United States Patent

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[54] METHOD OF ASSEMBLING A SHEET PILING IN THE EARTH FROM SHEET PILE SECTIONS; AS WELL AS A SHEET PILE SECTION SUITABLE FOR APPLICATION IN THIS METHOD

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[52] **U.S. Cl.**.....**61/62**

[51] **Int. Cl.**.....**E02d 5/16**

[58] **Field of Search**.....61/58, 60, 61, 62, 63

[56] **References Cited**

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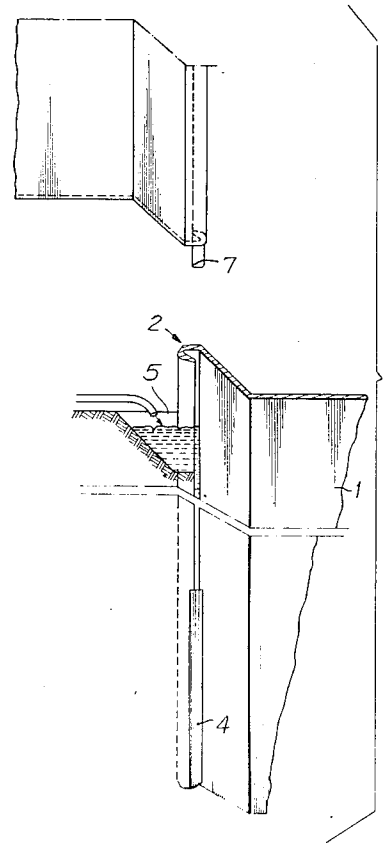
[57] **ABSTRACT**

A method of assembling a sheet piling in the earth from sheet pile sections which are each provided on either side with a locking channel and which are successively introduced into the earth. Prior to the introduction of a sheet pile section into the earth, its locking channel which is to co-operate with the adjacent locking channel of the next sheet pile section is sealed on the lower side as well as in the lower area of the upright open side. During the introduction of this sheet pile section into the earth a liquid having a low internal friction and a high specific gravity is fed into said locking channel, said liquid keeping the locking channel filled to approximately the level of the ground surface. This liquid is forced out of the locking channel when the next sheet pile section is being introduced into the earth.

A sheet pile section provided on either side with a locking channel, wherein one of said locking channels is sealed on its lower side by a lower end plate and on the upright open side by an upright side plate, which extends from the lower side of the locking channel over part of the height of said locking channel.

