A. A. FRIESTEDT.

SHEET PILING.

APPLICATION FILED DEC. 31, 1906.

912,949.

Patented Feb. 16, 1909.

2 SHEETS—SHEET 1.

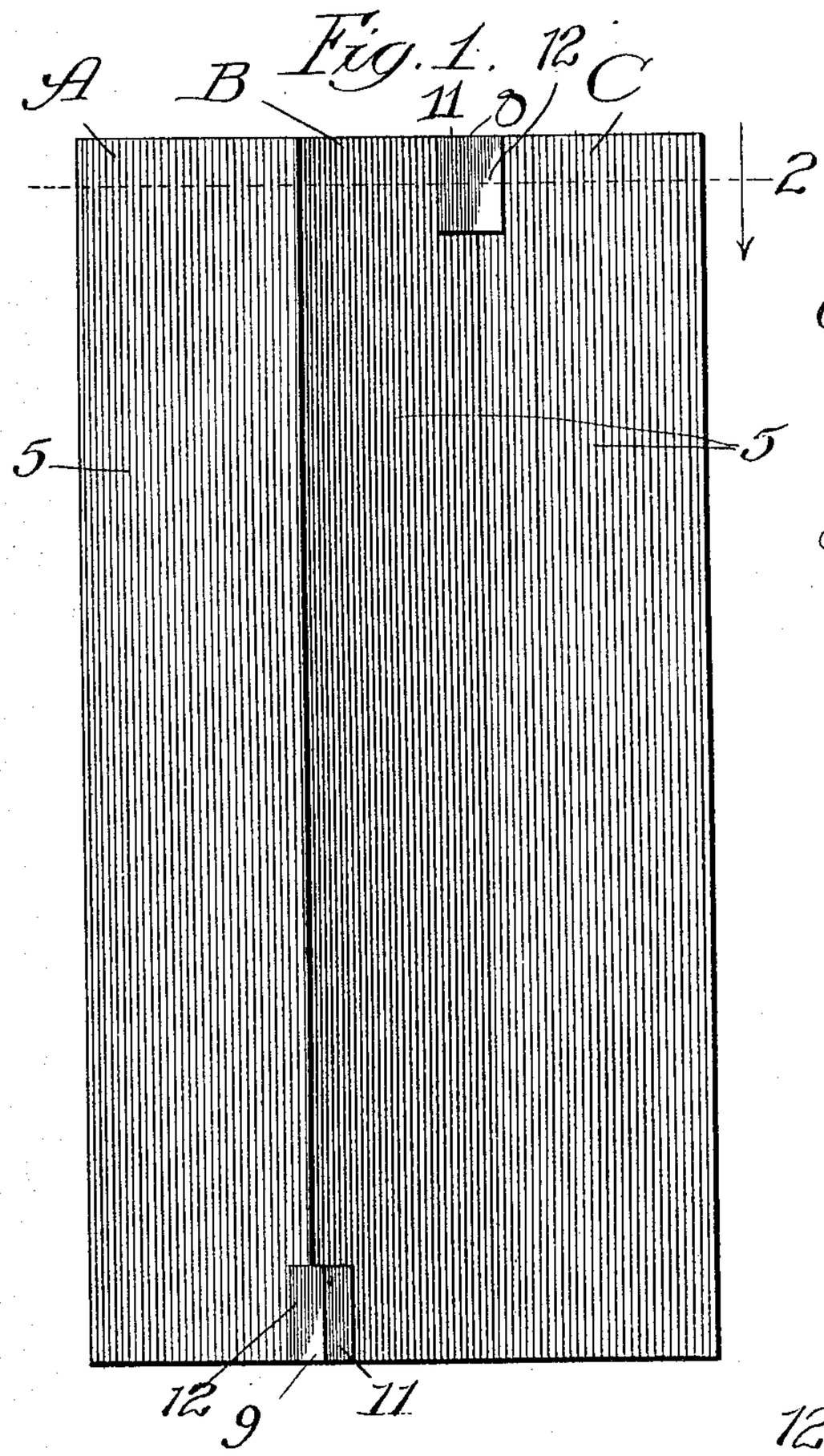


Fig. 2.

