No. 725,608. PATENTED APR. 14, 1903.

H. WITTEKIND.

METAL SHEET PILING.

APPLICATION FILED FEB. 16, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

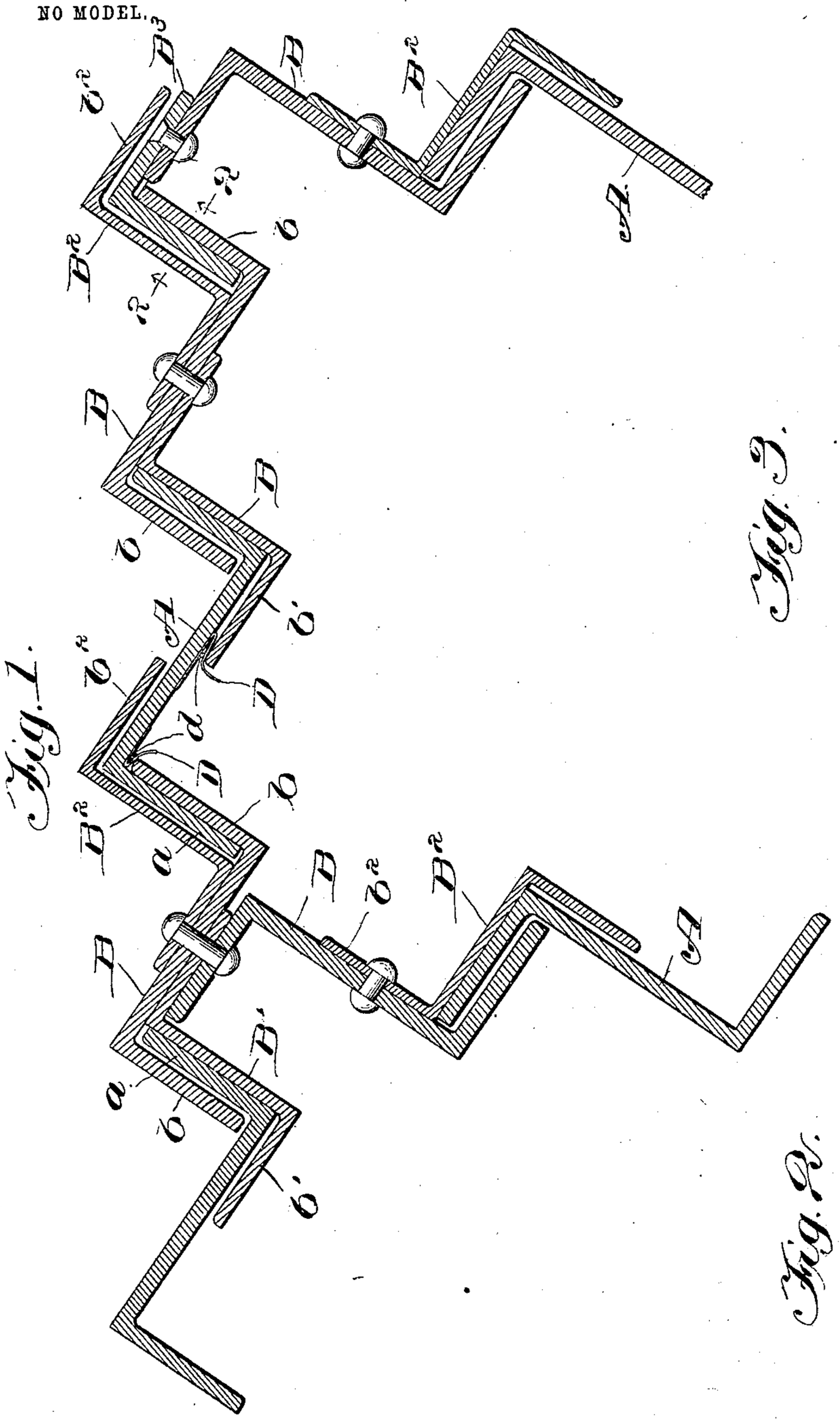


Fig. 3.

