

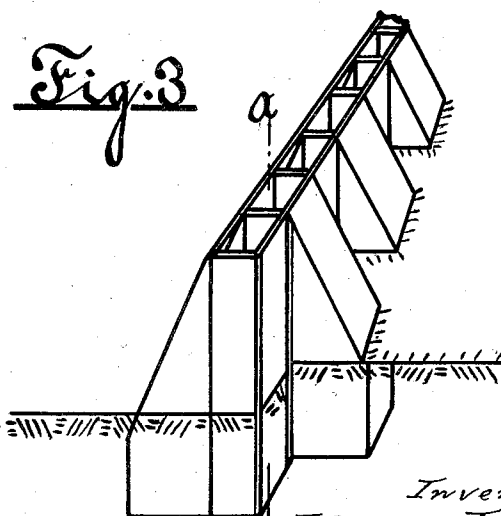
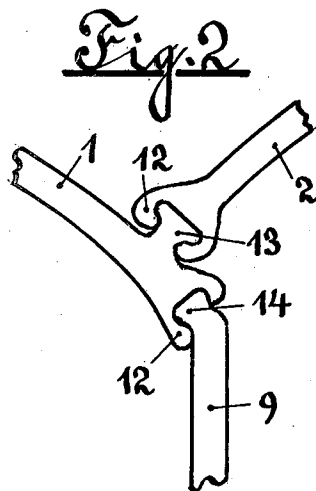
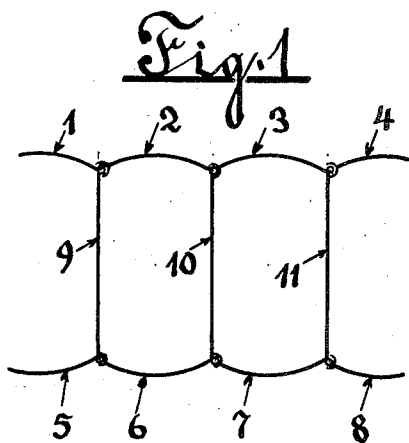
Oct. 22, 1935.

J. JENSEN

2,018,446

SHEET PILING

Filed June 18, 1934



Inventor:
Johannes Jensen

a *By* *L. R. Rieger*
Attorney.

UNITED STATES PATENT OFFICE

2,018,446

SHEET PILING

Johannes Jensen, Aagaard, Denmark

Application June 18, 1934, Serial No. 731,210
In Germany September 9, 1933

4 Claims. (Cl. 61—62)

The present invention relates to border-piling elements of the kind, in which each pair of adjoining assembled elements forms a pipe.

Such elements, provided with the necessary guiding and locking members, are known, but are subject to the drawback that the guiding and locking members are disadvantageously placed. Thus elements are known, the cross-section of which is mainly U- or Z-shaped, and the guiding and locking members of which consist of inner guides or bulbs, fixed on the free edges of the flanges, and embraced in guides or claws, fixed on the trunk or bottom of the elements. Such an arrangement will, however, involve considerable difficulties upon the immersion of the element.

By way of example the immersion can be made in such a way that the bulbs during the immersion are guided in the claws of an element previously immersed, but as these claws are filled with soil, which must now be pressed out of them in order to give room for the bulbs, it is obvious that the immersion is highly impeded, the operation itself contributing to a further compression of the soil contained in the claws.

It is also possible to provide a construction in which, upon immersion of an element, the flanges with the bulbs placed thereon are free, while the claws of an adjoining element are guided around the bulbs of the element previously immersed. This is much easier accomplished, as the soil can escape to all sides when the claws are immersed around the bulbs previously immersed, but, then this arrangement involves the drawback that the flanges are free and should they in the course of the immersion strike a stone or other inequalities of the soil, they will tend to deflect sideways and be more or less deformed, which will render the placing and immersion of the succeeding element difficult.

The above mentioned drawbacks are avoided by the element according to the invention in that the embracing guides (claws) of the element are fixed at the free edges of its side walls or flanges, whereas its inner guides (bulbs) are to be found on its trunk or bottom. By this arrangement the immersion is immensely facilitated when the element, which is to be immersed, is placed in such a way that its embracing guides embrace the inner guides of an element previously immersed, as in this way the flanges of the element are at the same time steered so that they cannot swerve sideways.

Furthermore, the border-piling elements known are subject to the drawback that they are hardly able to resist lateral pressure, i. e. pressure

acting in the cross-direction of the finished border-piling. Therefore, the invention also aims at the making of a border-piling element which in itself makes a pipe, or which by the immersion together with an adjoining element previously immersed forms a pipe, and which is able to resist stronger forces in the cross-direction mentioned than the elements generally known with a simultaneous better utilization of the material of the element. According to the invention this is achieved through the fact that the cross-sectional area of the element increases downwardly.

In the drawing:

Figure 1 is a diagrammatic view showing a cross-section through a border-piling according to the invention.

Fig. 2 is a fragmentary detail view showing the joint arrangements and drawn on a larger scale than Fig. 1.

Fig. 3 is a perspective view of part of a border-piling.

Fig. 4 is a section on the line *a-a* of Fig. 3, drawn on a larger scale than Fig. 3.