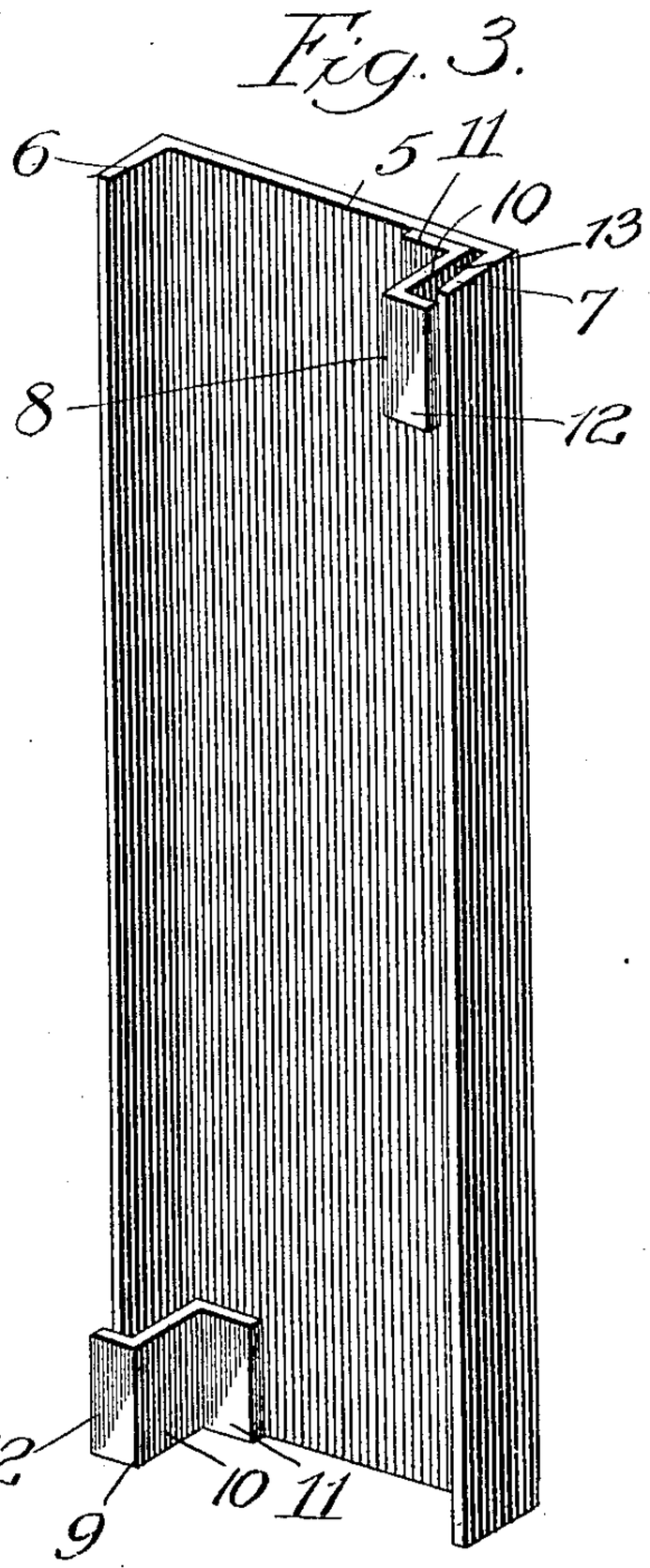