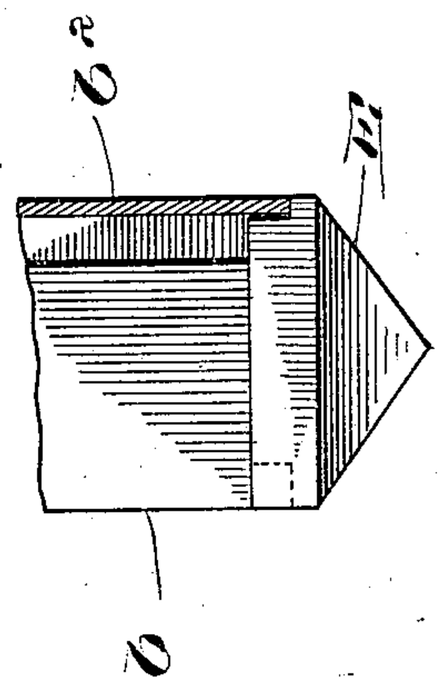
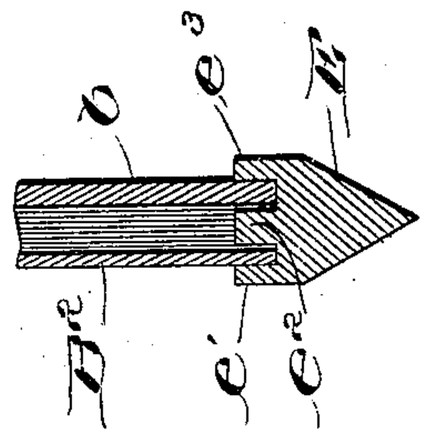


Fig. 2.



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METAL SHEET PILING.

APPLICATION FILED FEB. 16, 1903.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

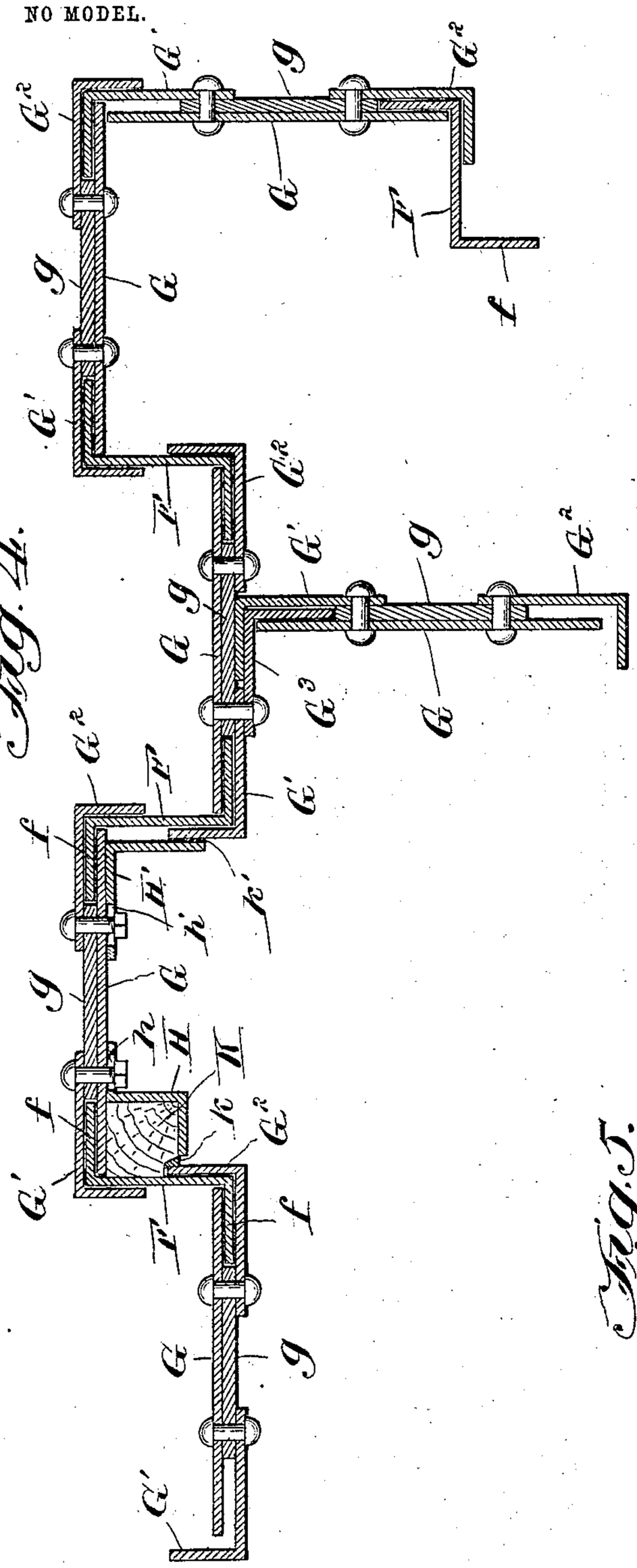


Fig. 6.

