

1,393,545.

Patented Oct. 11, 1921.

FIG. 1.

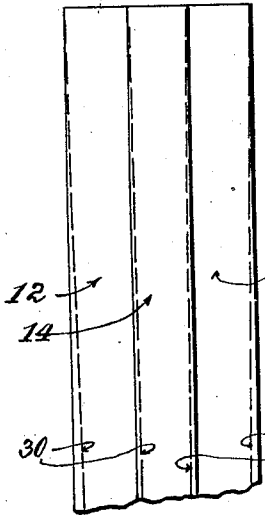


FIG. 2.

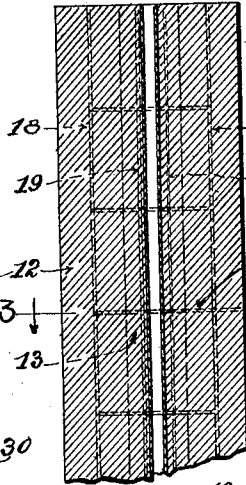


FIG. 3.

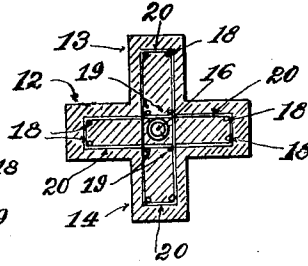


FIG. 4.

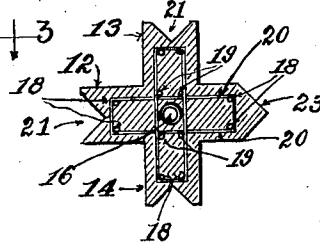


FIG. 5.

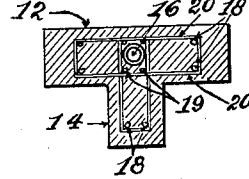


FIG. 6.

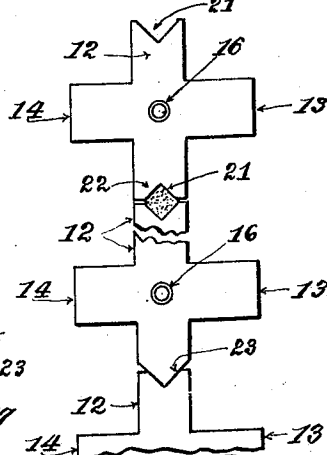
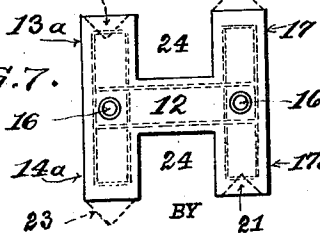


FIG. 7.



WITNESS:

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UNITED STATES PATENT OFFICE.

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CONCRETE PILE.

1,393,545.

Specification of Letters Patent.

Patented Oct. 11, 1921.

Application filed June 28, 1919. Serial No. 307,384.

To all whom it may concern:

Be it known that I, EDWIN C. KNUTH, a citizen of the United States and resident of the city of Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Concrete Piles; and I do hereby declare that the following description of my invention, taken in connection with the accompanying sheet of drawings, forms a full, clear, and exact specification, which will enable others skilled in the art to which the said invention appertains to make and use the same.

This invention has general reference to concrete piles; and it consists, essentially, in the novel and peculiar combination of parts, and details of construction, as hereinafter first fully set forth and described, and then pointed out in the claims.

The object of this invention is the production of an efficient, serviceable, strong, and comparatively inexpensive pile for all purposes where piling must be employed to carry a building structure. Another object of this invention is the production of a pile which can be employed for local, as well as sheet piling, without change or modification.

In order to accomplish these desirable objects, and others which will hereinafter appear, I construct this pile as shown in the drawings, forming a part of this specification, in which—

Figure 1 is an elevation of a concrete pile constructed in accord with my invention. Fig. 2 is a longitudinal sectional elevation of the same. Fig. 3 is a transverse sectional plan on line 3—3 of Fig. 2. Figs. 4 and 5 are transverse sectional plan views of slightly modified constructions. Fig. 6 is a plan view of a series of piles showing their adaptability for use in sheet piling. Fig. 7 is a plan view of another modification of my invention.

Like parts are indicated by the same characters and symbols of reference in all the various figures.