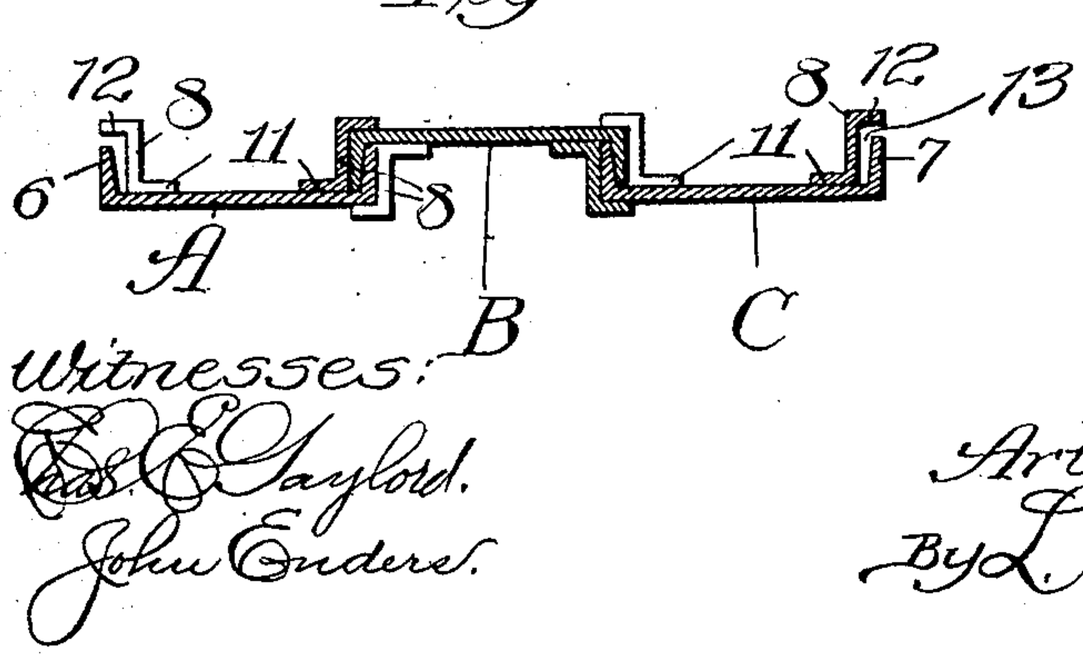


