

PATENT SPECIFICATION

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(54) A SHORING ARRANGEMENT FOR SERVICE TRENCHES

(71) I, JOSEF KRINGS of Hans-Bockler-Strasse 23, Oberbruch, 5138 Heinsberg, Germany; a German citizen, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates in general to a shoring arrangement for a service trench etc. with graduated cross section.

It is known to provide shoring arrangements for service trenches having a rectangular or trapezoidal cross section, which include vertical or slanted posts, shoring walls connected therewith, which sheeting walls connect one pair of posts, one with the other, and with spreader devices pressing the shoring walls against the side wall of the trench.

The depth of such trenches is limited because of the cross section of the trench. If one wants to dig deeper trenches, then one will be forced to use a graduated cross section.

The graduated trench cross section has the additional advantage in that the reinforcement can be built more strongly close to the bottom of the trench than in the case of trenches with a constant cross section. It is true, that such a trench requires relatively long supporting posts, so that the shoring arrangement is exposed to the danger of buckling or one must provide several shoring arrangements which are independent of one another. In the case of this latter arrangement, the transition from one shoring arrangement to the other is critical, since in this case a corresponding reinforcement has not been provided. A graduated cross section of a trench permits the insertion of substantially vertical sheeting walls and thus also offers a larger working space and more security than rectangular or trapezoidal cross sectional trenches.

The invention relates to the problem of creating a shoring arrangement which is

suitable for the shoring of trenches of graduated cross section and which arrangement can be developed with largely similar parts simplifying the storage of the parts. At the same time, it is particularly important to assure a secure transition from one sheeting wall to another sheeting wall.

The invention provides a trench shoring arrangement comprising at least two tiers of shoring panels stepped in relation to each other one above the other and each lower tier being spaced more inwardly of the trench than the tier above it, each tier comprising a plurality of posts, and panels held between the posts, the posts of each lower tier being disposed inwardly towards the centre of the trench of the posts of the respective next upper tier, and contiguous therewith, the posts on opposite sides of the trench being placed oppositely across the trench, and having devices extending across the trench between opposed pairs of such sets of posts to retain said posts firmly against the side walls of the trench.

One embodiment according to the invention has the posts of the shoring arrangement, which in each instance are the top posts, extended below the respective shoring walls and connected with the associated posts of the lower tier arrangement. For example, the posts can be welded together.

Another advantageous embodiment according to the invention has the posts connected with one another in a manner wherein the posts are guided slidingly positively within one another. This embodiment makes it possible to drive the posts into the ground displaced in their length in relation to one another and thus provides for good guidance. At the same time, the posts can be relatively short, so that no problems of transportation occur. Furthermore, the shoring arrangements can also be inserted and withdrawn singly.

In order to be able to drive such a shoring arrangement well into the ground, for

example by means of a shovel dipper, it has been provided advantageously, that the posts guided within one another are developed as hollow box profiles in a conventional manner, and that for the driving in of the posts a U-shaped, unequal sided anvil, which can be inserted into the posts, has been provided.

With the above and other objects in view that will hereinafter appear, the nature of the invention will be more clearly understood by reference to the following detailed description, the appended claims and the several views illustrated in the accompanying drawings:

Figure 1 is a transverse vertical cross sectional view through a graduated trench shored in accordance with this invention;

Figure 2 is an enlarged fragmentary horizontal cross sectional view taken generally along the line II—II of Figure 1;

Figure 3 is an enlarged fragmentary horizontal cross sectional view taken generally along the line III—III of Figure 1;

Figure 4 is a fragmentary vertical sectional view similar to Figure 1 of a modified shoring arrangement;

Figure 5 is an enlarged fragmentary horizontal cross sectional view taken generally along the line V—V of Figure 4;

Figure 6 is an enlarged fragmentary horizontal cross sectional view taken generally along the line VI—VI of Figure 4; and

Figure 7 is a fragmentary vertical sectional view similar to Figure 4 showing an anvil driving the sheeting.

In Figure 1 there is illustrated a trench 1 having a stepped shoring arrangement 2 in accordance with this invention. The shoring arrangement includes cooperating posts 3, 4 and shoring walls 5, 6 supported by the posts and by spreader devices 7 pressing the sheeting arrangements opposing one another against the walls of the trench, which spreader devices generally have contra-rotating spindles. At their ends these spreader devices have shoes 8 which are seated in the posts 3, 4 and preferably are guided in slidable relation. The shoes can also be secured in place in a known manner by bolts (not shown).

The arrangement of the embodiment of Figures 1—3 makes it possible to connect the shoring walls 5, 6 positively with the posts 3, 4 which are of steel profiles.