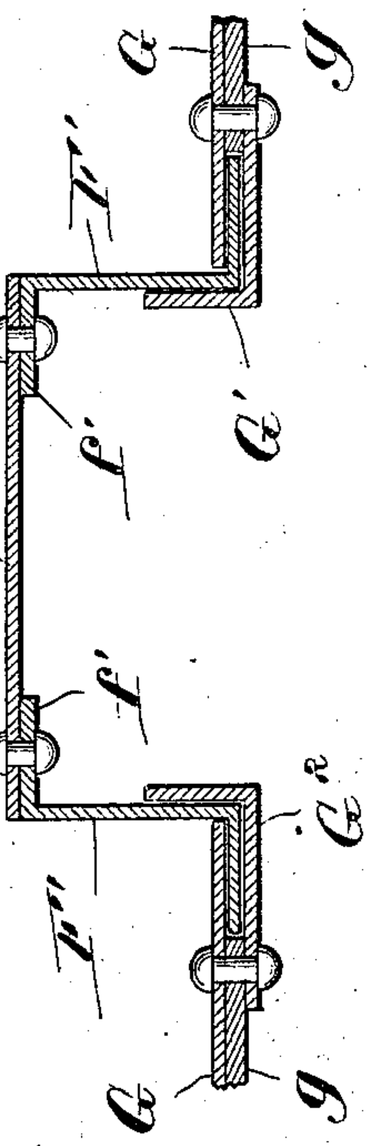
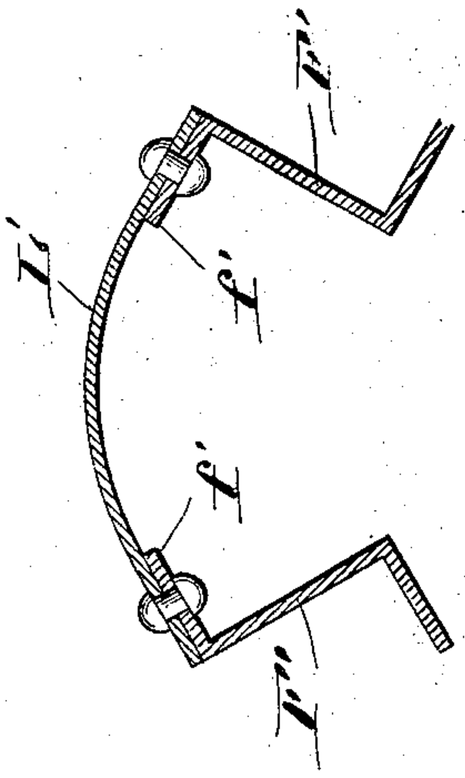


Fig. 5.



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UNITED STATES PATENT OFFICE.

HENRY WITTEKIND, OF CHICAGO, ILLINOIS.

METAL-SHEET PILING.

SPECIFICATION forming part of Letters Patent No. 725,608, dated April 14, 1903.

Application filed February 16, 1903. Serial No. 143,531. (No model.)

To all whom it may concern:

Be it known that I, HENRY WITTEKIND, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Metal-Sheet Piling; and I declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates in general to piling for use in constructing caissons, coffer-dams, &c., and in protecting earth excavation.

My invention more particularly relates to metal-sheet piling.

The primary object of my invention is to provide a metal-sheet piling in the construction of which standard rolled beams may be used, their edges being so interlocked as to permit the connection or separation of adjacent beams by relative longitudinal movement.

A further object of my invention is to provide a metal-sheet piling the sections of which may be readily interlocked as they are successively driven, so as to render the piling strong and waterproof.

A still further object of my invention is to provide a metal-sheet piling which will be simple in construction, strong in structure, and efficient in use.

My invention, generally described, consists in a series of interlocked sections capable of being separately driven, alternate sections consisting in Z-beams between which are located connecting-sections uniting the adjacent edges of the successive Z-beams.

