F. W. SKINNER.

JOINT FOR CONNECTING ADJACENT UNITS OF SHEET PILING OR THE LIKE.

APPLICATION FILED MAR. 13, 1907.

907,902. Patented Dec. 29, 1908.

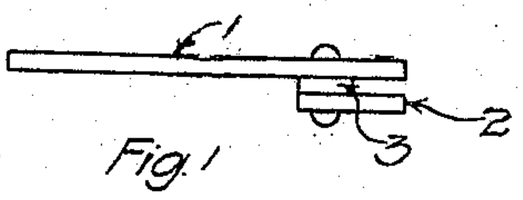


Fig. 1

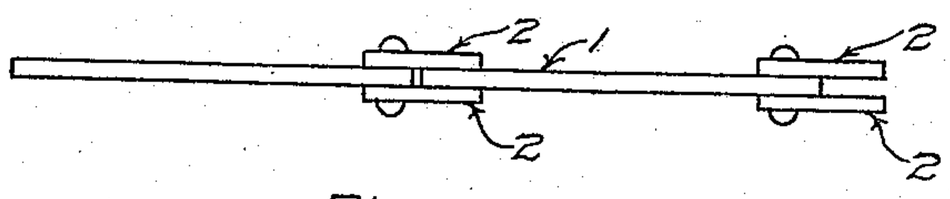


Fig. 3

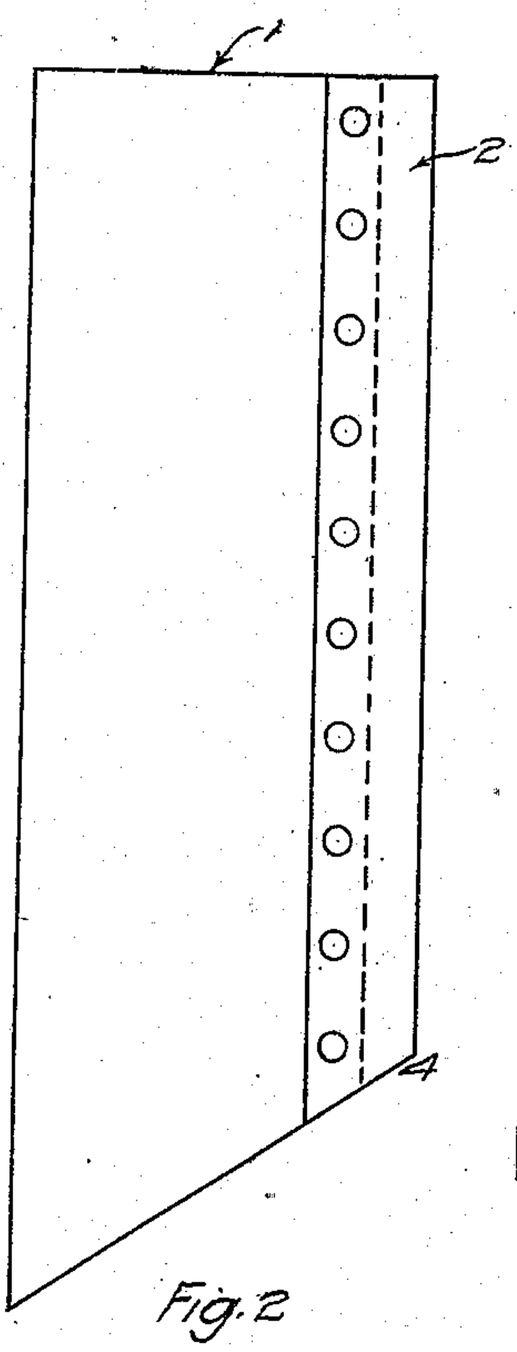


Fig. 2

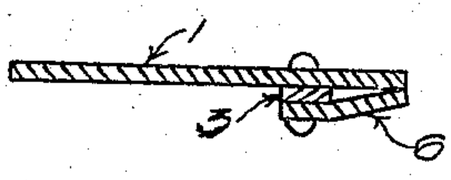


Fig. 4

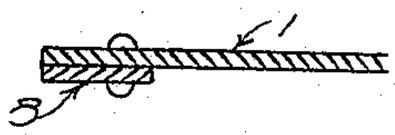


Fig. 9

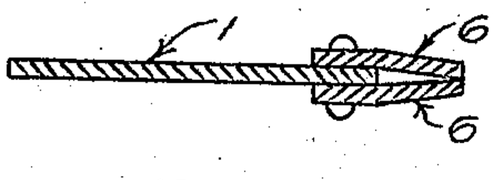


Fig. 6

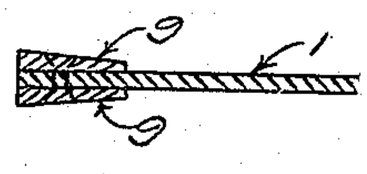


Fig. 10

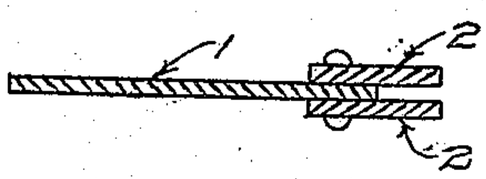


Fig. 5

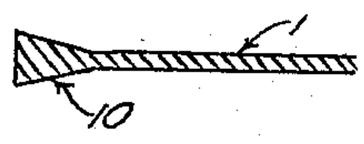


Fig. 11

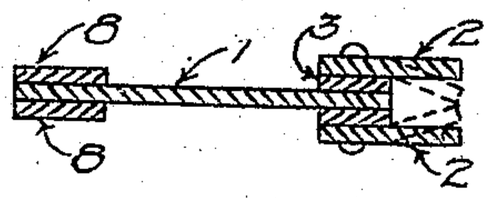


Fig. 7

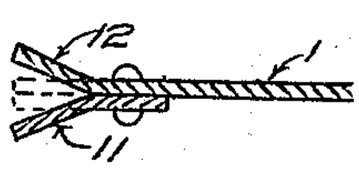


Fig. 12

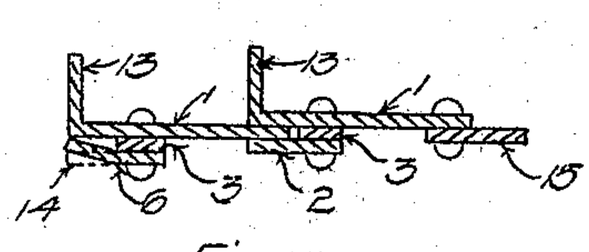


Fig 14

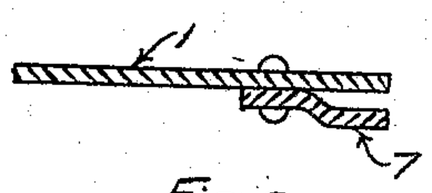


Fig. 8

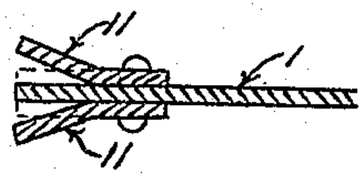


Fig. 13

Witnesses:

Chas. W. Buckmall.

Max. Weiss

Frank W. Skinner Inventor

# UNITED STATES PATENT OFFICE.

FRANK W. SKINNER, OF TOMPKINSVILLE, NEW YORK.

## JOINT FOR CONNECTING ADJACENT UNITS OF SHEET-PILING OR THE LIKE.

No. 907,902. Specification of Letters Patent. Patented Dec. 29, 1908.

Application filed March 13, 1907. Serial No. 362,186.

*To all whom it may concern:*

Be it known that I, FRANK W. SKINNER, a citizen of the United States, residing at No. 50 Sherman avenue, Tompkinsville, in the county of Richmond and State of New York, have invented a new and useful Form of Joint for Connecting Adjacent Units of Sheet-Piling and other Structural Elements.

My invention relates to a simple and economical method of forming flat jaws on the edge of a sheet pile unit to engage the adjacent edge of another sheet pile unit; to a method of temporarily closing said jaws during driving to exclude dirt and other foreign material; and to a method of utilizing the resilience of the jaws to increase the tightness of the joint, and to special forms of male joint members engaging the jaws.