In the embodiment of Figures 1—3, the posts 3, which are outside posts, extend to the bottom of the trench. The shoring walls 5 are secured to the upper sections 9 of the posts 3, and constitute an upper tier the cross section of which is shown in Figure 2, with the lower edges of the sheeting shoring extending somewhat below the upper edges

of the posts 4, in which the shoring walls 6 of the lower section are held to constitute a lower tier. Each post 4 is in front of a lower section 10 of an associated post 3 and is connected with the latter rigidly, for example by means of welding or screw fasteners. In order to avoid excessive lengths of the posts 3, these posts can be formed in a suitable manner of individual parts. In Figure 3 there is illustrated a cross section through the lower section 10. The graduation in structural section can in principle also be repeated in the case of deeper trenches having additional tiers of shoring walls.

Each of the posts 3, 4 is provided with an inwardly opening guideway 11 extending along the inner face thereof for receiving the shoes 8 in sliding guided relation.

Each post 3, 4 is of a section wherein a lateral guideway 12 is formed in the opposite sides thereof (Figs. 2, 3) and the ends of the shoring walls 5, 6 have mounting heads 13 locked in the guideways preventing separation of the shoring walls 5, 6 from their respective posts 3, 4.

In Figures 4—7 there is illustrated a different embodiment of the invention. In this arrangement an outside post 3' is driven into the ground only somewhat below the upper edge of the lower post 4. Each post 4 is guided slideably in the guideway 11 of the associated post 3' and is supported with its upper portion overlapping the post 3'.

Each post 3' 4 like in the case of the arrangement illustrated in Figures 1—3 is formed essentially of two I-sections welded together in side-by-side relation and to which are secured lateral angle sections 17 and has at least in part defined the guideway 11 for the shoes 8, as well as in part defining the lateral guideways 12 for the positive reception of heads 13 of the shoring walls 5, 6. Strips 18 are also welded to the I-beams and cooperate with the angle sections 17 in defining the guideways 12.

As is well known, the posts 3, 4 may be forced into the ground by means of a shovel dipper. Since the inside posts 4 are accessible only with difficulty to the shovel dipper, a U-shaped anvil 14 has been provided, one of which legs is somewhat longer than the effective height of the shoring wall 6. Such an anvil 14 is shown in Figure 7. It is placed from above into the posts 3, 4 for example in the manner as shown in Figure 7 on transverse bolts 16 in the inside of the posts and it is driven into the ground by means of the shovel dipper or some other battering ram, schematically designated by the numeral 15.

The shoring arrangements according to the invention permit the necessary shifting of the spreader devices 7 in a known manner. Except for the spreader devices of

the individual posts, in the case of the shoring arrangement according to Figures 4—7, the shoring arrangement can be pulled apart individually and independently of one another, whereby one could start out effectively from the inside sheeting arrangements. This is also possible if the shoring arrangement 2 is composed, according to Figure 1, of shoring wall panels which are releasably connection with one another and the posts. If these shoring walls are disconnected from one another, then there will result in the advantage that the lower part of the posts 3 no longer has any shoring wall panels attached thereto, so that the posts 3 can be pulled easily, even if the trench at that time has already again been filled.

The guideways 11 of the posts 3, 4 can be made partially interrupted or modified in order to offer the possibility of inserting an additional shoring arrangement within the trench into the lower part of the guide 3. The inside posts in that case do not have to be introduced from the upper end of the outside posts.

WHAT I CLAIM IS:—

1. A trench shoring arrangement comprising at least two tiers of shoring panels, stepped in relation to each other, one above the other and each lower tier being spaced more inwardly of the trench than the tier above it, each tier comprising a plurality of posts, and panels held between the posts, the posts of each lower tier being disposed inwardly towards the centre of the trench of the posts of the respective next upper tier, and contiguous therewith, the posts on opposite sides of the trench being placed oppositely across the trench, and having devices extending across the trench between opposed pairs of such sets of posts to retain said posts firmly against the side walls of the trench.

2. A trench shoring arrangement ac-

cording to Claim 1 wherein one posts of an upper tier extend below one upper tier panels and are connected to one posts of the lower tier below one upper tier panels.

3. A trench shoring arrangement according to Claim 2 wherein the inner and outer posts of each set are welded together.

4. A trench shoring arrangement according to Claim 2 wherein the inner and outer posts of each set are in interlocked sliding engagement with one another.

5. A trench shoring arrangement according to Claim 1 wherein the inner and outer posts of each set are in interlocking sliding engagement with one another.

6. A trench shoring arrangement according to Claim 5 wherein said posts are in the form of hollow box sections, and a U-shaped anvil having unequal length legs is provided for simultaneously driving inner and outer post of a set.

7. A trench shoring arrangement according to claim 1 where said upper sheeting walls vertically overlap said inner parts.

8. A trench shoring arrangement according to claim 1 wherein said inner and outer posts are connected together as extensions of one another, and said inner and outer posts and said upper and lower sheeting walls are in vertically overlapping relation.

9. A trench shoring arrangement according to claim 8 wherein the connection between each pair of inner and outer posts is a sliding connection.

10. A trench shoring arrangement for shoring trenches substantially as described with reference to and as illustrated in the accompanying drawings.

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