10 Claims, 4 Drawing Figures



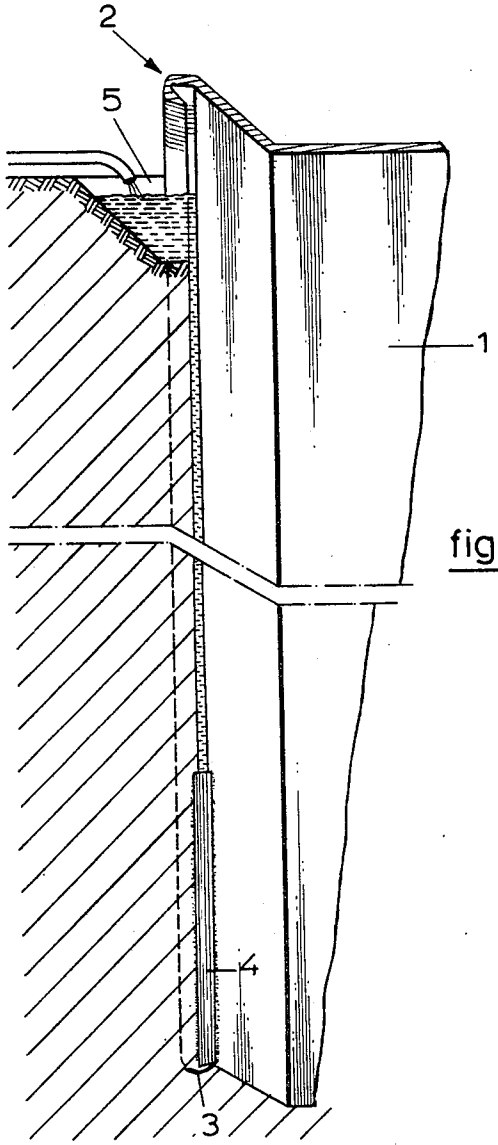


fig.1

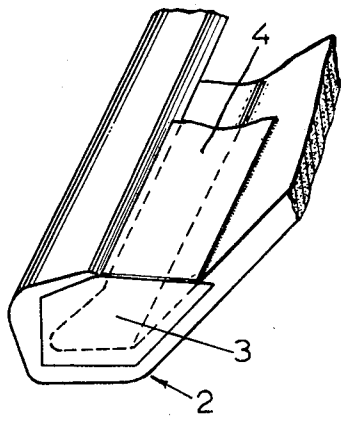


fig.2

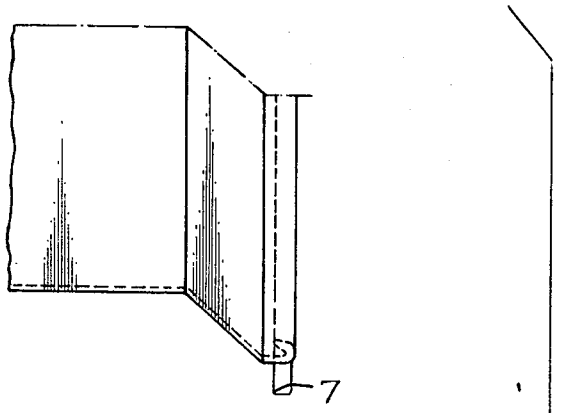
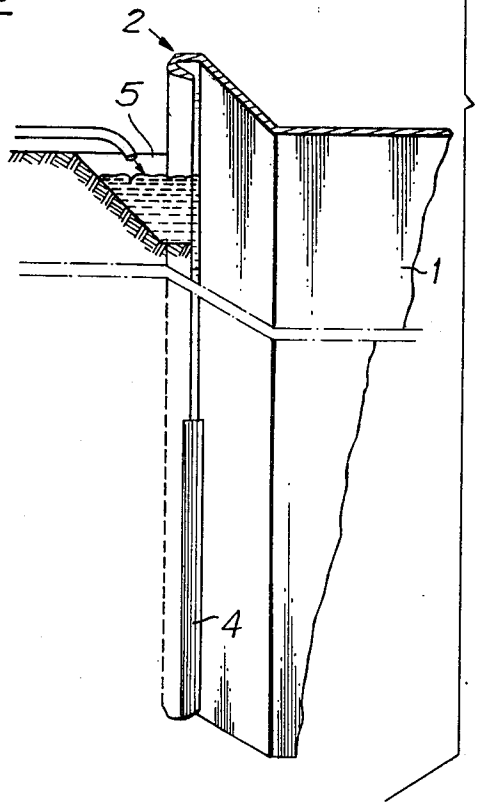


fig.3



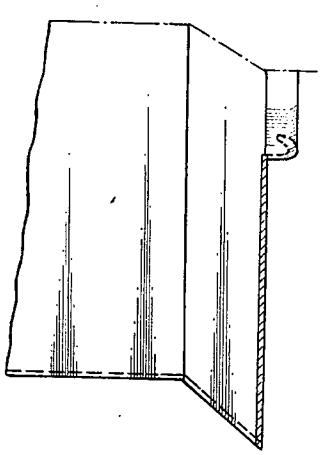
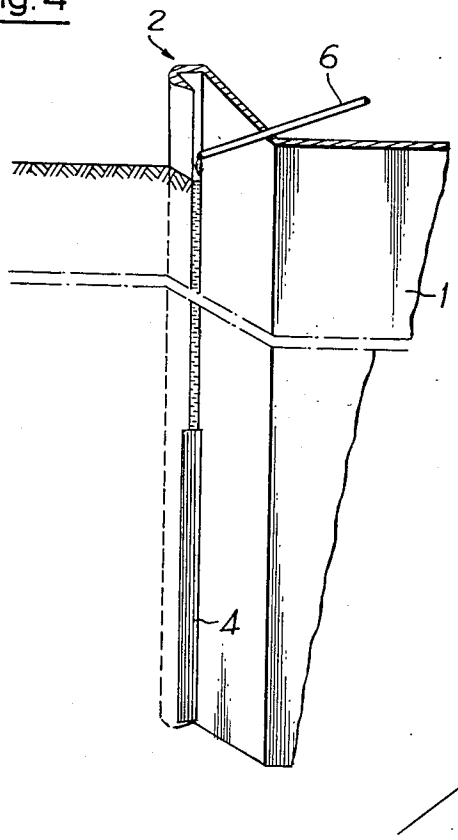