Joints for metal sheet piles have heretofore generally been made with a curved, hooked or flange connection adapted to resist their transverse separation and to permit longitudinal motion only between the adjacent pile units. This construction is generally heavy and costly and limited to the use of special shapes and given dimensions, and are thus very restricted in their application.

My invention provides a joint composed of the fewest and simplest possible members having no excess of metal or weight, composed of plain flat bars, and can be applied to simple plates or to sheet piles of any dimension or form of cross section. It is very easily manufactured and driven, has the minimum exposure to injury, can be easily repaired when distorted, and provides for very tight closure without expensive or delicate fitting.

It essentially consists of a new and special method of forming on a metal sheet pile a joint analogous to the familiar tongue and groove joint commonly used for wooden sheet piles. In my joint the spring action of the jaws, combined with the drawing tendency developed in driving by the beveled pile point, tends to insure close engagement of adjacent pile units without the necessity existing in other forms of joints, for a positive interlocking device.

Figure 1 is an end view and Fig. 2 is a side elevation of a sheet metal pile provided with the simplest form of my joint. Fig. 3 is an end elevation of two sheet pile units in engagement and having joints of the same type as that shown in Figs. 1 and 2, but with their details slightly modified. Figs. 3 to 13, inclusive are transverse sections through the male and female parts of my joint modified by simple variations of detail.

