

PATENT SPECIFICATION

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(72) Inventor KARL RUNE SVENSSON

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(54) IMPROVEMENTS IN OR RELATING TO PILE CONNECTING DEVICES

(71) We, BAUTECHNIK A.G. GRABS, a Swiss Company of CH-9470 Buchs SG, Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to pile connecting devices.

According to the invention there is provided a pile connecting device comprising two plates which are adapted to be secured to the ends of two piles, each plate having a planar surface adapted to bear against the planar surface of the other plate, the plates being formed with recesses that register in the abutting position, the recesses being adapted to receive connecting means for the plates, wherein the recesses are through grooves extending inwardly from the edges of said plates, and wherein the connecting means are pins having heads at both ends, the pins being adapted to be inserted into said grooves, with the heads cooperating with the surfaces of the plates opposite said planar surfaces.

In this specification, the term "pins having heads at both ends" is to be interpreted as including pins in which the distance between the heads is adjustable, as in the case of a bolt having a nut at one end.

The invention thus provides an effective pile connecting device which is inexpensive and permits rapid mounting.

For a better understanding of the invention, and to show how the same may be carried into effect, reference will now be directed, by way of example, to the accompanying drawings, in which:—

Figure 1 is a plan view of one plate of a pile connecting device according to the invention,

[Price 25p]

Figure 2 is a side view of the plate shown in Figure 1,

Figure 3 is a side view to a larger scale of a pin of the pile connecting device of Figures 1 and 2,

Figure 4 is a plan view of a detail of the pile connecting device, to a still larger scale,

Figure 5 is a view from below of the other plate of the pile connecting device of which one plate is shown in Figure 1, and

Figure 6 is a side view of the plate of Figure 5.

Referring to Figures 1 and 2, the upper half of the pile connecting device illustrated therein comprises a plate 1 which is adapted to be secured to the bottom of a reinforced concrete pile, and to cooperate with another plate on the top of a preceding pile. The plate 1 includes anchorages for reinforcing rods 2, for reinforcing the concrete.

Referring to Figures 5 and 6, the lower part of the connecting device comprises a further plate 1, both plates 1 having cooperating surfaces that are planar. Each plate 1 is formed with a number of recesses 4, pairs of which in the upper and lower plates registering when the plates abut. The recesses 4 are adapted to receive, when registering, connecting means 5. The recesses 4 are through grooves extending inwardly from the edges of the plates 1, while the connecting means 5 are pins having heads 6 at both ends. The pins 5 are inserted into the grooves 4 laterally, from the edges of the plates 1. The heads 6 of the pins cooperate with the upper and lower surfaces of the upper and lower plates 1, respectively.

In the preferred embodiment illustrated, the plates 1 are square, and the through grooves 4 are formed at the corners of the plates 1. This results in improved strength, as compared with an arrangement of the

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grooves 4 at the middle of the sides of the plates 1. However, the plates 1 can have other configurations, such as rectangular or circular. Naturally, the number of grooves 4 can also be varied within certain limits.

As shown in Figure 4, the sides of the grooves 4 are curved, portions 8 thereof being resiliently deformable to retain the pins 5 in the inserted positions.

The heads 6 of the pins 5 are designed to produce a wedge action upon insertion of the pins 5 in the grooves 4. A transitional portion 9 is provided between the stem 10 and head 6 of each pin 5, the transitional portion 9 being frusto-conical. In one embodiment, the plates 1 have a thickness of 10 mm., the stems of the pins are 18 mm. long and each conical transitional portion is 2 mm. long. The grooves 4 can also be designed to produce a wedge action upon insertion of the pins 5 thereinto. Thus, the edges of the grooves 4 can be provided with bevels of a cross-section varying longitudinally of the grooves 4.

The upper plate 1 is provided with an upwardly extending rim 11 which is adapted to receive the end of the pile. Over the grooves 4, the rim 11 is formed with recesses 12 receiving the heads 6 of the pins 5. These recesses 12 are backed by walls 13 so that they cannot be clogged by concrete.

The connecting device according to the invention is not intended exclusively for connecting sections of pile, but can also be used for connecting other parts of a pile. The connecting portion shown in Figures 5 and 6 can thus be used to connect a pile point 14 to the lower end of a pile. The plate 1 has on its lower surface a tubular socket 15 for the pile point 14. The socket 15 is attached to a central support 16. Brackets 17 extend from the corners of the plate 1 to the support 16 and the socket 15, the brackets 17 being formed over the grooves 4 with recesses 18 receiving the heads 6 of the pins 5. The brackets 17 are tapered towards the corners of the member 1 and protect the pins 5 when the pile is being driven into the ground.

The pile point 14, which preferably is a cylindrical stud with a part spherical hollow at the end, is secured to the tubular fastening 15 by means of a bolt engaging in a threaded bore 19.

A central bore 20 is formed in the plate 1. This bore 20 is part of a centering means for the two members of the pile connecting device. The bore 20 can also be used as an inspection hole.

The pile connecting device according to the invention is intended to be made primarily of sheet metal welded together. Other constructions may also be employed.

According to the preferred embodiment

illustrated, the pin 5 with its two heads 6 is an integral piece. However, it could also comprise two parts, such as a bolt and a nut.

