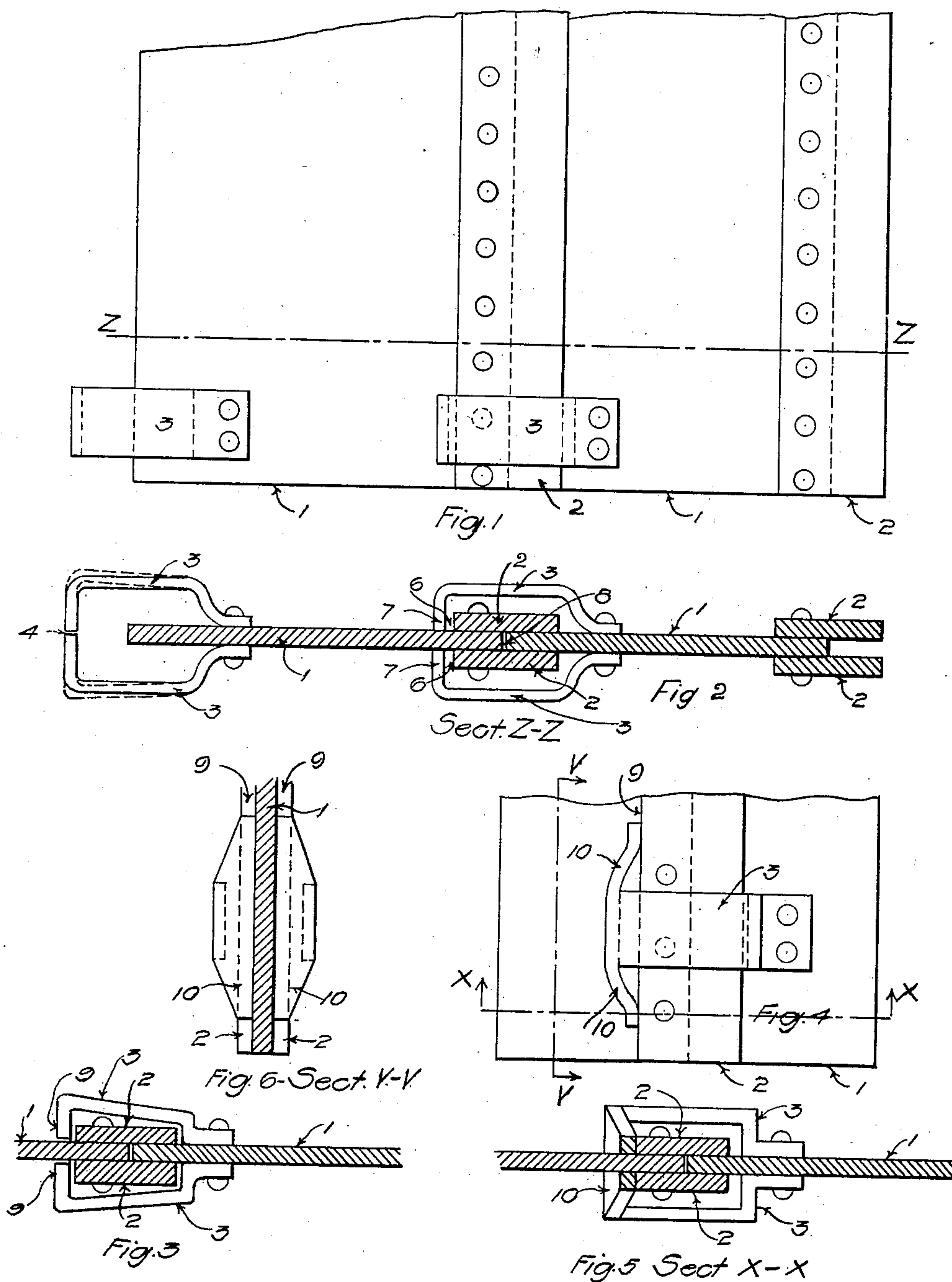


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 LOCKING THE JOINTS OF ADJACENT UNITS OF SHEET PILING OR OTHER STRUCTURAL ELEMENTS.  
 APPLICATION FILED JULY 29, 1907.

912,497.

Patented Feb. 16, 1909.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

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## LOCKING THE JOINTS OF ADJACENT UNITS OF SHEET-PILING OR OTHER STRUCTURAL ELEMENTS.

No. 912,497.

Specification of Letters Patent.

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*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 Improvement for Locking the Joints of Adjacent Units of Sheet-Piling or other Structural Elements, of which the following is a specification.

My invention relates to a device, added to a complete pile joint, to hold the different parts in engagement and prevent the separation of adjacent pile units when driven. It affords a very simple and economical method of locking ordinary tongue and groove, lap or butt joints together without the necessity of providing interlocking members in the joints themselves; a requirement that often complicates construction and involves difficulty and expense in driving.

The simplest and cheapest forms of joints between adjacent units of sheet piling provide a sliding contact but are not held together except by friction and external pressure. So long as the different parts of such joints maintain their desired or normal relative positions, they may be very efficient and exclude earth, sand even, to a large degree, quicksand and water, but they are liable and almost certain to become displaced in driving and lose much of their efficiency.

My invention provides clamps or guides attached to one pile unit at one or more points and engaging the other pile unit so as, with the aid of the regular joint, to hold the two pile units and all parts of their joint, in close engagement and prevent the relative displacement of the pile units, thus maintaining during and after driving a close joint substantially equivalent to one made with interlocking members.

