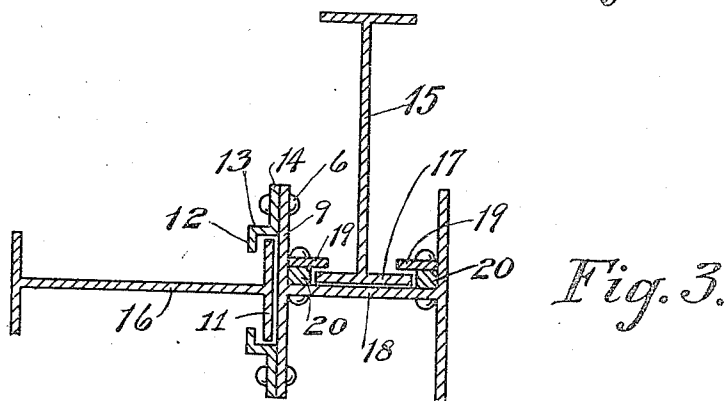
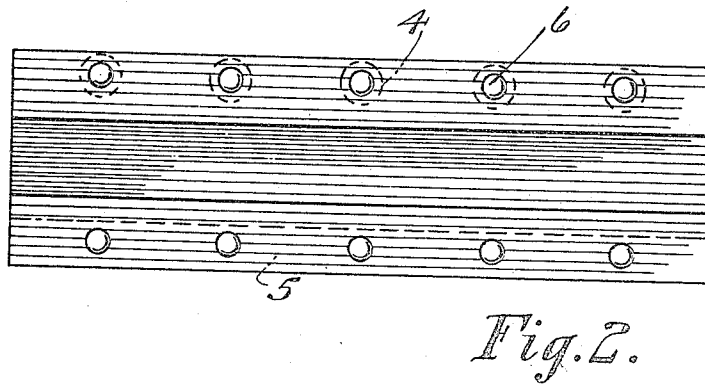
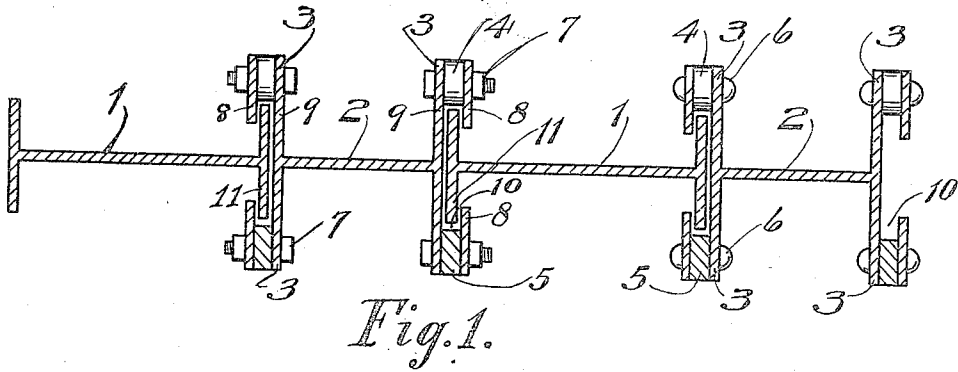


F. N. KNEAS.
METAL SHEET PILING.
APPLICATION FILED OCT. 28, 1909.

957,169.

Patented May 3, 1910.



WITNESSES:

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METAL SHEET-PILING.

957,169.

Specification of Letters Patent.

Patented May 3, 1910.

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To all whom it may concern:

Be it known that I, FRANK N. KNEAS, a citizen of the United States, residing at Norristown, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Metal Sheet-Piling, of which the following is a specification.

My invention relates to metal sheet piling intended for the usual functions of such piling, including the retention of earth, water and the like, from excavations.

The purpose of my invention is to provide metal sheet piling made of standard metal shapes capable of use and generally used in building operations and which can, for this reason, be easily procured and ultimately used in the construction of the building upon which foundation work is being done or nearby buildings, which can be readily driven and which, when driven, shall form a chain of vertical members reliably secured together and offering great resistance to lateral pressure.

