

PATENT SPECIFICATION

(11)

1 417 346

(21) Application No. 22815/73 (22) Filed 14 May 1973

(19)

(31) Convention Application No. 2 230 395

(32) Filed 22 June 1972 in

(33) Germany (DT)

(44) Complete Specification published 10 Dec. 1975

(51) INT. CL.³ E02D 17/00 E21D 11/00 E02D 17/08

(52) Index at acceptance

E1H 1E 2B 5

E1B 1A2D 1C3B 1C3D 1C5A 1D2 1F1B

E1E 3



(54) SHORING PANEL STRUCTURE

(71) I, JOSEF KRINGS, of D5138 Heinburg, Oberbruch, Hans-Böckler-Strasse 23, Germany, a German National, 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 to a shoring panel structure of the type which includes parallel-horizontal angle-sectioned frame members, the ends of which are limited by vertical retaining frame members, as well as facing sheets e.g. welded to both sides of the frame members.

Shoring panel structures of the foregoing type, as well as other known types which utilize horizontal frame members, especially shoring panels for the shoring of canals or ditches have the disadvantage that whenever they are to be pulled out of the ground by means of loop tension eyes attached to their upper edges, they are exposed to considerable bending strains and are readily subject to deformation.

This undesirable arrangement leads to the consideration of deflecting the vertical tension and pressure forces acting on the panel structure in their effective directions and avoid as much as possible direct shearing forces.

In accordance with this invention there is provided a shoring panel structure comprising a frame including a plurality of vertically spaced horizontal angle-sectioned rigid frame members, two vertical end frame members secured to at least certain of said horizontal frame members; and facing sheets secured to opposite faces of said frame; said frame additionally including tubular vertical frame members intermediate said end frame members extending between and defining a passage through said horizontal frame members, at least the upper ends of said tubular frame members being open and accessible.

The term "angle-sectioned" includes members with flanges extending from a web

in the same or opposite direction, for example, of I or U cross-section.

A further feature of the invention is the provision of the tubular member with locking members which are useable in the forcing in or pulling out of the panel structure.

Preferably loop tension eyes may have rod portions thereof introduced into the upper ends of the tubular members and be secured thereto by means of locking members. The frictional forces occurring during the pulling of the panel structure are absorbed primarily by the vertical tubular members. In a like manner, advantageously, an additional frame may be provided for driving in the panel structure which additional frame may be formed of horizontal frame members and intermediate braces with the frame having pegs on its lower edge which can be inserted into the vertical tubular members of the panel structure and be supported by the locking members thereof.

It is to be understood that when an additional frame is provided, the frame functions as an anvil or buffer and it transmits all the forces acting upon it to the vertical tubular members of the panel structure. As a result, it will be ensured that the panel structure is driven into the ground in the direction of its vertical tubular members, that is perpendicular in relation to the horizontal frame members thereof.

It is also to be understood that the tubular vertical frame members offer the additional advantage that they can be used for the scouring of the panel structure with water or thixotropic fluids, or they may be utilized for the removal of ground water.

In a preferred form of the invention, the tubular vertical frame members are pipes which are welded to the horizontal frame members, and the horizontal frame members are in the form of beams having either an I- or U-cross-section.

In another embodiment of the invention, the tubular vertical frame members are

1 417 346

9

in the form of short spacer tubes which are positioned between the horizontal frame members and are welded thereto in vertical alignment with one another. In this event, further vertical members, generally in the form of pipes, will be located within the spacer tubes and pass through aligned openings in the horizontal frame members.

It is further to be noted that in order to save weight, every second, third or fourth horizontal frame member may be terminated at the terminal vertical frame member in lieu of extending to the vertical side frame members.

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:

In the drawings; with reference to which shoring panel structures are described by way of example:

Figure 1 is a fragmentary perspective view of a shoring panel structure in accordance with this invention with a portion of a facing sheet thereof being broken away so as to illustrate the internal construction thereof.

Figure 2 is a fragmentary elevational view of the shoring panel structure of Figure 1 with intermediate portions thereof broken away and there being associated therewith a driving frame to be utilized in driving the panel into place.

Figure 3 is an elevational view of a modified form of panel with a portion of a facing sheet thereof broken away and one of the vertical frame members being shown in section to illustrate the specific details thereof.

Figure 4 is an enlarged fragmentary elevational view with parts broken away and shown in section and shows the connection between a pulling eye and one of the vertical frame members.