Fig. 3.



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Inventor:
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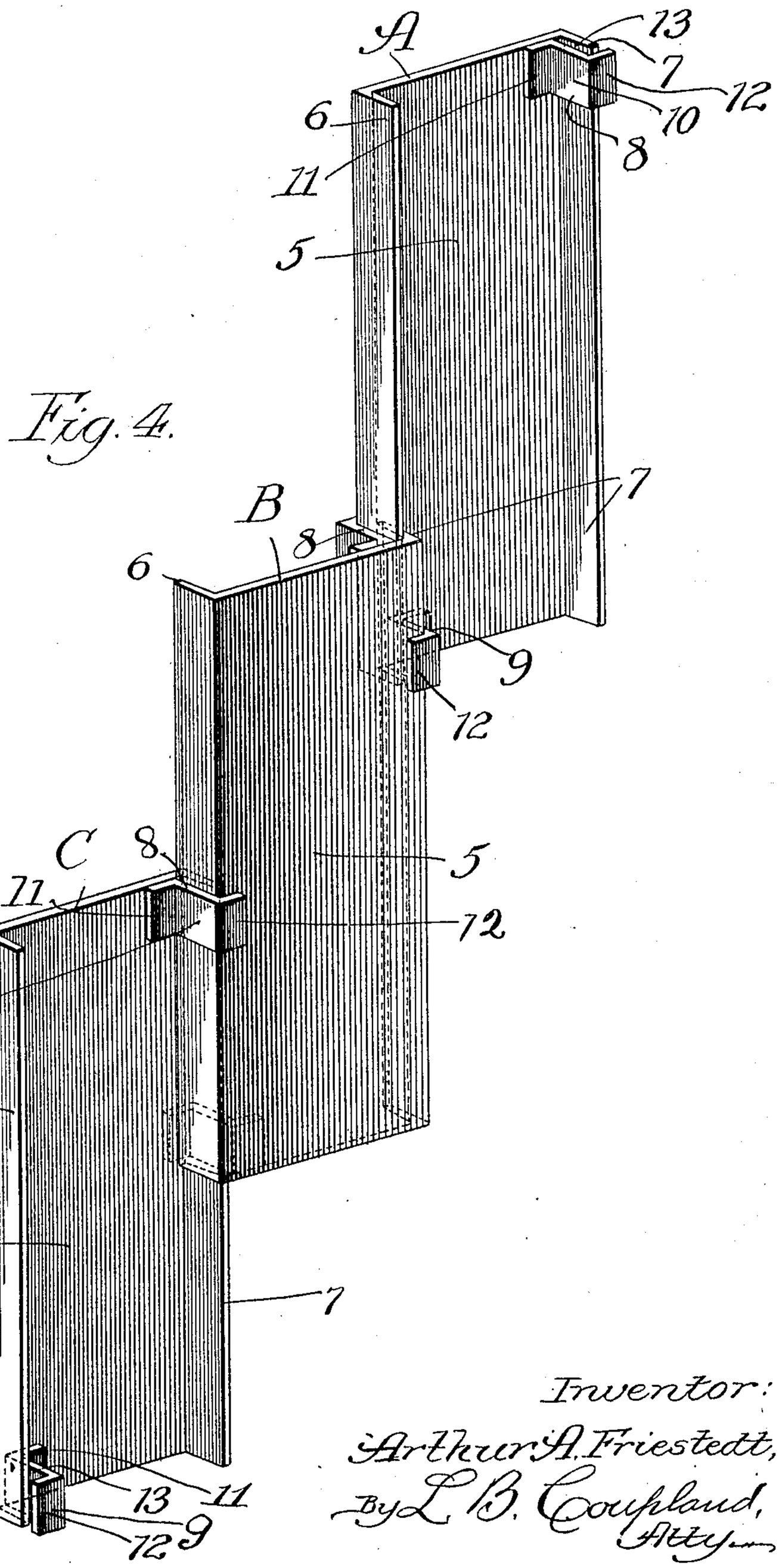

Fig. 4.

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UNITED STATES PATENT OFFICE.

ARTHUR A. FRIESTEDT, OF CHICAGO, ILLINOIS, ASSIGNOR TO LUTHER P. FRIESTEDT, OF CHICAGO, ILLINOIS.

SHEET-PILING.

No. 912,949. Specification of Letters Patent. Patented Feb. 16, 1909.

Application filed December 31, 1906. Serial No. 350,149.

To all whom it may concern:

Be it known that I, ARTHUR A. FRIESTEDT, citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sheet-Piling, of which the following is a specification.

This invention relates to metal sheet-piling of the rolled steel beam type, used in the construction of sea-walls, docks, wharves, coffer-dams, caissons, retaining-walls, sheeting for mine-shafts, bridge-pier foundations, and all similar work whether of a temporary or permanent character.

The object of this invention is to provide a sheet-piling in which the weight is greatly reduced, the cost of production proportionately lessened, and at the same time increasing the ease and facility with which the piling may be driven or withdrawn by diminishing the area of the surface having frictional contact.

Heretofore the practice has been to extend the interlocking or retaining guide means, the whole length of the beam-sections or units, no matter what the length might be, thus adding greatly to the weight, increasing the cost and rendering the operation of rolling more difficult, and in some forms or shapes impossible.

The advantages of the present invention will be better understood when it is known that the piling sections may run from twenty to sixty feet in length, in accordance with the requirements or character of the work.

The present invention entirely dispenses with the practice or requirement of a full length interlock or retaining means, and thereby reduces the weight, approximately from eight to ten pounds per square foot, lessening the cost of the product and making a great saving in transportation and handling.