The border-piling shown in Fig. 1 consists of a series of uniform side-pieces 1—8 and cross-pieces of intermediate pieces 9—11. Thus the first of the elements shown in the drawing consists of the pieces 1, 9 and 5, the next of the pieces 2, 10 and 6 and so on. Before the ramming the parts are joined into elements as shown for 1, 9 and 5 and for 2, 10 and 6. Each of the side-pieces 1—8 have along each edge claws 12, and along one edge, the one turning away from the preceding elements, also a bulb 13. The cross-pieces 9—11 have along both edges bulbs 14, which before the ramming are led into and fixed in the corresponding claws of the side-pieces of the element. During the ramming the claws 12 of the free edges of the element are carried in over the bulbs 13 of the side-pieces of the preceding element. By this procedure the element is guided during the ramming so that it keeps its form. In this way the trouble of soil filling the claws are avoided, as the claws are pressed down around the bulb previously driven in so that soil cannot obstruct the ramming.

In the cavities formed between each pair of adjoining elements cement or similar material can later be cast and, if suitable, reinforced with insertion of iron. The thickness of the wall thus formed can be varied by making the intermediate pieces 9—11 narrower or wider.

The joining of the intermediate pieces with the side-pieces of the elements need not be made as

above indicated, but can be arranged in any other adequate way.

The border-piling elements shown in Figs. 3 and 4 have a downwardly increasing cross-section, so that they are better able to resist side-pressure. They are provided with guiding and locking members similar to those shown in Figs. 1 and 2. In the form of construction shown the cross-section of the element increases continuously downwards, but the sloping planes of the element need not pass in the whole length or the whole width of the element.

The elements according to the invention can consist of iron, reinforced concrete, or other suitable material, and they can be individually joined of several pieces or made in one piece, just as they can be provided with one or more sets of guiding and locking members. These members, which may be constructed so as to form one piece with the elements, may also be made as independent members, which may adequately have the form of bulbs or claws as described above, or they may be formed as ribs, projecting grabs, or the like, preferably passing through the whole length of the element.

The immersion of the border-piling elements can be made by way of ramming or pressing, e. g. hydraulic or pneumatic. The soil contained in the pipes formed of the elements can be removed, e. g. through digging, rinsing, washing, cutting, or through a combination of these methods, whereby the immersion is facilitated and takes place with greater safety for proper placing of the elements.

The elements according to the invention can have other forms than those hitherto known, e. g. be of trapeziform, but then one of the non-parallel sides is removed. The elements can be used inter alia for border-pilings, bearing garlands for cofferdams, and in connection with foundation works, when the proper foundation is surrounded by a mantle or border-piling which is immersed to solid foundation. In bearing garlands for cofferdams the pipes formed of the elements stretch along the circumference of the cofferdam some distance down below its bottom, and the pipes mentioned can either be prolonged up above the water surface or be continued in canals in the cofferdam. By using elements like those shown in Figs. 3 and 4 it is possible to get a greater diameter at the bottom than at top of the tubular garland.

The elements according to the invention can further be used e. g. for the construction of piers, quay walls, dams, breakwaters, and similar devices, and the pipes formed of them can, during or after the placing, be filled with concrete which may be reinforced.

I claim as my invention:

1. A border-piling element of the type adapted, when assembled with an adjacent element, to form a pipe, comprising an element of U-shaped cross-section, claw-like embracing guides

extending longitudinally of the element on the free edges of the substantially parallel side plates thereof, and tongue-like members of dovetail cross-section extending longitudinally of the element adjacent the edges of the substantially parallel side plates which are connected by the joining web, said claw-like guides being adapted to cooperate with the dovetail tongue-like members of a previously driven element.

2. A border-piling element of the type adapted, when assembled with an adjacent element, to form a pipe, comprising an element of U-shaped cross-section, claw-like embracing guides extending longitudinally of the element on the free edges of the substantially parallel side plates thereof, and tongue-like members of dovetail cross-section extending longitudinally of the element adjacent the edges of the substantially parallel side plates which are connected by the joining web, said claw-like guides being adapted to cooperate with the dovetail tongue-like members of a previously driven element, and said U-shaped element being formed so that the cross-section thereof increases from the upper to the lower extremities thereof.

3. A border-piling element of the type adapted, when assembled with an adjacent element, to form a pipe, comprising an element of U-shaped cross-section, claw-like embracing guides extending longitudinally of the element on the free edges of the substantially parallel side plates thereof, tongue-like members of dovetail cross-section extending longitudinally of the element adjacent the edges of the substantially parallel side plates which are connected by the joining web, said claw-like guides being adapted to cooperate with the dovetail tongue-like members of a previously driven element, and means including claw-like guides and cooperating members for detachably but rigidly connecting the web to the substantially parallel sides of the U-shaped element.

4. A border-piling element of the type adapted, when assembled with an adjacent element, to form a pipe, comprising an element of U-shaped cross-section, claw-like embracing guides extending longitudinally of the element on the free edges of the substantially parallel side plates thereof, tongue-like members of dovetail cross-section extending longitudinally of the element adjacent the edges of the substantially parallel side plates which are connected by the joining web, said claw-like guides being adapted to cooperate with the dovetail tongue-like members of a previously driven element, said U-shaped element being formed so that the cross-section thereof increases from the upper to the lower extremities thereof, and means including claw-like guides and cooperating members for detachably but rigidly connecting the web to the substantially parallel sides of the U-shaped element.

JOHANNES JENSEN.