A further purpose of my invention is to provide for complete and effective water-proofing of the joint to prevent leakage therethrough, where water is present.

A further purpose of my invention is to provide standard shapes, preferably of I beam or H form, with preferably outside guiding flanges.

A further purpose of my invention is to provide standard shapes with preferably outside guiding flanges spaced therefrom by means which may be swelled by the water to assist in sealing thereof, or the spacing means may be metallic.

A further purpose of my invention is to provide preferably standard shapes with guiding flanges spaced therefrom by compressible material so that the joint may be adjusted or tightened to secure against leakage and movement, if water be present.

A further purpose of my invention is to provide adjoining I or H shaped beams, having adjoining flanges of different width and to secure these flanges by guiding and retaining means mounted upon the wider flanges.

Further objects of my invention will appear in the specification and claims forming a part hereto.

I have shown in the accompanying illus-

trations my preferred form of the invention and which I have found to be most practical, illustrating the adaptation of this form to work in a direct line and to the turning of corners.

Figure 1 is a transverse section of a straight row of my piling. Fig. 2 is an edge view of the structure shown in Fig. 1 looking from right to left. Fig. 3 is a cross-section of the structure which I use in turning corners of the structure.

Similar numerals of reference indicate corresponding parts in the figures.

In the drawings, I have shown I beams spaced and connected by means of beams which I prefer to make of general H shape. I have perforated the portions 3 of the wider flanges where they extend beyond the narrower flanges and have applied spacers 4, 5 to the flanges, showing them upon the outer faces of the flanges and illustrating two different kinds of spacers, those at 4 being of general washer shape, and those at 5 being in the form of strips of any desired length. Evidently the washer form would permit free passage of water through between the washers and a joint made with washers would have to depend for its water checking quality upon some other seal than that of the washers themselves. The strip spacer can be made to form the seal itself and be applied to one or both edges. I form the spacers of different type either of wood or metal as preferred, and where wood is used, take advantage of its capabilities of swelling when soaked in water and of general compressibility to form a tight joint and to permit the extent of the spacing attained by it to be varied.

I have illustrated the use of rivets, as at 6, and of bolts, as at 7, to retain flanges 8 in spaced relation to the flanges 9 of the H beams. Evidently the bolt form is capable of being tightened or loosened to vary the distance of separation of the flanges 8 and 9, while the rivet connection is not so easily adjusted.

By means of the spacing of the two flanges I obtain passages 10 between the flanges and in which the outer edges of flanges 11 may lie and be guided in driving relation. Evidently these flanges 11 can form any desired character of fit within the space afforded, providing it permits driving,

and the flanges 8 and 9 can be brought into proximity with each other by means of the bolt 7 to make the fit still closer where required to stop passage of water, or the space
5 between flanges 8 and 11 can be calked in the usual manner. Evidently the water tight joint upon one side of the structure, which I have shown, will be sufficient to prevent the passage of water through the
10 wall formed, and one side only need be tightened or formed to make the joint tight.

In Fig. 3 I have shown the function of the spacer as performed by the projection of the flange 12 by means of the neck 13,
15 the strip forming the flange and neck being extended at 14 to provide for engagement with the flange 9 and so that it may be secured thereto by rivets 6. In this form I have shown how the corner may be turned
20 by a beam 15 having its web angularly placed with respect to the webs of the sections used in the portion of the wall containing beam 16. The flange 17 is shown
25 as in contact with the web 18 and as retained in operative relation therewith by means of flange 19 resting upon fillers 20 which are formed of any desired material, whether wood or metal.