fig. 4



METHOD OF ASSEMBLING A SHEET PILING IN THE EARTH FROM SHEET PILE SECTIONS; AS WELL AS A SHEET PILE SECTION SUITABLE FOR APPLICATION IN THIS METHOD

BACKGROUND OF THE INVENTION

The invention relates to a method of assembling a sheet piling in the earth from sheet pile sections which are each provided on either side with a locking channel.

When introducing sheet pile sections into the earth by ramming or vibrating, difficulties are frequently encountered which are not due solely to resistances of the earth but which are chiefly the result of frictional resistance in the locking channels.

SUMMARY OF THE INVENTION

It is a first object of the present invention to provide a method according to which this frictional resistance in the locking channels is considerably reduced.

According to the invention, this method is characterized in that prior to the introduction of a sheet pile section into the earth, its locking channel which is to co-operate with the adjacent locking channel of the next sheet pile section is sealed on the lower side as well as in the lower area of the upright open side, while during the introduction of this sheet pile section into the earth a liquid having a low internal friction and a high specific gravity is fed into said locking channel, said liquid keeping the locking channel filled to approximately the level of the ground surface, while this liquid is forced out of the locking channel when the next sheet pile section is being introduced into the earth.

The liquid prevents earth from penetrating into the locking channel, so that practically no frictional resistance will occur between the interengaging locking channels during the introduction into the earth of the next sheet pile section. The seal on the lower portion of the upright side of the locking channel prevents penetration into said locking channel of earth which tends to press on the lower end of the sheet pile section while this section is being driven into the earth. This pressure is no longer active at a distance from the lower side, so that the locking channel may be caused to be completely filled with liquid with the aid of the bottom seal and of the partial lateral seal of said locking channel.

The invention further comprises a sheet pile section suitable for application in the method described hereinbefore.

Said sheet pile section is characterized in that one of the locking channels is sealed on its lower side by a lower end plate and on the upright open side by an upright side plate, which extends from the lower side of the locking channel over part of the height of said locking channel.

The invention also comprises a sheet piling assembled from said sheet pile sections with the application of the method described hereinabove.

BRIEF DESCRIPTION OF THE DRAWING

The invention will hereafter be explained with reference to the drawing.

FIG. 1 shows a portion of a sheet pile section according to the invention during the introduction into the earth, the earth in front of the sheet pile section having been omitted for greater clarity.

FIG. 2 is a perspective view of the lower part of the locking channel shown in FIG. 1, on a larger scale.

FIG. 3 illustrates the sheet pile section of FIG. 1 showing the reamer below the locking channel of the subsequent pile section; and

FIG. 4 shows the hose for flushing liquid into the locking channel of the sheet pile section.

DESCRIPTION OF A PREFERRED EMBODIMENT

In FIG. 1 a sheet pile section 1 is shown, which has been rammed or vibrated almost completely into the earth.

This sheet pile section 1 comprises on either side a locking channel. FIG. 1 only shows the locking channel 2 which is remote from the last sheet pile section (not shown) already driven in the earth. Of the two locking channels of the sheet pile section 1, only this locking channel 2 is sealed on its lower side by a lower end plate 3 and on the upright open side by an upright side plate 4, which extends from the lower side of the locking channel 2 over part of this locking channel 2. The height of the upright side plate 4 may range from 0.5 to 1.5 meters. The lower end plate 3 as well as the upright side plate 4 may be made of thin sheet iron having a thickness of, for example, 1 millimeter, but the use of other materials is of course also possible.

During the introduction of the sheet pile section 1 into the earth, a liquid having a low internal friction and a high specific gravity is fed into the locking channel 2 shown. The other locking channel of the sheet pile section 1, which is not provided with an end plate 3 or with a side plate 4, engages during the introduction of the sheet pile section 1 with the adjacent locking channel of the preceding sheet pile section which has already been introduced into the earth, the latter locking channel being of the same construction as the locking channel 2.