My invention will be more fully described hereinafter with reference to the accompanying drawings, in which the same is illustrated as embodied in several convenient and practical forms, and in which—

Figure 1 is a horizontal sectional view through one form of my invention; Fig. 2, a detailed view showing a wedge for facilitating the driving of the compound section of my improved piling; Fig. 3, an elevational view of the wedge and a portion of a section of piling; Fig. 4, a horizontal sectional view of a modified embodiment of my invention; Fig. 5, a horizontal sectional view of a modification of one of the sections employed in the structure shown in Fig. 4, and Fig. 6 a horizontal sectional view of still another modification in a form of section used in the structure shown in Fig. 4.

Similar reference characters are used to indicate similar parts in the several figures of the drawings.

Reference-letter A designates a Z-beam of standard size. Interposed between the Z-beams A A are compound sections composed of three Z-beams riveted together. Such compound sections consist in a main Z-beam B of the same size as the Z-beam A and smaller size Z-beams B′ and B^2. The side portion b' of the Z-beam B′ is secured to the central portion of the large Z-beam B, while the side portion b^2 of the Z-beam B^2 is also secured to the central portion of the Z-beam B on the other side thereof from the Z-beam B′. Rivets C or bolts may be used for fastening the three Z-beams B, B′, and B^2 together. A channel is formed between the end portion b of the beam B and the central and one end portion of each of the beams B′ and B^2 to receive the end portions of the Z-beams A, located on either side of the compound section. In order that the corners may be formed between series of sections, it is only necessary to omit one of the smaller Z-beams of a compound section and in lieu thereof secure an angle-beam B^3 to one of the end portions b of the Z-beam B, as shown at the right in Fig. 1. The angle-beam fits within the channel formed at the end of a compound section constructed, as above described, of three Z-beams.

It is frequently necessary to provide dividing-partitions extending between opposite walls of the coffer-dam or other structure, and such a partition may be readily constructed by omitting one of the smaller Z-beams in a compound section and uniting an end portion b of the larger Z-beam B in such compound section directly to the intermediate portion of one of the compound sections in each of the opposing walls, as shown near the left in Fig. 1.

The structure which is to be formed by a

series of sections such as above described is constructed by first driving one section—for instance, a Z-beam A—and then driving a compound section composed of the three Z-beams, the compound section being interlocked with the Z-beam A, as clearly shown in Fig. 1. The end of the compound beam which surrounds the adjacent end portion of the Z-beam A is guided through its engagement with the previously-driven Z-beam; but in order to facilitate the penetration of the other end of the compound section into the earth a driving-point E is located beneath the same. Such driving-point may conveniently consist in a wedge-shaped portion provided at its upper end with parallel ribs e', e^2, and e^3, which form grooves for receiving the lower edges of the end portion b of the beam B and the intermediate portion of the beam B^2. The central rib e^2 on the driving-point fits within a channel formed between the beams B and B^2. The opposite ends of the ribs e' and e^3 are cut away, as indicated in Fig. 3, to extend beneath the side portion b^2 and the intermediate portion of the beam B at the end of the channel.

In order to render the structure water-tight, calking may be inserted on the inside of the structure between the ends of the compound sections and the adjacent surfaces on the Z-beam sections A. A sheet of tin D is preferably driven in ahead of the calking d, so as to facilitate the removal of the calking when it is desired to remove the sections constituting the structure.

In Fig. 4 I have illustrated a modified embodiment of my invention, in which the Z-beams F are arranged with their intermediate portions parallel and the side portions f on adjacent beams extending toward each other.

Compound sections interposed between the Z-beams are formed of a plate G and angle-beams G′ and G^2, secured thereto by any suitable means—such, for instance, as bolts or rivets. A filler-bar g is interposed between the plate G and the ends of the angle-bars G′ and G^2, thereby forming channels to receive the side portions of the adjacent Z-beams F.

In order that square or rectangular structures may be formed when sections such as shown in Fig. 4 are employed, it is merely necessary to interlock two compound sections together, as shown at the right in Fig. 4—that is, one of the angle-bars G′ of one section is received within the channel formed between the angle-bar G^2 and the end of the plate G in the other compound section.

In order that cross walls or partitions may be extended between opposing walls of a structure, an angle-bar G^3 is secured to one of the compound sections, preferably by having one edge thereof overlapping the inner edge of the angle-bar G′, as clearly shown in Fig. 4. A compound section may then be engaged with the angle-bar G^3 by receiving the same within the channel formed between the angle-bar G′ and the adjacent end of the plate G.