In the drawings, Figure 1 is an elevation showing a number of piling-sections assembled in joint relation. Fig. 2 is a transverse section on line 2, Fig. 1, looking in the direction indicated by the arrow. Fig. 3 is a view in perspective of a single piling-section or unit; and Fig. 4 is a view in perspective showing a number of sections in relative progressive positions in the operation of driving.

The form of metal beams or piling sections, shown in the drawings and used in practical illustration, are of the standard channel type, but it is obvious that my invention may be employed in connection with other forms and fabrications either of a standard or special roll.

For convenience and clearness in description three piling-sections or units are shown in assembled relation and will be designated in their order as sections A, B and C. These sections are of the channel-beam form, comprising the usual web or body 5 and the edge flanges 6 and 7 turned at right angles thereto. These sections are usually assembled in the alternate relation shown, that is, the channel side of section A faces in one direction, the channel side of section B facing in the opposite direction, and the third section C facing in the same direction as section A, and so on in continuous order when assembled in a wall structure. This arrangement may be varied by changing the form and position of the interlocking device. The alternating disposition is however, preferred for the reason that the ordinary integral edge flanges 6 and 7 interlock against a lineal and to a certain extent against a lateral displacement.

The interlocking, retaining and guide means consists of companion angle-clips 8 and 9 mounted on the respective ends and diagonal corners of each section, as best shown in Fig. 3.

In referring to the piling-sections, the term upper and lower ends will be used in order to correctly locate the position of the locking clips, the clip 8 being mounted on the upper ends and the duplicate clip 9 on the lower ends of the respective sections. These clips are of a shape or contour like that of a Z-beam in cross-section and consist of the web-part 10 and the companion flanges 11 and 12, turned at right angles to the web-part but in opposite directions with reference to each other. In mounting the clips on the piling-sections, the flange 11 of each clip is rigidly secured, preferably to the channel side of the section and set inward far enough to provide a space 13 between the web-part 10 of the clips and the adjacent flanged edges of the piling sections for the convenient insertion and loose engagement of the next joining section, as shown in Figs. 2 and 4. In their assembled relation in a completed wall structure, the free flanges of the clips at the upper ends of the piling-sections overlap the corner and back of the joining section at one

side, and the free flanges of the clips on the lower ends and diagonal corners overlap the corner of the next joining section on the other side, as shown in Figs. 1 and 2. To be more explicit the free flange 12 of clip 8, rigidly secured to the middle section B, will overlap the corner and back of the next joining section C at the upper end, while the clip 9 rigidly secured to the lower diagonal corner of the same section B, will overlap the joining section A at the lower end, as shown in Fig. 1. The relative position of the clips on the opposite or inner side of Fig. 1, will be fully understood by reference to Fig. 2. Each pair of joining sections may be termed rights and lefts, that is the two clips on one section would be placed on diagonal corners as shown in Fig. 3. The next joining section on either side would have the clips on the diagonal free corner of Fig. 3 and so on alternately in continuous order. By this arrangement the assembled sections are held together against displacement in any direction except endwise.

In describing the operation of assembling and driving reference will be made to Fig. 4, which shows a reverse arrangement from that of Fig. 1, the two end sections having the channel side facing outward instead of inward and the middle section with the back outward. Supposing section C to have been driven into place, the next joining section is shown as having been driven about half ways and the section A just entered. It will be noted that the joining edge of section B has a clip on the lower joining corner as indicated by dotted lines. As the operation of driving progresses this clip follows closely along the corner edge and back of section C and prevents the driven end of section B from separating laterally or moving inward over the channel side of section C. At the same time the interlocked flanged edges of the two channel sections prevent lineal spreading. The clip at the upper end and on the opposite side having the same functions and retaining the sections in proper relative engagement. The lower clip moving down with the section being driven has the effect of clearing the way and reduces the pressure on the surface of the sections and lessens the friction in the operation of driving. These short locking clips may be located at any point between the respective ends of the piling sections and made in any shape corresponding to the particular form of beam section being used.