In the embodiment shown in the drawing, the liquid is first fed into a hole 5 which has been dug into the earth, from where the liquid runs into the locking channel 2.

As an alternative, as shown in FIG. 4, it is of course also possible to flush the liquid through a hose 6 into the locking channel 2.

The liquid used may be a bentonite suspension, the stability of which, while maintaining the thixotropic properties, may be enhanced by adding a small amount of cement.

The liquid consistently keeps the locking channel 2 filled to approximately the level of the ground surface and prevents earth from penetrating into the locking channel 2.

During the introduction of the next sheet pile section, a reamer 7, as shown in FIG. 3, having a height of a few centimeters, accommodated underneath the wall portion of the locking channel of said subsequent sheet pile section which interlocks with the sheet pile section 1 that has already been introduced into the earth, is fittingly received in the locking channel 2. This reamer may be rigidly attached to this subsequent sheet pile section and presses the liquid sideways out of the locking channel 2 with its lower end.

The wall portion of the locking channel of the subsequent sheet pile section, which is intended to interlock with the locking channel **2**, may be removed over a height from the underside which approximately corresponds to that of the upright side plate **4**.

As an alternative, it is likewise possible to form said upright said plate **4** of a material which is deformed and compressed by the wall of the locking channel of the next sheet pile section during the introduction thereof.

According to the invention, the major advantage is attained that frictional resistance in the locking channels during the introduction into the earth of the sheet pile sections is reduced to a minimum.

The invention is not restricted to the embodiment illustrated in the drawing, which may be varied in different manners within the scope of the appended claims.

I claim:

1. A method of assembling a sheet piling in the earth from a plurality of contiguous sheet pile sections, each said section having at its vertically extending sides a locking channel-shaped edge portion adapted to engageably interlock with a similar edge portion of an adjacent pile section; comprising sealing the bottom surface and the lower portion of the area defined by said channel-shaped edge portion of the section side adapted to be engaged by a successive pile section, introducing said pile section into the earth, feeding a liquid having a low internal frictional coefficient and a high specific gravity into said channel-shaped edge portion during the introduction of said pile section into the earth, maintaining the level of said liquid in said channel-shaped edge portion at a height to approximately the level of the ground surface of the earth, and introducing a successive contiguous pile section into the earth so as to position the channel-shaped edge portion thereof into interlocking relationship with the adjacent edge portion of the preceding pile section while concurrently forcing out the liquid in said edge portion.

2. A method according to claim **1**, comprising fastening a reamer in the channel-shaped edge portion of said successive pile section, said reamer extending below said pile section and adapted to extend into the channel-shaped edge portion of the preceding pile section, said liquid being forced sideways and upwardly by the lower end of said reamer during assembly of said pile sections.

3. A method according to claim **1**, wherein said liquid is fed into said channel-shaped edge portion by a hose.

4. A method according to claim **1**, including forming a hole in the earth for conveying said liquid into said channel-shaped edge portion.

5. A method according to claim **1**, wherein said liquid comprises a bentonite suspension.

6. A method according to claim **5**, wherein said bentonite suspension includes a small quantity of cement.

7. A sheet pile section having on either side generally channel-shaped edge portions adapted to lockingly engage similar edge portions of adjacent contiguously positioned piling sections, one of said channel-shaped edge portions comprising an end plate sealing the lower end thereof, and an upwardly extending side plate extending over the open end of said edge portion, said side plate extending upwardly from the lower edge of said channel-shaped edge portion over a part of the height of the edge portion of said piling section.

8. A sheet pile section according to claim **7**, wherein said side plate has a height in the range of 0.5 to 1.5 meters.

9. A sheet pile section according to claim **7**, wherein said end plate and said side plate are each formed of essentially thin-gauged sheet metal.

10. A sheet pile section according to claim **7**, wherein the channel-shaped edge portion of the contiguous pile section adapted to be interlocked with said first-mentioned edge portion has its lower portion removed to an extent corresponding in height to at least the height of said upwardly extending side plate.

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