

No. 848,143.

PATENTED MAR. 26, 1907.

J. R. WEMLINGER.  
METAL SHEET PILING.  
APPLICATION FILED OCT. 6, 1906.

Fig. 1

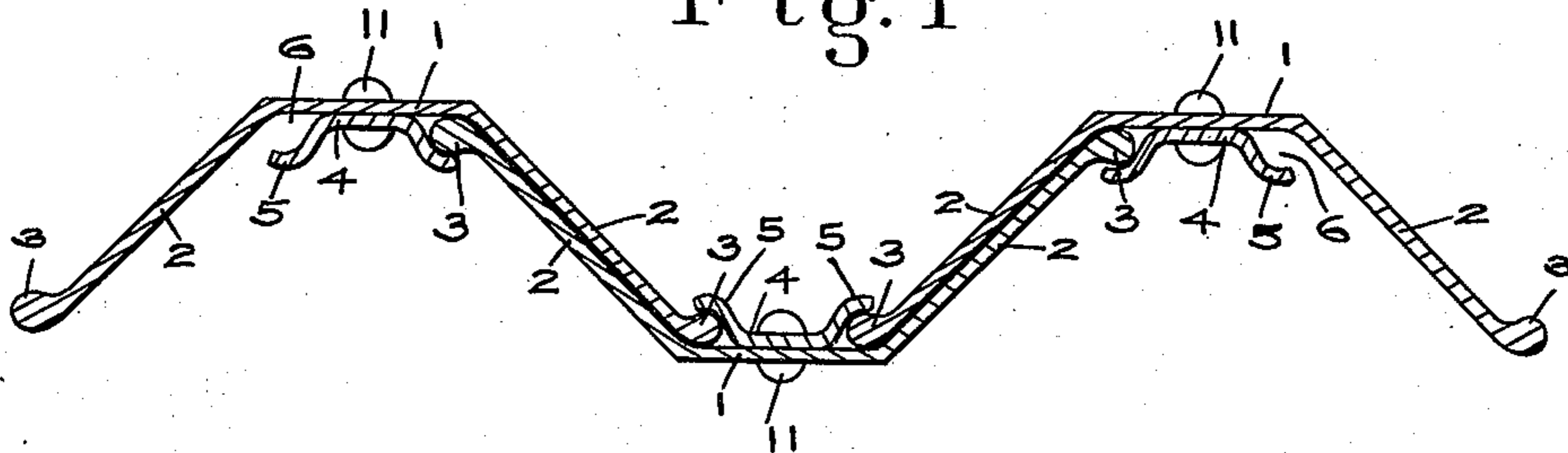


Fig. 2

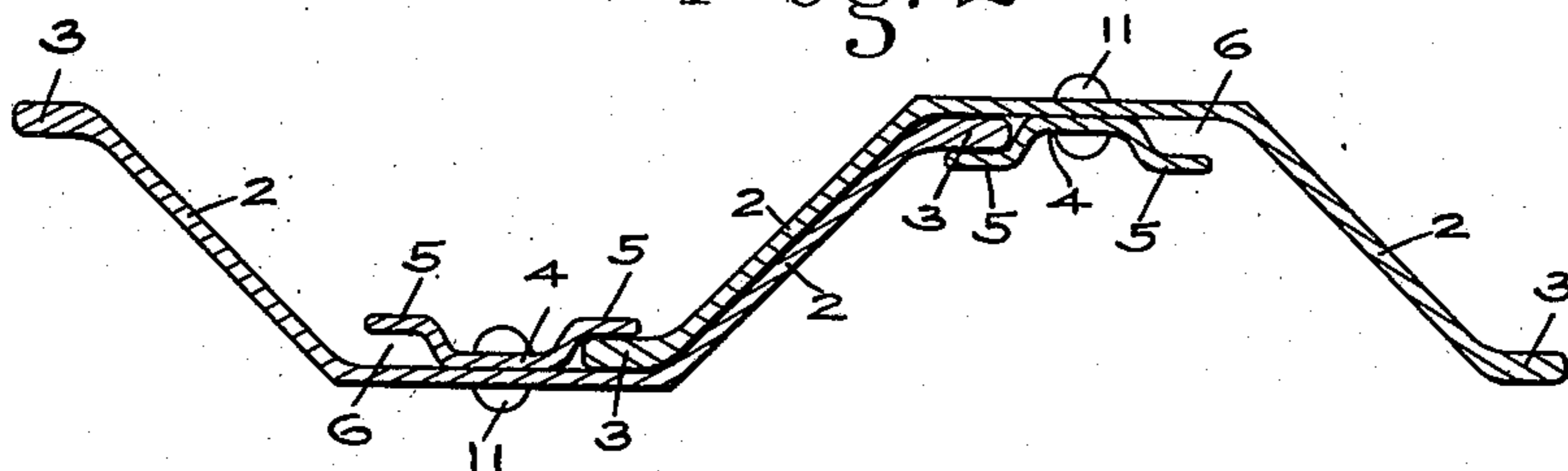
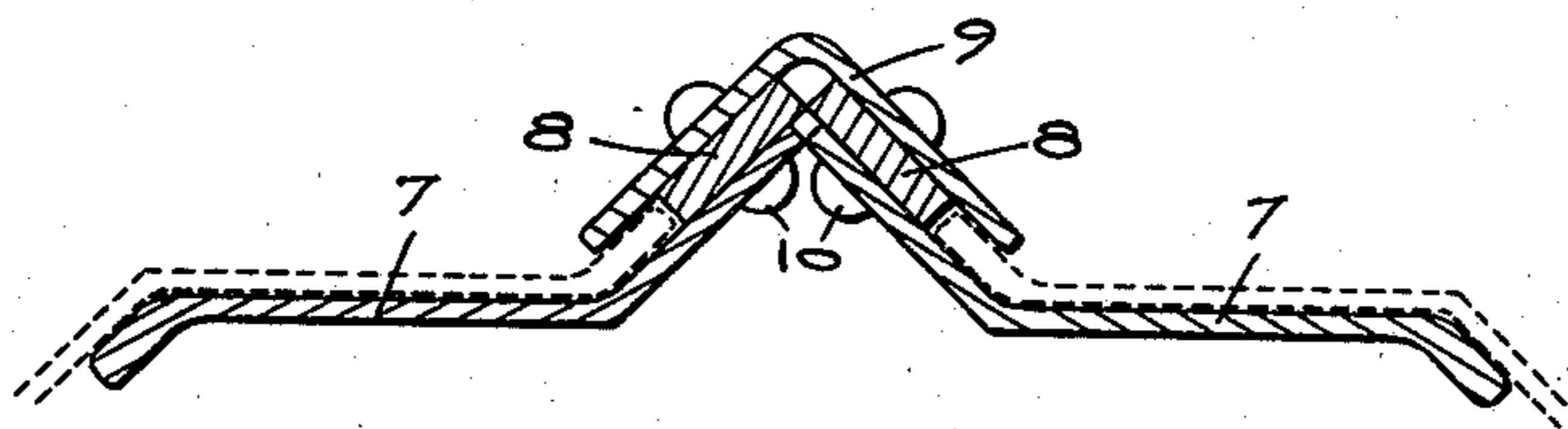


Fig. 3



Witnesses

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## METAL SHEET-PILING.

No. 848,143.

Specification of Letters Patent.

Patented March 26, 1907.

Application filed October 6, 1905. Serial No. 281,574.

*To all whom it may concern:*

Be it known that I, JULIUS R. WEMLINGER, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Metal Sheet-Piling, of which the following is a specification.

In the design of a unit for metal sheet-piling a very important, if not the most important, requisite is stiffness, because the unit must be so rigid that it may be driven through any ordinary material without buckling. This stiffness must be obtained without making the section unusually heavy; otherwise the cost of the material and that of its handling is prohibitive. Furthermore, it is important that all the units be such as may be easily manufactured and fabricated with the least possible number of parts, and it is advantageous to have all the units alike and interchangeable.

The structural shapes which have been and are used to a great extent in metal sheet-piling may have certain advantages; but these are more than offset by the ineffectiveness of said shapes for the work required of them and the higher cost due to excessive weight. These structural shapes are designed for an entirely different purpose from that of sheet-piling. For instance, a rolled channel, while very efficient and particularly designed to resist forces applied to it in a direction parallel to its web, is weak and inefficient when subject to forces applied to it in a direction perpendicular to its web, as will be readily understood by those familiar with the design of structures. Therefore in order to provide a strong and economical unit it is advisable and preferable to design a special section and one whose configuration is such that the wall of piling shall be as nearly as possible of uniform thickness. In cases where the piling is made up of units of different configuration and weight the strength of the wall of piling is of course limited to that of the weakest member, and it follows that in such a case there must be an excess of weight at the joints and in the heavier members.