To place my piling, a beam such as 1 is
30 driven into position, a flange 8 is secured to each of the flanges 9 in proper operative relation whether by means of separate spacers or (as illustrated in neck 13 of Fig. 3) by the material of the flange 8 itself
35 forming grooves within which the flange 11 may lie. The beam 2 is then driven into position with the flange 8 outside of the flange 11, forming guiding and sealing means for continuous connection between
40 the beams 1 and 2 during the driving operation and subsequent thereto. When it is desired to turn the corner, the flange guiding and sealing structure is formed upon the web of one of the beams, instead of upon
45 its flange, and the flange of a beam 15 is inserted therein. These several beams may be driven in either order, beginning with any of the three beams 15, 16 or 18.

It will be evident that the exact structure
50 shown and described need not be used to obtain the main advantages of my device and such changes as are found desirable in practice may be used to modify the form shown.

55 Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. In metal sheet piling, a composite member composed of a metallic shape of H section, wood spacers on the outside faces of the flanges, metallic bars superimposed on the wood spacers and projecting inwardly beyond edges of the spacers and forming a plurality of grooves, and secondary members with flanges engaging in said grooves.
65

2. In metal sheet piling, members of H shape, and spacers and metallic strips on the outside faces of the flanges to form grooves between the flanges and the strips, the grooves being limited at the edges by the
70 spacers.

3. In metal sheet piling, members of H shape composed of a central web portion and straight flanges at substantial right angles therewith, compressible spacers secured in
75 proximity to the edges of the flanges and metallic bars fastened to the flanges through the spacers forming grooves outside of the flanges.

4. In metal sheet piling, members of H
80 shape composed of a central web portion and two substantially straight parallel flanges, bars spaced from the flanges and bolts for regulating the distance between the flanges and the bars and uniting the bars to the
85 flanges.

5. In metal sheet piling, members of H shape composed of a central web portion and two substantially parallel flanges, bars, means for spacing the bars from the outer
90 faces of the flanges, adjoining I shaped members having flanges overlapped by the bars, connections through the bars, spacing means and flanges of the H shaped members, and means for tightening the connection.
95

6. In metal sheet piling, primary members composed each of a web portion and two flanges, packing strips capable of swelling on the application of water, metallic
100 guide bars outside of the packing strips forming grooves between the guide bars, packing strips and the flanges of the primary members and adjoining secondary members having flanges extending into the
105 grooves.

7. In metal sheet piling, a series of members composed each of a web portion and two flanges, placed with their flanges in contact, one flange being narrow and the other wide at each contact, and the extending portions
110 of the wider flanges being perforated, and members attached through the perforations of each wider flange to guide and engage the narrower flanges of the adjoining member.
115

8. In metal sheet piling, H shaped columns consisting each of two parallel plates connected by a web at their central portions, said plates being perforated near their outer edges, connecting devices passing through
120 said perforations and means on the outer portions of the connecting devices adapted to engage flanges of adjoining members, the connecting devices offering shearing resistance to lateral displacement of the engaged
125 flanges.

9. In metal sheet piling, rolled members of H section, separable metallic bars attached to the flanges, and means for spacing the bars from the outside faces of the flanges
130

to form grooves capable of receiving and retaining flanges of adjoining members placed edge-wise with the H shaped members.

5 10. In metal sheet piling, composite members, each composed of a metallic web and two flanges, non-metallic strips attached to the outer faces of the flanges, and metallic guides outside of the non-metallic strips.

10 11. In metal sheet piling, a plurality of like I beams placed edgewise and spaced and intermediate H beams also placed edge-wise and separate flanges secured to the flanges of the latter inclosing the flanges of the I beams.

15 12. In metal sheet piling, the combination of beams with wide and narrow flanges occurring at regular intervals, and separable

means united to the wide flanges for embracing the narrow flanges of adjoining members. 20

13. In metal sheet piling, members each having a central web, primary flanges at an angle therewith, the said flanges having separable reversely turned secondary flanges at their outer extremities to form grooves 25 on the outer faces of the primary flanges, placed edgewise with I beams to form a metallic wall.

In testimony whereof I affix my signature in presence of two witnesses.

FRANK N. KNEAS.

Witnesses:

CLAY W. KELLAR,
W. H. KNEAS.