In lieu of employing a compound section such as described at both sides of the Z-beams a plate L, as shown in Fig. 6, may be secured to the side portions f' f' of the adjacent Z-bars F′ F′, thereby constituting a compound section composed of two Z-bars and the connecting-plate to engage within the channels formed between the plates G and angle-bars G′ and G^2. When it is desired to form a curved structure, as in the case of a round caisson, the plate rigidly united to the Z-bars F′ F′, as shown at L′ in Fig. 5, may be curved.

In order to prevent leakage between the compound sections and the Z-beams, an angle-beam H′ may be secured to the plate G in the compound sections by means of slots h', surrounding bolts, as shown in Fig. 4. The slots h' permit the angle-beam H′ to closely engage the side edge of the angle-beam G′ of the adjacent compound section, and by inserting calking k' a water-tight seam may be formed.

In lieu of the angle-beam H′ a Z-beam H of small section may be provided, as shown in Fig. 4, thereby forming a chamber within which is located a wooden strip K. A series of slots h are provided in one of the side portions of the Z-bar H, which permit of the adjustment of the Z-bar closely around the wooden strip. Calking k may then be inserted between the wooden strip and the adjacent side edge of the angle-beam G^2 of the adjoining compound section, thereby forming a water-tight seam.

From the foregoing description it will be observed that I have invented an improved sheet-metal piling composed, essentially, of Z-beams of standard size united at their adjacent edges by interposed sections.

In this application the compound section, composed of a plate and angle-beams secured thereto and extending around the ends thereof to form channels, is only claimed in combination with Z-beams the oppositely-extending flanges of which are received within the grooves or channels in the adjacent compound sections, and such compound section is claimed *per se* in my pending application, filed March 26, 1903.

While I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form, the proportion of parts, and the substitution of equivalents, as circumstances may suggest or render expedient, without departing from the spirit of my invention.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a metal-sheet piling the combination with a series of Z-beams, of sections interposed between the successive Z-beams, and

means for uniting the oppositely-extending flanges of the Z-beams and the adjacent edges of the intermediate sections.

2. In a metal-sheet piling, the combination with a series of Z-beams, of sections interposed between the successive Z-beams, and means secured to said interposed sections for detachably engaging the flanges of the adjoining Z-beams.

3. In a metal-sheet piling, the combination with a series of Z-beams, of sections interposed between the successive Z-beams having channels to receive flanges on the adjoining Z-beams.

4. In a metal-sheet piling comprising detachable sections, the combination with a series of Z-beams constituting alternate sections of the piling, of intermediate compound sections interposed between the successive Z-beams and having channels into which extend the side flanges of the adjoining Z-beams.

5. In a metal-sheet piling comprising detachable sections, the combination with a series of Z-beams constituting alternate sections of the piling, of intermediate compound sections interposed between successive Z-beams each composed of a plate and angle-beams spaces from the plate and extending around the side edges thereof to form channels to receive the side flanges of the adjoining Z-beams.

6. In a metal-sheet piling comprising detachable sections, the combination with a series of Z-beams constituting alternate sections of the piling, of intermediate compound sections interposed between successive Z-beams each composed of a plate, angle-beams extending around the side edges of the plate and filler-bars interposed between the plate and the angle-beams to form channels to receive the side flanges of the adjoining Z-beams.

7. In a metal-sheet piling comprising detachable sections, the combination with a series of Z-beams constituting alternate sections of the piling, of intermediate compound sections interposed between successive Z-beams each composed of a plate, angle-beams extending around the side edges of the plate and filler-bars interposed between the plate and the angle-beams to form channels to receive the side flanges of the adjoining Z-beams, and means for rendering water-tight the joints between adjacent sections of piling.

8. In a metal-sheet piling comprising detachable sections, the combination with a series of Z-beams constituting alternate sections of the piling, of intermediate compound sections interposed between successive Z-beams each composed of a plate, angle-beams extending around the side edges of the plate and filler-bars interposed between the plate and the angle-beams to form channels to receive the side flanges of the adjoining Z-beams, beams adjustably secured to said plates of the compound sections on the sides thereof opposite said angle-beams and overlapping the angle-beam on the adjoining compound section, and calking interposed between said adjustable beams and the adjacent surfaces of the adjoining compound sections.

In testimony whereof I sign this specification in the presence of two witnesses.

HENRY WITTEKIND.

Witnesses:
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