In all figures the same, or corresponding parts, are indicated by the same reference numbers.

In Figs. 1 and 2 the female part of the joint is formed by a longitudinal strip 2 and filler 3, riveted to the edge of the web plate 1, thus forming two jaws adapted to engage the opposite plain edge of the web plate, acting as a male member of the joint. The lower end of the pile is beveled on the line 4—5, with the acute angle driven next the preceding pile unit, and thus tends to carry the pile in the direction 4—5 as it descends and thus maintain automatically close engagement of the male and female members of the joint and promote contact of the adjacent edges of the webs of the sheet pile units.

In Fig. 3 a joint is shown with the female member made symmetrical by a jaw plate, 2, riveted on each side of the web plate 1, the latter thus acting as a filler of the same thickness as the opposite edge of the web which forms the male member of the joint.

Fig. 4 shows a modification of the joint of Figs. 1 and 2, made by bending one jaw of the female joint so that they converge and tends to temporarily close the opening. This closure is of great value in excluding earth and other materials while the pile is being driven and afterwards before the male member is engaged with it, and is also valuable in that when the jaws are forced apart by the entrance of the male member a positive spring action is developed which tends to close the joint positively, makes a superior engagement between the male and female members, automatically compensating for irregularities of construction, obviating necessity of exact dimensions or clearances, and insuring a tight joint as well as one that can easily be restored for future repeated driving.

Figs. 5 and 6 show how the joint of Fig. 3 can be easily made into a spring contact, closed joint by bending the flat jaw plates 2, 2, even after they are riveted to the web plate, as in Fig. 5, so that their outer edges converge as in Fig. 6′, thus forming a joint equivalent to that of Fig. 4, but with the advantage of being concentric and symmetrical with the pile web 1.

Fig. 7 shows, at the right a symmetrical female joint modified from the joints of Figs.

5 and 6 by the insertion of fillers 3, 3, between the jaw plates 2, 2 and the pile web 1, thus providing for a reinforced or special male member. The left part of Fig. 7 shows a reinforced male joint adapted to engage the female joint on the right of the same figure.

Fig. 8 shows a female part of a joint made with the jaw plate bent to obviate the use of a filler plate thus economizing material.

Fig. 9 is the male member of a joint reinforced by a bar 8, riveted to the longitudinal edge of the pile.

Fig. 10 is the male member of a joint reinforced by bars 9, 9 riveted on both sides of the longitudinal edge of the pile web. These bars may be of uniform thickness or may be beveled as shown, or may be otherwise varied to provide continuous engagement with the jaws of the female part of the joint.

Fig. 11 is the male part of a joint with reinforcement integral with the pile web.

Fig. 12 is the male member of a joint with the reinforcement plate 11, and a longitudinal edge 12, of the pile temporarily separated so that engagement with the jaws of the female member of the joint will tend to force them together towards the positions indicated by the dotted lines, and thus develop spring action promoting the tightness and security of the joint.

Fig. 13 is the male member of a joint made with two reinforcement bars bent outwards to secure spring action and tight contact when in engagement with the female part of the joint.

Fig. 14 is a transverse section through two sheet piles in engagement, each of which has a special section made with an angle bar provided with a joint made by flat bars riveted to the pile web. It shows one of the pile units with the female part of the joint temporarily closed by having the outer edge of the plate 6 bent over against the pile web 1, in a manner to exclude earth etc. from the joint until it is bent back to the position by the entrance of the male member. In these pile units, one edge of the web 1, directly, engages the jaws of the female part of the joint and itself forms the male part of the joint, overlapping the web 1, of the adjacent pile unit.

The accompanying drawings illustrate the simplest construction of my joint and demonstrate some of the ways in which it can be practically constructed and applied. I do not wish to limit myself to the details here shown, but my invention includes the general type of tongue and groove joint made with flat plates, or with flat plates combined with the pile webs, the arrangement of joint members so that they are displaced by the engagement of the male and female parts of the joint, the temporary closure of the female part of the joint, and the development of spring contact between the male and female parts of the joint.

I do not wish to limit my invention to piles or to sheet piles but may apply it to any other form of construction to which it proves available.

I claim:

1. A sheet pile with the longitudinal opening of the female joint temporarily closed.

2. In a sheet pile the combination of a temporarily closed longitudinal joint member and a beveled pile point.

3. In a sheet pile unit, the combination of a straight flat web plate and an offset jaw plate on one edge forming with the web plate a female part of a joint.

4. In a sheet pile unit the combination of a web plate with jaw plates riveted to one edge thereof and inclined together beyond the edge of the web.

FRANK W. SKINNER

Witnesses:
CHAS. W. BUCKNALL,
MAX WEISS.