Figure 5 is a horizontal sectional view taken along the line V—V of Figure 4 and shows further the details of the connection between the pulling eye and the vertical frame member.

Referring now to the drawings in detail, it will be seen from Figure 1 that the panel structure is generally identified by the numeral 1. The panel structure 1 includes a plurality of horizontal frame members which extend the full width of the panel structure and are suitably connected at their ends, such as by welding to vertical end frame members 5. The horizontal frame members 2 have vertically aligned openings therein and passing therethrough are tubular vertical frame members 4. The frame members 4 are welded to the frame

members 2 so as to provide for a rigid construction.

The frame of the panel structure 1 also includes horizontal frame members 3 which are disposed between the horizontal frame members 2, but terminate short of the vertical end frame members 5, the frame member 3 generally terminating at the endmost ones of the vertical frame members 4. It is to be understood that of the horizontal frame members 2 and 3, every second, third or fourth horizontal frame member may be a full length horizontal frame member 2 and the remaining horizontal frame members may be shorter frame members 3. It is also to be understood that the tubular vertical frame members intermediate the endmost frame members 4 extend through and are welded to the horizontal frame members 3.

At this time it is pointed out that the horizontal frame members 2 and 3 are in the form of beams preferably of an I- or U-section. Normally, the vertical end frame members 5 will also be in the form of beams, but preferably will be of a generally C-section. The vertical frame members 4 are preferably formed of cylindrical tubes.

The panel structure 1 is completed by facing sheets 6 and 7 which are secured to the frame members 2 and 5 preferably by way of spot welding 18.

In order to facilitate the anchoring and driving of the sheeting 1, it is to be noted that the tubular vertical frame members 4 project below the lowermost horizontal frame member 2. Further, the lower ends of the tubular vertical frame members 4 are cut at an angle so as to define points 17. On the other hand, it is to be understood that the points 17 could be formed separate and apart from the vertical frame members 4 and inserted therein in any conventional manner.

It is to be understood that the upper ends of the tubular vertical frame members 4 preferably terminate flush with the upper horizontal frame member 2, but that the upper ends thereof are open for purposes to be described hereinafter.

Referring now to Figure 2, it will be seen that the tubular vertical frame members 4 are provided in the interior thereof with locking elements in the form of a pair of diametrically opposed segments shaped elements 8. These same locking elements 8 are illustrated in greater detail in Figures 4 and 5. It is to be understood that the locking elements are suitably secured in the tubular members such as by welding or other permanent securing means.

Referring now to Figures 4 and 5, it will be seen that when it is desired to pull the panel structure 1, a plurality of lifting or

pulling eyes 9 are associated with the panel structure. The pulling eyes 9 each have a depending shaft or rod portion 10 of a diameter to be received within the tubular vertical frame member 4. The lower portion of each shaft 10 is notched for the reception of the locking elements 8 and below the notch portion of the shaft 10, there is a projecting portion 11 which is configured so that when the eye 9 is disposed 90° from the position illustrated in Figure 4, the portion 11 of the shaft 10 may pass down between the two locking elements 8 and thereafter the eye 9 may be rotated 90° so that the portion 11 will lock beneath the locking elements 8 in the manner specifically illustrated in Figure 4. In effect, the portion 11 of the shaft 10 has two circumferentially spaced shoulders which conform in outline substantially to the outline of the locking elements 8.

It is to be understood that by providing the tubular vertical frame members 4 with means by which pulling eyes 9 may be directly secured to the tubular frame members 4, the panel structure may be lifted vertically from the driven position thereof without unduly stressing the frame of the panel structure. By placing all of the pulling stress on the vertical frame members 4, little or no bending stresses are placed upon the horizontal frame members 2, 3 and therefore, no twisting or racking of the panel structure occurs during the pulling thereof.

Returning once again to Figure 2, it will be seen that there may be associated with the panel structure 1 a driving frame which is generally identified by the numeral 12. The driving frame 12 includes a pair of horizontal frame members 13 are connected preferably formed of beams. The horizontal frame members 13 are connected together at spaced intervals by intermediate braces 14. Depending from the underside of the frame 12 is a plurality of pegs 15 which may either be separately formed or which may be extensions of certain of the intermediate braces 14. The pegs 15 are of a size to be received within the upper portions of the tubular vertical frame members 4 and extend downwardly from the lowermost horizontal frame member 13 a distance sufficiently to seat upon the locking elements 8.