WHAT WE CLAIM IS:--

1. A pile connecting device comprising two plates which are adapted to be secured to the ends of two piles, each plate having a planar surface adapted to bear against the planar surface of the other plate, the plates being formed with recesses that register in the abutting position, the recesses being adapted to receive connecting means for the plates, wherein the recesses are through grooves extending inwardly from the edges of said plates, and wherein the connecting means are pins having heads at both ends, the pins being adapted to be inserted into said grooves, with the heads cooperating with the surfaces of the plates opposite said planar surfaces.

2. A pile connecting device as claimed in claim 1, wherein the plates are rectangular, preferably square, the through grooves being formed at the corners of the plates.

3. A pile connecting device as claimed in claims 1 or 2, wherein the sides of the grooves are curved, to provide resiliently deformable portions adapted to retain a pin within each groove.

4. A pile connecting device as claimed in any preceding claim, wherein the heads of the pins and the grooves are so designed that a wedge action is produced upon insertion of the pins into the grooves.

5. A pile connecting device as claimed in claim 4, wherein a transitional portion between the stems and the heads of the pins is provided, and wherein the portion is frusto-conical.

6. A pile connecting device as claimed in any preceding claim, wherein the plate is provided with a rim extending away from the abutting surface, the rim being adapted to receive the end of a pile, said rim being provided, above the grooves, with recesses for receiving the heads of the pins when the latter are inserted in their grooves.

7. A pile connecting device as claimed in claim 6, wherein the recesses in the rim for receiving the heads of the pins are defined by walls.

8. A pile connecting device as claimed in any preceding claim, wherein one of the

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grooves 4 at the middle of the sides of the plates 1. However, the plates 1 can have other configurations, such as rectangular or circular. Naturally, the number of grooves 4 can also be varied within certain limits.

As shown in Figure 4, the sides of the grooves 4 are curved, portions 8 thereof being resiliently deformable to retain the pins 5 in the inserted positions.

10 The heads 6 of the pins 5 are designed to produce a wedge action upon insertion of the pins 5 in the grooves 4. A transitional portion 9 is provided between the stem 10 and head 6 of each pin 5, the transitional portion 9 being frusto-conical. In one embodiment, the plates 1 have a thickness of 10 mm., the stems of the pins are 18 mm. long and each conical transitional portion is 2 mm. long. The grooves 4 can also be designed to produce a wedge action upon insertion of the pins 5 thereinto. Thus, the edges of the grooves 4 can be provided with bevels of a cross-section varying longitudinally of the grooves 4.

25 The upper plate 1 is provided with an upwardly extending rim 11 which is adapted to receive the end of the pile. Over the grooves 4, the rim 11 is formed with recesses 12 receiving the heads 6 of the pins 5. These recesses 12 are backed by walls 13 so that they cannot be clogged by concrete.

The connecting device according to the invention is not intended exclusively for connecting sections of pile, but can also be used for connecting other parts of a pile. The connecting portion shown in Figures 5 and 6 can thus be used to connect a pile point 14 to the lower end of a pile. The plate 1 has on its lower surface a tubular socket 15 for the pile point 14. The socket 15 is attached to a central support 16. Brackets 17 extend from the corners of the plate 1 to the support 16 and the socket 15, the brackets 17 being formed over the grooves 4 with recesses 18 receiving the heads 6 of the pins 5. The brackets 17 are tapered towards the corners of the member 1 and protect the pins 5 when the pile is being driven into the ground.

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The pile connecting device according to the invention is intended to be made primarily of sheet metal welded together. Other constructions may also be employed.

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illustrated, the pin 5 with its two heads 6 is an integral piece. However, it could also comprise two parts, such as a bolt and a nut.

WHAT WE CLAIM IS:—

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2. A pile connecting device as claimed in claim 1, wherein the plates are rectangular, preferably square, the through grooves being formed at the corners of the plates.

3. A pile connecting device as claimed in claims 1 or 2, wherein the sides of the grooves are curved, to provide resiliently deformable portions adapted to retain a pin within each groove.

4. A pile connecting device as claimed in any preceding claim, wherein the heads of the pins and the grooves are so designed that a wedge action is produced upon insertion of the pins into the grooves.

5. A pile connecting device as claimed in claim 4, wherein a transitional portion between the stems and the heads of the pins is provided, and wherein the portion is frusto-conical.

6. A pile connecting device as claimed in any preceding claim, wherein the plate is provided with a rim extending away from the abutting surface, the rim being adapted to receive the end of a pile, said rim being provided, above the grooves, with recesses for receiving the heads of the pins when the latter are inserted in their grooves.

7. A pile connecting device as claimed in claim 6, wherein the recesses in the rim for receiving the heads of the pins are defined by walls.

8. A pile connecting device as claimed in any preceding claim, wherein one of the



plates is provided on the side opposite the abutting surface with a fastening for a pile point.

- 5 9. A pile connecting device as claimed in claim 8, wherein said one plate has secured thereto brackets arranged at right angles to the plate and extending from the grooves towards the centre of the plate,
10 said brackets being formed over the grooves with recesses receiving the heads of the pins.

10. A pile connecting device, substantially as hereinbefore described, with

reference to Figures 1 to 4 or Figures 3 to 6 of the accompanying drawings.

HASELTINE, LAKE & CO.,

Chartered Patent Agents,

Hazlitt House,
28, Southampton Buildings,
Chancery Lane,
London WC2A 1AT.

- and -
9 Park Square,
Leeds LS1 2LH.Yorks.

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