This pile comprises a main, rectangular, portion 12, from which project, preferably medially, two branches 13, 14, preferably at right angles to said main body, and formed integrally therewith, so that the whole forms a monolithic structure. These members 12, 13, 14, are of even width and thickness

throughout, so that all sides thereof are parallel to one another.

A pile of this construction possesses advantages over a solid round, square, or polygonal contour in that for a given diameter, the pile shown in Fig. 3, weighs only about $\frac{2}{3}$ of that of a solid pile of the contours mentioned, and offers a greater frictional resistance than a round, square, or polygonal pile, of the same weight. These piles are, preferably, manufactured in certain, predetermined sizes and length, and owing to their decreased weight, offer advantages in shipping on account of their reduced freight charges.

The pile as described has its lower end tapered, as illustrated at 15, which facilitates forcing it into the ground, and where jetting is desired or necessary, to assist in sinking the pile, I locate in the main portion of the pile a tube 16, extending the entire length of the pile, through which tube a stream of water may be forced to issue therefrom at the lower end of the pile.

In order to impart to this pile the required strength, I reinforce the same with a series of vertically disposed, metallic rods 18, preferably on all of the eight, (more or less) corners, and also at the inner angles of the members, as at 19, and then cross-reinforce the pile at the desired or required distance apart, with horizontal reinforcing rods 20, properly tied to the vertical rods at their intersecting points.

In order to adapt the construction herein disclosed for use in sheet piling, I form in the outer longitudinal margins of the element 12, longitudinal, preferable V-shaped, grooves 21, and in driving these piles, I place them in a position where these grooves are opposing each other, as shown at 21, Fig. 6, and then fill the spaces thereby formed with concrete *in situ*; or I force wooden timbers into these spaces to render the joints between the elements 12, water proof.

While this method of employing the piles for sheet piling is very effective, I may form only one longitudinal margin of the main element with the groove 21, and bevel the sides of the opposite portion of the main element, as shown in Figs. 4 and 6, at 23, so that the latter member fits into the groove. Any interstices which may result if the piles are not closely driven, or as it may happen,

not perfectly linear, may be readily filled with cement. Sheet piling formed with the elements 12, 13, and 14 is of superior strength, because the two elements projecting from the main body 12, form, as it were, buttresses for these main portions 12, and assist in resisting force or pressure applied to the pile.

While I prefer that the main portion 12 be reinforced by the branches or wings 13, 14, formed thereon, I may, in some cases, dispense with one of these wings, as illustrated in Fig. 5, especially so when a smooth surface at one side of the piling is desired; while, if a pile of superior strength is required, I may form two of these branches on each side of the main body 12, as shown at 13^a, 14^a, 17, and 17^a, in Fig. 7, in which case, when the piles are to be used for sheet piling, I may provide the longitudinal edges of the members 13^a, 14^a, 17, and 17^a with a groove 21 on one member and a corresponding projection 23 on the other member; and when the piles have been driven, fill the spaces 24 thus formed with concrete, or earth, *in situ*, and if preferred, may form these grooves and corresponding projections on adjacent members 13^a and 17, and 14^a and 17^a.

Having thus fully described this invention, I claim as new, and desire to secure to myself by Letters Patent of the United States—

1. A reinforced concrete pile of the kind described comprising two flat open work skeleton reinforcing structures crossing at their middle portions and forming in section

a Greek cross, the skeleton structure embedded in concrete following the outer contour the Greek cross section of the reinforcing structure.

2. A reinforced concrete pile of a Greek cross section box like skeleton metallic reinforcing structures extending longitudinally within the two main divisions of the pile and metallic tie members forming the sides of said rectangular structures and extending across the middle portion of the pile, and a tube extending longitudinally of the pile and within the square formed by said ties.

3. A reinforced pile having a Greek cross-section, pairs of longitudinally disposed reinforcing rods within the several wings of the pile adjacent to the several edges thereof, other pairs of longitudinally extending reinforcing rods within the pile adjacent to the bases of the several wings, and horizontally disposed ties lacing the rods together and extending from side to side of the pile from one wing to the opposite wing and forming two parallelograms crossing at the center of the pile.

4. A reinforcing pile having a cross-section similar to the Greek cross, and a pair of reinforcing skeleton structures penetrating each other at the center of the pile and extending out into the wings of the pile, as and for the purpose specified.

In testimony that I claim the foregoing as my invention, I have hereunto set my hand.

EDWIN C. KNUTH.