It is to be understood that when it is desired to drive the panel structure 1 into the ground, the additional frame 12 is positioned thereon by engaging the pegs 15 and the upper ends of the tubular vertical frame members 4 and thereafter driving on the additional frame 12 with the frame 12 functioning as an anvil.

Since the frame 12 directly reacts on the vertical frame members 4, it will be seen

that driving of the panel structure 1 may be accomplished with a minimum of bending forces being applied to the horizontal frame members and the facing sheets.

It is to be understood that inasmuch as the tubular vertical frame members 4 are open throughout the length thereof, the vertical frame members may be advantageously utilized for the withdrawal of ground water or the insertion of suitable fluids, including thixotropic fluids.

Referring now to Figure 3, it will be seen that there is illustrated a modified form of the invention. In this form of the invention, in lieu of directly securing the tubular frame members 4 to the horizontal frame members 2, 3, spacer tubes 16 are inserted between adjacent horizontal frame members 2, 3 and welded thereto with there being aligned openings in these horizontal frame members thus forming outer tubular frame members. The inner tubular frame members 4 are freely vertically movable within the outer tubular frame members defined by the spacers 16 and through the horizontal frame members 2, 3.

It is to be noted that the inner tubular vertical frame members 4 will still be provided with pointed ends 17 so that they provide pointed stakes. However, the tubular vertical frame members 4 will be separately drivable into the ground independent of the remainder of the panel structure 1. To this end, the uppermost horizontal frame member 2 will have mounted thereon suitable conventional driving devices 19 in the form of screw driver slots or wedge receptors for driving the tubular frame members 4 down as stakes into the earth and for pulling the same when it is desired to remove the panel structure 1.

Although only several preferred embodiments of the invention have been specifically illustrated and described herein, it is to be understood that minor variations may be made in the structural details of the panel structure without departing from the scope of the invention, as defined by the appended claims.

WHAT I CLAIM IS:—

1. A shoring panel structure comprising a frame including a plurality of vertically spaced horizontal angle sectioned rigid frame members, two vertical end frame members secured to at least certain of said horizontal frame members; and facing sheets secured to opposite faces of said frame; said frame additionally including tubular vertical frame members intermediate said end frame members extending between and defining a passage through said horizontal frame members, at least the upper ends of said tubular frame members being open and accessible.

pulling eyes 9 are associated with the panel structure. The pulling eyes 9 each have a depending shaft or rod portion 10 of a diameter to be received within the tubular vertical frame member 4. The lower portion of each shaft 10 is notched for the reception of the locking elements 8 and below the notch portion of the shaft 10, there is a projecting portion 11 which is configured so that when the eye 9 is disposed 90° from the position illustrated in Figure 4, the portion 11 of the shaft 10 may pass down between the two locking elements 8 and thereafter the eye 9 may be rotated 90° so that the portion 11 will lock beneath the locking elements 8 in the manner specifically illustrated in Figure 4. In effect, the portion 11 of the shaft 10 has two circumferentially spaced shoulders which conform in outline substantially to the outline of the locking elements 8.

It is to be understood that by providing the tubular vertical frame members 4 with means by which pulling eyes 9 may be directly secured to the tubular frame members 4, the panel structure may be lifted vertically from the driven position thereof without unduly stressing the frame of the panel structure. By placing all of the pulling stress on the vertical frame members 4, little or no bending stresses are placed upon the horizontal frame members 2, 3 and therefore, no twisting or racking of the panel structure occurs during the pulling thereof.

Returning once again to Figure 2, it will be seen that there may be associated with the panel structure 1 a driving frame which is generally identified by the numeral 12. The driving frame 12 includes a pair of horizontal frame members 13 are connected preferably formed of beams. The horizontal frame members 13 are connected together at spaced intervals by intermediate braces 14. Depending from the underside of the frame 12 is a plurality of pegs 15 which may either be separately formed or which may be extensions of certain of the intermediate braces 14. The pegs 15 are of a size to be received within the upper portions of the tubular vertical frame members 4 and extend downwardly from the lowermost horizontal frame member 13 a distance sufficiently to seat upon the locking elements 8.