In assembling, the piling-sections telescope together endwise, but interlock edgewise.

Having thus described my invention, what I claim is—

1. A sheet piling-section having a clip mounted on each edge thereof and located relatively at each end.

2. A sheet piling-section having an interlocking guide-clip mounted on one end and edge and a companion clip mounted on the opposite end and edge thereof.

3. A sheet piling-section having a clip mounted on each end thereof and placed on the same side but not located in line with reference to each other.

4. A sheet piling-section having a clip mounted on one end thereof, a companion clip mounted on the opposite end, said clips being located on the same side of said section but not in line with each other.

5. A sheet piling-section having interlocking guide-clips mounted on each respective end, said clips being located on the same side of said section but positioned as on the opposite sides of a line running through the longitudinal center thereof.

6. A sheet piling-section having an interlocking guide-clip mounted on one end thereof, and a companion clip mounted on the opposite end, said clips being positioned relatively as at the end of a diagonal line.

7. A sheet-piling section, having an interlock and guide means mounted thereon and positioned with reference to each other as at the ends of a connecting diagonal line, and a joining piling section also provided with an interlock and guide means but located in opposite relation with reference to the interlocking means on the first named section.

8. A sheet-piling section, having an interlock and guide means mounted thereon, said means comprising companion clips having one end rigid and the other free and located as at opposite ends and diagonal corners, and a joining section also provided with companion clips mounted on the opposite diagonal corners with reference to the position of the clips on the first named section, whereby the joining sections are locked together at diagonal corners on opposite sides.

9. A beam or piling-section of the channel type having an interlocking guide-clip mounted on its respective ends and opposite edges so as to relatively position said clips as at the end of a diagonal line, a joining piling section in a reversed position and having interlocking guide-clips mounted on the respective ends but on the opposite edges relative to the position of the clips on the first named section whereby a plurality of sections may be assembled in continuous order.

10. A metal sheet-piling composed of rolled beam sections having engaging flanged edges and arranged alternately when assembled in a wall structure, and interlocking guide-clips mounted on the respective ends of said sections and positioned alternately as at the end of a diagonal line.

11. A metal sheet-piling composed of beam sections having flanged edges which loosely interlock when assembled in joint relation, and Z-clips mounted on said sec-

tions and located as at the opposite ends thereof and adapted to retain the same against displacement.

12. A metal sheet-piling composed of beam sections having flanged edges which loosely interlock when said sections are assembled in an alternately reversed position, and companion Z-clips mounted on the same side and opposite edge of each section in retaining the same against displacement.

13. A metal sheet-piling composed of beam sections adapted to loosely interlock when assembled alternately in joint relation, and clips mounted on the respective ends of each section and overlapping the edge of the next joining section in continuous order.

14. Sheet piling comprising beam sections provided with oppositely projecting coacting flanges, juxtaposed at each point, in combination with clips attached to said sections and arranged in pairs, each pair of clips having between them a pair of said flanges and permitting the sliding contact of said flanges with each other during driving.

15. Sheet piling comprising channel beam sections, assembled in alternating position relatively to each other, and clips arranged in pairs, each pair of clips having between them a pair of juxtaposed flanges of said sections and permitting the sliding contact of said flanges with each other during driving.

16. Sheet piling comprising beam sections, in combination with clips attached to said sections and arranged in pairs at or near the tops and bottoms thereof, each pair of clips having between it a juxtaposed pair of flanges of two sections and holding the joint together but permitting sliding contact of said flanges during driving.

17. Sheet piling comprising beam sections having parts overlapping each other, in combination with clips arranged in pairs, each pair of clips having two sections between them, but allowing sliding contact of the same during driving.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ARTHUR A. FRIESTEDT.

Witnesses:
L. B. COUPLAND,
G. E. CHURCH.