Essentially the device is a comparatively small piece projecting from the edge of one pile unit to engage a continuous shoulder on the adjacent edge of the next pile unit in such a manner as to prevent the displacement of the units in the planes of their webs and to maintain the engagement of the different parts of the regular joint, thus providing, in effect a movable lock which serves the same purpose as a much more elaborate and expensive lock incorporated in the regular joint or extending its full length. If necessary the device can be made to prevent trans-

verse as well as longitudinal displacement of the pile units. Usually it may suffice to apply the device to the lower end of the pile, since if that is made to always register properly with the pile last driven and the pile is maintained in the proper plane the whole joint will be satisfactory. Additional members may however be added at various points in the length of the pile if desirable to lock the joint at the upper end and intermediately.

In most cases the device is a single piece or a pair of pieces of relatively small dimensions which engage a shoulder formed by a groove or rib, formed by the regular elements of the pile unit without adding materially to the cost of the pile unit, therefore providing the joint lock for a cost little if any in excess of the cost of the small clamping pieces, and at the same time obviating increased friction or resistance in driving.

One of the simplest forms is a plate secured to and projecting beyond the rear edge of the forwardly driven pile unit with its extremity bent inwards towards the pile web, so as to engage a continuous shoulder there in a hook like manner and thus hold the lower end of the advance pile against the previously driven one in any position.

With a tongue and groove joint or a lap joint a single piece theoretically suffices to lock the joint but ordinarily I prefer to use two pieces, symmetrically arranged on opposite sides of the pile web and providing a balanced connection as shown in Figures 1 to 6.

I am aware that Patent 527,469 dated Oct. 16, 1894 and issued to James A. Wakefield shows a series of metallic spring clamps on one side of a sheet pile lap joint. These clamps however, as illustrated and described and specified in the claims are of radically different form and function from mine. They are designed merely to transform a lap joint to a tongue and groove joint and are especially limited by their description and construction to the development of contact on the flat side of the pile units, with pressure perpendicular to the web. Their only function and their only possible action is to prevent displacement of two pile units in a direction perpendicular to their webs. The claims of this patent cover only the combinations of a lap joint and yielding or spring clamps and sheet piles made of a plurality of thicknesses of planks, none of which interfere



in any respect with my invention. In distinction from this patent, my invention is not a part of the regular sheet pile joint, but is a separate addition applicable to a completed regular joint; the effective bearing of the locking pieces is not with pressure perpendicular to the pile webs, but parallel with them, against shoulders formed by ribs or grooves, and the purpose of the clamp is to prevent displacement of adjacent pile units in the direction parallel with their webs, a function which cannot be performed by Wakefield's device.

My invention is adapted to all forms of non-locking joints on either wood or metal piles, and may obviously be modified in many ways to secure an interlocking piece on one pile unit sliding against a continuous shoulder on the adjacent pile unit, or it may be modified in various ways. I do not wish to limit myself to any specific details but to include any sliding lock device applied to a joint which without it would permit displacement of adjacent pile units and opening of the joints.

Figs. 1 to 6 inclusive show locks adapted for metal sheet piles with tongue and groove joints.

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

Fig. 1 is a side elevation of the feet of two metal sheet piles in engagement with a tongue and groove joint locked by my joint lock. Fig. 2 is a horizontal transverse section at Z Z Fig. 1. 1, 1 are the pile webs, 2, 2 are jaw plates forming the joint groove, 3, 3 are the lock pieces, riveted to the pile web, with or without the clearance 4 between their projecting ends. 6, 6 are clearances between the bent ends 7, 7 of the lock pieces and the shoulder formed by the edge of the jaw plates 2, 2, against which they take bearing if the clearance 8, between the pile webs 1, 1 tends to become much wider. Fig. 3 is a transverse section through a tongue and groove joint similar to that shown in Figs. 1 and 2, and shows the joint lock made with pieces slightly modified to reduce the clearance around the tongue and groove joint. Fig. 4 is a part of the side elevation of the feet of two metal pile units with a tongue and groove joint locked by special bars 3, 3, having on

the ends projecting flanges 10, 10, to provide two points of bearing with greater effectiveness and reduced friction on the shoulders 9, 9 formed by the edges of the jaw plates 2, 2. Fig. 5 is a horizontal transverse section at X X Fig. 4, and Fig. 6 is a vertical section at V V Fig. 4.

The use of a second set of locking pieces in the upper part of the piles will similarly maintain the upper parts of the adjacent pile units in proper relative positions, but are generally unnecessary since those shown at the feet of the piles always suffice to keep the units in engagement at one point, and the upper part of the advance pile unit can be maintained in the required position between rangers or other guides above the surface of the ground. I do not limit my invention to sheet piles, but apply it to any other construction where it is desirable to maintain sliding joints in contact without full length lock bars. The locking piece may thus be very short and inexpensive while the full length shoulder which it engages costs very little and is easily formed on the body of the pile.

I claim—

1. In a sheet pile tongue and groove joint, a locking piece attached to the male member of the joint and adapted to engage the edge of one of the flat plates forming the female part of the joint of an adjacent pile unit.

2. In sheet pile tongue and groove joint, short locking pieces attached to the male member of the joint and virtually forming a short section of a female joint inclosing the female joint of the adjacent pile unit and interlocking with the latter by means of an engagement against the rear edges of the elements of the female member of the joint.

3. In sheet piles, a tongue and groove joint inclosed by a short section of a slotted sliding sleeve attached to one of two engaged pile units.

4. In sheet piles, a double tongue and groove joint, the full length main groove being inclosed in a short auxiliary groove.

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Witnesses:

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