I have found, by means of well-known calculations, that in trough shapes, such as shown in my application Serial No. 240,987 and in the present application, the bending moment with respect to the neutral axis parallel to the web is more than one hundred and fifty per cent. greater than the corresponding bending moment of a rolled channel and

nearly seventy per cent. greater than that of an I-beam, both of the same unit weight as the trough shape under consideration. Moreover, this remarkable excess of strength over the structural shapes named is not obtained at the expense of width of section, because in actual dimensions the trough-sections investigated are one and one-half ( $1\frac{1}{2}$ ) times as wide and of the same depth as the channel and nearly twice as wide and shallower than the flange width of the I-beam referred to. These trough shapes are therefore very rigid in driving and by reason of their arched section are well adapted to withstand the thrust of the material behind them. Furthermore, they are extremely easy to manufacture and can be rolled to their final shape as easily as any other standard structural shape.

Referring now to the annexed drawing, which forms part of this specification and in which like numerals refer to like parts; Figure 1 is a transverse section through a plurality of units joined together. Fig. 2 is a section similar to that of Fig. 1. Fig. 3 is a section of a corner-piece adapted to be used in connection with the units shown in Fig. 2.

Each unit of the sheet-piling is composed of a web 1, sides 2, and locking edges 3, which may be formed of a bulb or rib, as shown in Fig. 1, or a thick flange, as shown in Fig. 2, or any other marginal enlargement which will answer the purpose sought to be obtained.

The web 1 is arranged with a locking member 4, secured to the web by rivets 11 and having upturned edges 5, which form a space 6 for receiving and locking the edges 3 of the contiguous units as the piling is driven in the usual way. In this manner a very strong and effective joint between the separate units is obtained, while the locking edges 3 also serve to reinforce the edges of the members 2.

The great strength of all the units allows the use of much thinner metal than is required for other shapes. Furthermore, the locking edges 3, by reason of their comparative bulk, serve a valuable purpose in the rolling of these sections. It is well known that in rolling trough-shaped sections of thin metal it is difficult to keep the sides straight, because there is not enough material present to give the edges stiffness in their heated state, and for this reason the thick edges 3 are useful beyond their serving to lock the units together.

In Fig. 3 I have shown a corner-section, which may be used at the intersection of two

lines of the sheet-piling. This corner-section is composed of members 7, which may be part of the main sections of the piling, strips 8, and a corner-piece 9, all secured together by rivets 5 10, so that the whole can be driven in a manner similar to that used in driving the main units.

In the drawing I have shown units having diverging or inclined sides 2; but these may of course be made substantially parallel, if advantageous or preferred.

What I claim as new, and desire to secure by Letters Patent, is—

1. In metal sheet-piling, the combination of units having a web and sides, said sides having enlarged edges, means secured to said web for joining the said units together.

2. In metal sheet-piling, the combination of trough-shaped units, each having a web and sides, said sides having marginal enlargements, splices secured to said web for joining the said units.

3. In metal sheet-piling, units each having a flat web and sides, said sides being arranged with a marginal enlargement, means secured to said web for receiving and securing portion of the contiguous units.

4. In metal sheet-piling, the combination of units each having a flat web and sides, said sides being arranged with marginal enlargements, splices secured to said web adapted to lock the said units together.

5. In metal sheet-piling, the combination of units each having a flat web and sides, said sides having thick edges, splices secured to said web adapted to overlap and lock the said edges.

6. In metal sheet-piling, units each having a web and sides, said sides having thick edges,

splices secured to the webs of said units and formed of strips having locking-flanges. 40

7. In metal sheet-piling, units of trough shape each having a web and flaring sides, said sides having marginal enlargements, splices secured to said units and formed of strips having locking edges which overlap the said marginal enlargements. 45

8. In metal sheet-piling, the combination of trough-shaped units, each having thick edges and arranged so that the sides of contiguous units overlap each other over their entire widths. 50

9. In metal sheet-piling, the combination of trough-shaped units having ribbed edges and arranged so that the sides of contiguous units overlap each other. 55

10. In metal sheet-piling, units each having a web and diverging sides, said sides having marginal enlargements and arranged so that the sides of contiguous units overlap each other over their entire widths, splices secured to said units for locking the same together. 60

11. In metal sheet-piling, the combination of units each having a web and diverging sides, said sides having marginal enlargements and arranged so that the sides of contiguous units overlap over their entire widths, locking-pieces secured to the said units and each formed of a strip having edges which overlap the said marginal enlargements. 70

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

JULIUS R. WEMLINGER.

Witnesses:

ALFRED MÜLLER,  
LOUISE H. STAADEN.