It is to be understood that when it is desired to drive the panel structure 1 into the ground, the additional frame 12 is positioned thereon by engaging the pegs 15 and the upper ends of the tubular vertical frame members 4 and thereafter driving on the additional frame 12 with the frame 12 functioning as an anvil.

Since the frame 12 directly reacts on the vertical frame members 4, it will be seen

that driving of the panel structure 1 may be accomplished with a minimum of bending forces being applied to the horizontal frame members and the facing sheets.

It is to be understood that inasmuch as the tubular vertical frame members 4 are open throughout the length thereof, the vertical frame members may be advantageously utilized for the withdrawal of ground water or the insertion of suitable fluids, including thixotropic fluids.

Referring now to Figure 3, it will be seen that there is illustrated a modified form of the invention. In this form of the invention, in lieu of directly securing the tubular frame members 4 to the horizontal frame members 2, 3, spacer tubes 16 are inserted between adjacent horizontal frame members 2, 3 and welded thereto with there being aligned openings in these horizontal frame members thus forming outer tubular frame members. The inner tubular frame members 4 are freely vertically movable within the outer tubular frame members defined by the spacers 16 and through the horizontal frame members 2, 3.

It is to be noted that the inner tubular vertical frame members 4 will still be provided with pointed ends 17 so that they provide pointed stakes. However, the tubular vertical frame members 4 will be separately drivable into the ground independent of the remainder of the panel structure 1. To this end, the uppermost horizontal frame member 2 will have mounted thereon suitable conventional driving devices 19 in the form of screw driver slots or wedge receptors for driving the tubular frame members 4 down as stakes into the earth and for pulling the same when it is desired to remove the panel structure 1.

Although only several preferred embodiments of the invention have been specifically illustrated and described herein, it is to be understood that minor variations may be made in the structural details of the panel structure without departing from the scope of the invention, as defined by the appended claims.

WHAT I CLAIM IS:—

1. A shoring panel structure comprising a frame including a plurality of vertically spaced horizontal angle sectioned rigid frame members, two vertical end frame members secured to at least certain of said horizontal frame members; and facing sheets secured to opposite faces of said frame; said frame additionally including tubular vertical frame members intermediate said end frame members extending between and defining a passage through said horizontal frame members, at least the upper ends of said tubular frame members being open and accessible.



2. A panel structure according to claim 1 wherein said tubular frame members include locking means for releasably securing pulling means to said panel structure.
- 5 3. A panel structure according to claim 2 wherein said locking means include stop members within said tubular frame members for interlocking engagement with pulling means.
- 10 4. A panel structure according to claim 3 together with pulling means for extracting the same from the ground including a rod member receivable in the upper end of any one of said tubular frame members, and
- 15 abutment means on said rod member passable between said stop members and engageable therebeneath upon rotation of said rod member.
- 20 5. A panel structure according to claim 3 together with means for driving the same into the ground, said driving means including a frame having depending projections receivable in the open upper ends of said tubular frame members, said projections
- 25 being of an extent to seat on said locking means.
6. A panel structure according to claim 1 wherein at least certain of said tubular frame members project below said frame and
- 30 terminate in pointed driving ends.
7. A panel structure according to claim 1 wherein a stake extends through each of selected ones of said tubular frame members and projects below said frame, and driving means carried by an upper end of each
- 35 selected tubular frame member for engaging each stake and forcing the same downwardly into the earth through the respective tubular frame member.
8. The panel structure of claim 7 wherein each stake terminates in a pointed end.
9. The panel structure of claim 1 wherein certain of said horizontal frame members terminate at one of said tubular frame members adjacent an end frame member.
- 45 10. The panel structure of claim 1 wherein the horizontal rigid frame members are structural members of an I- or U-profile.
11. A panel structure substantially as and for the purpose described with reference to and as illustrated in Figs. 1 and 2 or Fig. 3 of the accompanying drawings.
- 50 12. A panel structure as claimed in any of the preceding claims having a pulling eye connector substantially as described
- 55 with reference to and as illustrated in Fig. 4 of the accompanying drawings.

W. REID SHARP & CO.,
Chartered Patent Agents,
10, Portland Terrace,
Newcastle on Tyne, NE2 1QZ.

Printed for Her Majesty's Stationery Office by Burgess & Son (Abingdon), Ltd.—1975.
Published at The Patent Office, 25 Southampton Buildings, London, WC2A 1AY
from which copies may be obtained.



* C L H S *