a position away from the support plate. All the same, this solution has proved difficult to put
5 into practice in proportion to the degree to which the hinge axes of such tools have to withstand extremely large forces.

There have also been provided circular grooves in the support plates, centred on the axis of the drums, in such a
10 fashion that the drill tools fixedly mounted on the drums are separated by a distance less than the thickness of the plate (cf. DE-A-2 362 425). This solution has proved satisfactory. All the same, with the thickness of plates now used, there still remains a step of sufficient size to
15 withstand the weight of the drilling device exerted via the lower surfaces of the edge of the support plate.

The present invention aims to provide a different solution to the problem explained above, possibly in combination with the already known means.

20 To this end, the invention has as object a drilling machine for digging trenches in the ground, of the type comprising at least one substantially vertical support plate on which are mounted two drilling drums one on each side of it for rotation about an axis substantially
25 perpendicular to the plate, characterized by the fact that at least one mobile digit is mounted on the lower edge of said plate, drive means being provided for causing oscillation of said digit from one side to the other of the

central plane of said plate when the drums are rotated.

Thus the digits according to the invention come into contact with the vertical sidewalls of the step, on which they exert a component of lateral force which tends to
5 break up this step.

As a result, independently of any means which possibly allow the thickness of the step to be reduced, the present invention allows this step to be disintegrated more easily and thus assures improved penetration of the drilling
10 device.

To ensure a simple form of mounting, with good resistance to shock and wear, the said digit may be mounted on the lower edge of the plate via elastic means.

Alternatively, any mechanical means, such as hinges,
15 may be used.

In one particular embodiment of the invention said drive means may comprise cams positioned on the sides of the drilling drums situated opposite the support plate. In particular said cams may be substantially continuous and
20 sinusoidal.

Preferably, the drilling device according to the invention comprises a plurality of digits mounted on said lower edge of the support plate, and said drive means are so formed that successive digits oscillate in opposite
25 face [sic] relative to the central plane of the plate.

Thus the lateral forces exerted by the digits of the drilling device on the step, can have a substantially nil lateral component, which avoids deviations of the device

and as a result ensures the verticality of the trench.

There will now be described by way of non-limiting example one particular embodiment of the invention with reference to the attached schematic drawings in which:

5 - Figure 1 is a side view of the lower part of the drilling device according to the invention, and

 - Figure 2 is a view on a larger scale along arrow II of Figure 1.

 The drilling device shown in figure 1 comprises in
10 known fashion a frame 1 on whose lower portion are mounted two drilling drums 2 via vertical support plates 3. The axes 4 of rotation of the drums are perpendicular to the plates 3. In this embodiment, hydraulic motors 5 are
15 mounted on the plates 3 and their output axles are fast with the drums 2 in such fashion as to turn them in opposite senses, in the senses given by arrows 6. Thus, the soil disintegrated by the drums 2 is delivered towards the lateral axis 7 of the drilling device where it is
20 sucked up by a suction nozzle 8.

 As shown in Figure 2, the drilling drums 2 carry on
25 their circumference drill picks 9 which ensure the disintegration of the ground on rotation of the drums. The picks 9a closest to the plate are inclined towards the transverse axis 10 of this plate in such manner as to approach it as closely as possible.

 On rotation of the drums 2 and the descent of the drilling device, a step nevertheless is formed at the bottom of the trench 12, a step whose thickness is at least

equal to the thickness of the plate 3, and on which the lower edge of plate 3 might come into abutment on descent of the device.

In order to disintegrate this step 11, the digits 13 are mounted on the lower semi-circular edge 14 of each plate 3. The digits 13 are directed substantially vertically of the edge 14 on which they are mounted via elastic blocks 15, in a manner allowing their oscillation according to arrow 15 from one side to the other of the central plane 10 of the plate 3.

The interior sides of the drums 2, positioned opposite the plate 3, are cut-out according to a continuous sinusoidal profile 17, so as to form two guidance surfaces, or cams, between which the head 18 of the digit 13 is positioned.

Thus as the drums turn in the senses indicated by arrows 6, the digits 13 oscillate as indicated by arrow 16 thus causing the destruction of the step 11, as shown in figure 2.

The surfaces 17 are so fashioned that the movements of two digits 13 positioned successively on a surface 14 take place in opposite phase on each side of plane 10. Thus, the digits 13 exert on step 11, on the one hand transverse forces and on the other hand torsional forces. These forces bring about the break-up of step 11 so that the latter cannot obstruct the progress of the drilling of the trench. Further, these movements in opposite phase result in a nul transverse force on the drilling device, such that

the latter is not deviated from the vertical as it proceeds.

Various variations and modifications can naturally be made to what is above described without thereby falling
5 outside the frame or the spirit of the invention.

Thus in particular, known means may be employed to reduce the thickness of the step before its disintegration by the means of the invention.

Similarly, the drilling drums, which have been
10 described as being driven by hydraulic motors situated in their hub may be driven by any other means, for example via chains passing to motors mounted in the frame.



CLAIMS

1. Drilling device for digging trenches in the ground, of the type comprising at least one substantially vertical support plate (3) on which are mounted two drilling
5 drums (2) one on each side of it for rotation about an axis (4) substantially perpendicular to the plate, characterized by the fact that at least one mobile digit (13) is mounted on the lower edge (14) of said plate, drive means being provided for causing oscillation
10 of said digit from one side to the other of the central plane (10) of said plate when the drums are rotated.
2. Drilling device according to claim 1 characterized by the fact that said digit is mounted on the lower edge of the plate via elastic means (15).
- 15 3. Drilling device according to one of claims 1 or 2 characterized by the fact that said drive means comprises cams (17) positioned on the sides of the drilling drums and situated opposite the support plate.
4. Drilling device according to claim 3 characterized by
20 the fact that said cams are substantially continuous and sinusoidal.
5. Drilling device according to any one of claims 1 to 4 characterized by the fact that it comprises a plurality of digits mounted on said lower edge of the support plate, and
25 said drive means are so operated that successive digits oscillate in opposite phase relative to the central plane of the plate.